Ancient Indian History & Archeology(M.Phil. & Ph.D)   (AIHCA)

1. Jorwe ware has
   - (A)   Red or orange matt surface
   - (B)   Red and green matt surface
   - (C)   Orange and blue matt surface
   - (D)   None of the above

2. *Lonakaras* were
   - (A)   Salt makers
   - (B)   Weavers
   - (C)   Liquor makers
   - (D)   Artisans

3. Khambat is identified with
   - (A)   Camp
   - (B)   Cambay
   - (C)   Cambodia
   - (D)   None of the above

4. Lingaraja is a
   - (A)   Triratha
   - (B)   Pancharatha
   - (C)   Saptaratha
   - (D)   Navratha

5. Dholavira attained the fully developed city scape in
   - (A)   Stage I
   - (B)   Stage II
   - (C)   Stage III
   - (D)   Stage I A

6. *Samarajni* denoted
   - (A)   A widow
   - (B)   Contemporary queen
   - (C)   Newlywed wife
   - (D)   None of the above

7. Barn yard is a variety of
   - (A)   Wheat
   - (B)   Rice
   - (C)   Gram
   - (D)   Millet

8   John Marshall relinquished theposition of Director-General of Archaeology in the year
    (A)   1926
    (B)   1931
    (C)   1924
    (D)   1928

9. Megasthenes described Pataliputra having the shape of a
    (A)   Parallelogram
    (B)   Square
    (C)   Rectangle
    (D)   Triangle

10. Ruins of Bharut stupa were discovered by
    (A)   A. Coller
    (B)   A. Cunningham
    (C)   John Marshall
    (D)   None of the above

11. Who authored the work *The Oxford Companion to Indian Archaeology?*
    (A)   Dilip. K. Chakrabarti
    (B)   R. Palmer
    (C)   Joseph Stalin
    (D)   Joseph Strayer

12. Agnimitra is referred to as the
    (A)   Viceroy at Vidisa
    (B)   Viceroy of Vidharbha
    (C)   Viceroy of Gwalior
    (D)   None of the above

13. The first site to be excavated by M. Wheeler
    (A)   Pataliputra
    (B)   Harappa
    (C)   Banawali
    (D)   Arikamedu

14. The text *Deshinamal*a was composed by
    (A)   Krish
    (B)   Hala
    (C)   Hemchandra
    (D)   Rampala

15. Sarasvati is locally known as
    (A)   Sarvat
    (B)   Sharvi
    (C)   Sarsuti
    (D)   Saras

16. Isampur is in
    (A)   Rajasthan
    (B)   Karnataka
    (C)   Delhi
    (D)   Gujarat

17. Who authored the work *A Study of Ancient Indian Numismatics*
    (A)   P. L Gupta
    (B)   J. Sayer
    (C)   S.K. Chakraborty
    (D)   Joseph R. Stayer

18. Prehistoric Rock paintings have been dated
    (A)   On the basis of colours used
    (B)   On the basis of artistic style
    (C)   On the basis of assemblage of microliths
    (D)   None of the above

19. Rupen valley is in
    (A)   North Gujarat
    (B)   Assam
    (C)   Bihar
    (D)   West Bengal

20. *Khila Kshetra* denotes
    (A)   Arable land temporarily kept fallow
    (B)   Aprada
    (C)   Aranya land
    (D)   Aprahata

21. Charudatta was a hero of
    (A)   *Dasakumaracharitam*
    (B)   *Mrihchhakatikam*
    (C)   *Ramcharita*
    (D)   None of the above

(3)

22. *Silappadhikaram* was composed by
   (A)   Sattanar
   (B)   Kovlam
   (C)   Ilango Adigal
   (D)   Kamandaka

23. Pithecanthropus Erectus had a brain case of
   (A)   750 cc
   (B)   550 cc
   (C)   1200 cc
   (D)   1000 cc

24. Skeleton of Lucy was discovered from
   (A)   Ethiopia
   (B)   Java
   (C)   India
   (D)   China

25. *n.p.* signifies
   (A)   No place
   (B)   No palace
   (C)   No pass
   (D)   None of the above

26. *fn* signifies
   (A)   Foot rest
   (B)   Footnote
   (C)   Foot case
   (D)   Foot print

27. *Passim* signifies
   (A)   Move up
   (B)   Move left side
   (C)   Here and there
   (D)   Pass information

28. *o.p.* signifies
   (A)   Out of print
   (B)   Operational
   (C)   Out of prism
   (D)   Paste

29. Who said ,"Historian speaks only with words"
    (A)   March Bloch
    (B)   E. H. Carr
    (C)   Lucien
    (D)   None of the above

30. Who is the author of the work *The Historian's Craft*
    (A)   E. Sjoberg
    (B)   S. Clark
    (C)   L. Mumford
    (D)   None of the above

31. Archival study means
    (A)   Data to be created
    (B)   Data already present
    (C)   Cost effective study
    (D)   All of the above

32. When one investigates relationship between his/ her study variables it is
    (A)   Descriptive study
    (B)   Correlational study
    (C)   Experimental study
    (D)   Data analysis

33. Hypotheses is to
    (A)   To test specific prediction
    (B)   Procedure to investigate
    (C)   Calculating the pattern
    (D)   None of the above

34. All quotations require a
    (A)   Bibliography
    (B)   Footnote
    (C)   Abbreviation
    (D)   An example

35. *et seq* signifies
    (A)   And the above
    (B)   And the following
    (C)   In the sequence
    (D)   In the place

36. *cap.* means
   (A)   Comment
   (B)   Capital
   (C)   Communicate
   (D)   Common

37. *.ital* means
   (A)   Italics
   (B)   Others
   (C)   Same
   (D)   Cited

38. Three Cs in research mean
   (A)   Coherence, Classification, Criticism
   (B)   Coherence, Conciseness, Clarity
   (C)   Character, Category, Clarity
   (D)   None of the above

39. In Qualitative research
   (A)   Small sample size is used
   (B)   Large sample size is used
   (C)   Numbers are used
   (D)   All of the above

40. *tr* means
   (A)   Transpose
   (B)   Translate
   (C)   Text
   (D)   Travel

41. "The authors last duty is the preparation of an index",
   (A)   J. Barzun and Henry Graff
   (B)   Henry Hammers
   (C)   Cadla Shree
   (D)   S. Shollock

42. *rom* means
   (A)   Reset in Roman
   (B)   Rewrite
   (C)   Omit Roman
   (D)   Insert comma

43. *stet* means
    (A)   Reset
    (B)   Let it stand as it is
    (C)   Insert hyphen
    (D)   Stands deleted

44. *bf* means
    (A)   Reset in bold face type
    (B)   Read
    (C)   Close space
    (D)   Start new para

45. Who authored the work *The Critical Method in Historical Research and Writing*
    (A)   A. Jackson
    (B)   Homer Hockett
    (C)   G. Renier
    (D)   W. Hancock

46. *N.B* signifies
    (A)   New Book
    (B)   Not Bold
    (C)   Please Note
    (D)   None of the above

47. The bibliography written in the form of an essay is
    (A)   Classical
    (B)   Critical
    (C)   Classified
    (D)   Select

48. Exploratory research studies are also called
    (A)   Arbitrary research
    (B)   Formulative research
    (C)   Rigid research
    (D)   All of the above

49. Construction of an artificial environment for research is
    (A)   Simulation research
    (B)   Arbitrary research
    (C)   Both A and B
    (D)   None of the above

50. Foot notes are of mainly
    (A)   5 kinds
    (B)   2 kinds
    (C)   7 kinds
    (D)   3 kinds

x-x-x

Anthropology (Ph.D.) (ANTH)

1. Which one of the following is a relative measure of variation?
   (A) Mean
   (B) Coefficient of variation
   (C) Chi-square
   (D) Standard deviation

2. Which one of the following is a probability sampling method?
   (A) Systematic sampling
   (B) Quota sampling
   (C) Snowball sampling
   (D) Purposive sampling

3. One way ANOVA is used
   (A) To compare the means of two or more than two groups
   (B) To test for linear trend
   (C) To compare several proportions
   (D) To compare ratio of two variants

4. "Goodness of fit" Test is also known as
   (A) T -test
   (B) ANOVA
   (C) Chi-square
   (D) Regression

5. What is the name of the conceptual framework in which the research is carried out?
   (A) Research Hypothesis
   (B) Research design
   (C) Synopsis of research
   (D) Research paradigm

6. A statistical technique showing relationship between two variables?
   (A) Regression
   (B) Correlation
   (C) Standard error
   (D) Standard deviation

7. Applied research is also called_____.
   (A) Analytical research
   (B) Empirical research
   (C) Contractual research
   (D) Qualitative research

8. First stage of research process is _____.
   (A) Identification of research problem
   (B) Review of literature
   (C) Research design
   (D) Data analysis

9. A null-hypothesis is _____.
   (A) When there is difference between the variables
   (B) Same as research hypothesis
   (C) Subjective in nature
   (D) When there is no difference between the variables

10. Non- sampling errors are introduced due to technically faulty observations or during the
_____.
  (A) Sequencing of data   (B) Processing of data
  (C) Collection of data   (D) Analysis of data

11. A research intends to explore the results of possible factors for the organization of effective mid-day meal interventions. Which research method will be most appropriate for this study?
  (A) Descriptive survey method   (B) Historical method
  (C) Ex- post facto method   (D) Experimental method

12. Which of the following is correct formula?
  (A) Mean-Mode = 3(Mean-Median)
  (B) Mean-Median = 3(Mean-Mode)
  (C) Mean-Median = 3(Mode-Mean)
  (D) Mean-Mode = 3 (Median-Mean)

13. Certain English and Latin abbreviations are quite often used in bibliographies and footnotes to eliminate tedious repetition. With this context match the following abbreviations with their full form. Use codes to answer.

Abbreviation	Full form
(a) ante.,	(i) enlarged
(b) cf.,	(ii) here and after
(c) Passion:	(iii) compare
(d) eng.,	(iv) before

Codes

	(a)	(b)	(c)	(d)
(A)	(iii)	(iv)	(i)	(ii)
(B)	(iii)	(ii)	(iv)	(i)
(C)	(i)	(ii)	(iii)	(iv)
(D)	(iv)	(iii)	(ii)	(i)

14. In which of the following methods the danger of losing sharpness of observation is possible because of too much familiarity?
  (A) Interview method   (B) Questionnaire method
  (C) Participant observation method   (D) Observation method

15. Sum of squares of deviations from a central tendency is called:
  (A) Mean deviation   (B) Variance
  (C) Standard deviation   (D) Deviation ratio

16. Which technique is used in quantitative methods on documents to reduce the possibility of impressionistic distortion?
    (A)   Content analysis   (B)   Case study
    (C)   Questionnaire   (D)   Observation

17. The focus on 'Imponderability of daily life' is the essential feature of?
    (A)   Focus group discussion   (B)   Structured interview
    (C)   Participant observation   (D)   Census

18. Which of the following is NOT formal experimental design?
    (A)   Completely randomized design
    (B)   Before -and- after without control design
    (C)   Latin square design
    (D)   Factorial design

19. Descriptive/ Diagnostic research studies do not include
    (A)   Probability sampling design
    (B)   Pre-planned design for analysis
    (C)   Advanced decisions about operational procedures
    (D)   Non-probability sampling design

20. Among the following conditions, which statements should be satisfied before x^2 can be applied?
    (a) Observations recorded and used are collected on a random basis.
    (b) The overall number of items must also be reasonably small
    (c) All the items in the sample must be independent
    (d) The constraints must be linear

    Codes

    (A)   Only (a) and (d)
    (B)   Only (a), (c) and (d)
    (C)   Only (b) and (c)
    (D)   Only (b), (c) and (d)

21. The important parametric tests are
    (a) z-test   (b) t-test
    (c) F-test   (d) Rosenzweig test

    Codes
    (A)   Only (d)
    (B)   Only (a) and (b)
    (C)   Only (c) and (d)
    (D)   Only (a), (b) and (c)

22. Match the following terms (List-I) with their meaning (List-II)

	List-I		List-II
(a)	Kurtosis	(i)	The measure of flat-topped ness of a curve
(b)	Mesokurtic	(ii)	A bell shaped curve or the normal curve
(c)	Platykurtic	(iii)	Curve is more flat than the normal curve
(d)	Leptokurtic	(iv)	Curve is relatively more peaked than the normal curve

Codes

	(a)	**(b)**	**(c)**	**(d)**
(A)	(i)	(ii)	(iii)	(iv)
(B)	(iv)	(iii)	(ii)	(i)
(C)	(i)	(ii)	(iv)	(iii)
(D)	(iii)	(iv)	(ii)	(i)

23. Which among the following statements regarding difference between survey and experiment, are NOT correct?

(A) Surveys are usually appropriate in case of social and behavioural sciences whereas experiments are mostly an essential feature of physical and natural sciences.

(B) Surveys are conducted in case of descriptive research studies whereas experiments are a part of experimental research studies

(C) Surveys provides methods of hypothesis testing whereas experiments are concerned with hypothesis formulation and testing the analysis of relationship between non-manipulated variables

(D) In surveys, variables that exist or have already occurred are selected and observed whereas experimental research provides a systematic and logical method for answering the question.

24. Uni-dimensional analysis include
(i) Measure of central tendency
(ii) Measure of dispersion
(iii) Measure of skewness
(iv) Two-way ANOVA

Codes
(A) (i), (ii) and (iv)
(B) (i), (ii) and (iii)
(C) Only (i) and (ii)
(D) Only (ii) and (iv)

25. The pictorial techniques include_____. Chose correct code.
    (i) Word association tests
    (ii) Rosenzweig test
    (iii) Rorschach test
    (iv) Thematic appreciation test

    Codes
    (A)   Only (i), (ii) and (iv)
    (B)   Only (ii), (iii) and (iv)
    (C)   Only (iii) and (iv)
    (D)   Only (i) and (ii)

26. Who among the following belongs to American Evolutionary School?
    (A)   E.B. Tylor   (B)   H.J.S. Maine
    (C)   L.H. Morgan   (D)   V.G. Childe

27. In which tribe marriage by probation is observed?
    (A)   The Gond   (B)   The Bhil
    (C)   The Kuki   (D)   The Kadar

28. Which of the following site had yielded evidence of Pit dwelling?
    (A)   Inamgaon   (B)   Utnur
    (C)   Bhimbetka   (D)   Burzahom

29. The central reference point from which all relationships can be traced on a genealogical diagram, is
    (A)   Id   (B)   Ego
    (C)   Centrum   (D)   Super ego

30. Robert Redfield's concept of "Folk-urban continuum" is based on his study of four communities – a city, a town, a peasant society and a folk or simple society. Identify these four communities and arrange them in correct sequence to depict the folk-urban continuum.
    (A)   Chankom – Marida – Tuski – Diztas
    (B)   Tuski – Chankom – Diztas – Marida
    (C)   Diztas – Tuski – Chankom – Marida
    (D)   Marida – Diztas – Chankom – Tuski

31. Which among the following is an upper Palaeolithic site of India?
    (A)   Vadamadurai   (B)   Birbhanpur
    (C)   Adamgarh   (D)   Renigunta

32. Identify the correct sequence of the following given by George James Frazer:
    (A)   Magic – Religion – Science   (B)   Religion – Science –
    Magic
    (C)   Science – Religion – Magic   (D)   Religion – Magic –
    Science

33. In which state the site Hathnora is located ?
    (A)   Bihar   (B)   Orissa
    (C)   Uttar Pradesh   (D)   Madhya Pradesh

34. Who formulated the doctrine of 'the psychic unity of mankind'?
    (A)   L.H. Morgan   (B)   E.B. Tylor
    (C)   Kenneth Pike   (D)   Adolf Bastian

35. The concept that behaviour in a society should be evaluated in terms of society's own
    cultural values is known as:
    (A)   Revivalism   (B)   Configurationism
    (C)   Ethnocentrism   (D)   Cultural relativism

36. Arrange the sequence in **ascending order** the advent of the following religions in
    India:
    (A)   Sikhism →Islam →Buddhism→Christianity
    (B)   Islam→ Sikhism →Christianity→Buddhism
    (C)   Buddhism→Christianity→Islam→Sikhism
    (D)   Christianity→Islam→Buddhism→Sikhism

37. Match the items in List-I with the items in list -II. Use codes given below
          List-I   **List-II**
    (a) Community Development Programme   (i)Vth Five-Year Plan
    (b) Tribal sub-plan   (ii) IIIrd Five-Year plan
    (c) Tribal Cooperative Marketing   (iii) Ist Five- Year plan
        Development Federation of India
    (d) Tribal Development Block   (iv) VII th Five- Year Plan

    Code:

          (a)   **(b)**   **(c)**   **(d)**

    (A)   (i)   (ii)   (iii)   (iv)

    (B)   (iv)   (iii)   (ii)   (i)

    (C)   (iii)   (i)   (iv)   (ii)

    (D)   (iii)   (i)   (ii)   (iv)

(6)

38. A belief in souls is called:
(A)   Animism   (B)   Animatism
(C)   Animation   (D)   Supernaturalism

39. A cultivation technique in which an area of forest is cut down, and then burned for crop production is known as:
(A)   Horticulture   (B)   Shifting agriculture
(C)   Irrigation agriculture   (D)   Settled agriculture

40. Who said 'civilization is the complex structure of great and little traditions'?
(A)   Mckim Marriot   (B)   B. Cohn
(C)   Robert Redfield   (D)   Milton Singer

41. A book named "Folklore in the Old Testament", published in 1918, was written by:
(A)   George Peter   (B)   Max Weber
(C)   James George Frazer   (D)   Spencer

42. The term Emic refers to:
(A)   Ethnocentric perspective   (B)   Outsider's perspective
(C)   Value-neutral perspective   (D)   Insider's perspective

43. The approach utilized in Anthropology that integrates a wide variety of disciplines in the study of human behaviour is:
(A)   Totalistic approach   (B)   Holistic approach
(C)   All encompassing approach   (D)   Comprehensive approach

44. In which year the First Public Notification on the 'Scheduled Tribes' was issued?
(A)   1950   (B)   1951
(C)   1952   (D)   1953

45. Match an item in List – I with an item in List – II. Select the correct answer by using the code given below:

List – I   List – II

(Tool Type)   (Techniques of Manufacture)
(a) Handaxe   (i) Pressure flaking
(b) Blade   (ii) Polishing
(c) Laurel leaf Point   (iii) Punch
(d) Celt   (iv) Acheulian

Codes:

	(a)	(b)	(c)	(d)
(A)	(iv)	(iii)	(i)	(ii)
(B)	(ii)	(i)	(iii)	(iv)
(C)	(i)	(ii)	(iv)	(iii)
(D)	(iii)	(iv)	(ii)	(i)

(7)

46. One of the oldest known Neolithic site in India is:
   (A)   Bagor   (B)   Sarai-Nahar-Rai
   (C)   Chirand   (D)   Lahura Deva

47. "Rites of Passage" refers to
   (A)   Life crisis rituals   (B)   Rituals performed for
ancestors
   (C)   War rituals   (D)   Village rituals

48. Which of the following are protective provisions for Scheduled Tribes as per the
   Indian Constitution?
   (i) Article 15(4), 16(4) and 23
   (ii) Article 46 and 164
   (iii) Article 332
   (iv) Article 340

   Codes:
   (A)   (i), (ii) and (iv)
   (B)   (ii), (iii) and (iv)
   (C)   iii), (iv) and (i)
   (D)   (i), (ii), and (iii)

49. Those aspects of society that are considered ordinary, having no special religious
   significance, is known as:
   (A)   Profane   (B)   Sacred
   (C)   Secular   (D)   Spiritual

50. Identify the correct instrumental sequence as per Malinowski.
   (A)   Cooperation or Tradition – Object – Technique – Context of situation
   (B)   Context of situation – Cooperation or Tradition – Technique – Object
   (C)   Technique – Object – Context of situation – Cooperation or Tradition
   (D)   Object – Technique – Cooperation or Tradition – Context of Situation

x-x-x

(Art History & Visual Arts)

1. Who is the author of *Prehistoric Rock Paintings of Bhimbetka*?
   (A) Mulk Raj Anand
   (B) Yashodhar Mathpal
   (C) Anand K. Coomaraswamy
   (D) None of the above

2. Bharut Stupa Gallery has been set up at?
   (A) National Museum, Delhi
   (B) Indian Museum, Kolkata
   (C) Dharohar Museum
   (D) None of the above

3. Who is the author of the *Indian Painting: The Great Mural Tradition*?
   (A) Mira Seth
   (B) B. N. Goswamy
   (C) A. L. Basham
   (D) None of the above

4. The doctrine of *Wahdat -al- Wujud* in Islam symbolizes
   (A) Unity of existence
   (B) Love
   (C) Purity
   (D) All of the above

5. Akbar's palace city was
   (A) Delhi
   (B) Fatehpur Sikri
   (C) Jodhpur
   (D) Panipat

6. Identify *Vesara* style temples
   (A) Mahadev temple Ittagi
   (B) Osian temple Jodhpur
   (C) Vaikanthaperumal temple Kanchi
   (D) Samaleswar temple Samaleswari

7. Which deity is also known as *Tripurantaka*
   (A) Vishnu
   (B) Balaram
   (C) Shiva
   (D) None of the above

8. Painting "Joy of Life" is by
   (A) Matisse
   (B) Derain

(C) Vlaminck

(D) Ritsder

9. Bichtir was in the court of
   (A) Muhammad Salim
   (B) Aurangzeb
   (C) Akbar
   (D) None of the above

10. The portrait of Dying Man during the reign of Jahangir was drawn by
    (A) Mansur
    (B) Bichtir
    (C) Dara
    (D) None of the above

11. Jagmohan served as the
    (A) *Mandapa*
    (B) *Garbhgriha*
    (C) *Pradakshinapath*
    (D) None of the above

12. Madhubani style of folk painting is popular in which state
    (A) Bihar
    (B) Haryana
    (C) Rajasthan
    (D) Jammu

13. Nakul Sahadeva ratha at Mahabalipuram has a
    (A) Circular plan
    (B) Rectangular plan
    (C) Oval plan
    (D) Apsidal plan

14. *Three Women* was painted by
    (A) Satish Gujaral
    (B) Amrita Shergill
    (C) Ravi Verma
    (D) None of the above

15. *Panchayatana* temple has
    (A) Five shikharas
    (B) Five additional temples around a main temple
    (C) Four temples around a main temple
    (D) None of the above

16. The " Gates of Paradise" in the Florence Bapistery are by
    (A) Ghiberti
    (B) Donatello
    (C) Michelangelo
    (D) None of the above

17. The Realistic Manifesto was written by
    (A) Naum Gabo
    (B) C. Pevsner
    (C) Naum Cuba
    (D) D. Pevs

18. *Asthabhadra* is a term used for
    (A) Vesara style temples
    (B) Rock cut mandapas
    (C) Image made of mixture of different metals
    (D) Name of a tribal deity

19. The Harrapan site of Banawaliis located in
    (A) Punjab
    (B) Haryana
    (C) Rajasthan
    (D) Gujarat

20. Who is associated with "Bunk art series"
    (A) Eduardo Paolozzi
    (B) Roserr Paro
    (C) Christiana Tero
    (D) None of the above

21. Krishna Reddy was born in
    (A) Chitoor
    (B) Poona
    (C) Kolkata
    (D) None of the above

22. M. F. Hussain died in
    (A) Africa
    (B) England
    (C) Canada
    (D) India

23. *Harmika* is associated with a
    (A) Stupa
    (B) Vihara
    (C) Temple
    (D) None of the above

24. *Japji* means a
    (A) Panth
    (B) God or spiritual guru
    (C) Administrator
    (D) Soldier

25. Brihdeshvara temple was built by
    (A) Arumolivarman
    (B) Prantaka I
    (C) Rajendra
    (D) None of the above

26. *Cf.* means
    (A) Compare
    (B) Cut
    (C) Contrast
    (D) None of the above

27. When same source is cited
    (A) Opcit is used
    (B) Ibid is used
    (C) Supra is used
    (D) Sic is used

28. SPSS is
    (A) Statistical package for society
    (B) Statistical package for social science
    (C) Statistical package for a scholar
    (D) Social package for social scientist

29. Ordinal data is a type of data
    (A) Having no numbers
    (B) Having numbers
    (C) Focused interviews
    (D) None of the above

30. ff symbolizes
    (A) Following pages
    (B) To follow
    (C) Forward
    (D) None of the above

31. et al is used for
    (A) More than one author
    (B) More than two authors
    (C) One author
    (D) None of the above

32. *l. c.* means
    (A) Lower case
    (B) Same author
    (C) Lower text
    (D) Shift

33. Collation is
    (A) Way to verify complex fact
    (B) To add
    (C) To compare
    (D) None of the above

34. Qualitative research method includes
    (A) Photo ethnography
    (B) Cause and effect
    (C) Telephone survey
    (D) None of the above

35. Random sampling is done by
    (A) 5 Techniques
    (B) 4 Techniques
    (C) 2 Techniques
    (D) 3 Techniques

36. Positive paradigm is
    (A) Associated with Quantitative method
    (B) Associated with Qualitative method
    (C) Paradigm shift
    (D) None of the above

37. Ontological question in research are
    (A) Related to nature of reality
    (B) Related to personality
    (C) Related to environment
    (D) None of the above

38. GDPR stands for
    (A) General Data Protection Regulation
    (B) General Data Personal Regulation
    (C) Get Data Pack Registered
    (D) All of the above

39. *Social Research Methods* is authored by
    (A) F. Fink
    (B) A. Bryman
    (C) G. Thomas
    (D) A. Bluman

40. For Quantitative research the best data is
    (A) Scale Data
    (B) Categorical Data
    (C) Ordinal Data
    (D) All of the above

41. Exploratory Research Designs are
    (A) Inductive
    (B) Secret
    (C) Specific
    (D) Both A and C

42. The abbreviation *Supra* signifies in research
    (A) Above
    (B) Below
    (C) Parallel
    (D) None of the above

43. Catherine Dawson authored
    (A) Practical Research Methods
    (B) Research Manual
    (C) Research Guide
    (D) Methods of Research

44. It is an Online Survey tool
    (A) Survey monkey
    (B) Quasi art
    (C) Likert survey
    (D) None of the above

45. Three types of data
    (A) Scale, Continuous scale and Nominal
    (B) Ordinal , Categorical and Nominal
    (C) Scale, Ordinal and Categorical
    (D) None of the above

46. Action Research is
    (A) Quantitative
    (B) Qualitative
    (C) Mixed
    (D) None of the above

47. The Citation style
    (A) London Style
    (B) Harvard Style
    (C) Chicago Style
    (D) Both B and C

48. Generally note taking is of
    (A) 5 Types
    (B) 2 Types
    (C) 1 Type
    (D) None of the above

49. Bibliography is mainly of
    (A) 5 Types
    (B) 3 Types
    (C) 6 Type
    (D) None of the above

50. The Unpublished Ph.D thesis is cited in
    (A) Italics
    (B) In Capital
    (C) In Small
    (D) None of the above

x-x-x

Biotechnology Engineering(Ph.D.) (BT-E)

1. Which of the following gene from the bacterium *Bacillus thuringiensis* is most commonly used for generating transgenic crops, identify the correct answer.

   (A) Cry
   (B) Epsps
   (C) Lyc
   (D) Ara

2. The bands in an electrophoretogram can be located and identified using following methods, except.

   (A) Coomassie brilliant blue staining
   (B) Fluorescent transillumination
   (C) Autoradiography
   (D) NMR spectroscopy

3. Most of the vertebrate genes have ATG as the translation start site and a uniquely conserved flanking sequence called as,

   (A) Kozak sequence
   (B) Shine-Dalgarno sequence
   (C) Homeo-box
   (D) Pribnow box

4. You have been provided with a sample test tube. The spectrophotometric evaluation of the sample provided the data, Q=OD(260nm)/OD(280nm)=1.8. The sample in the test-tube is one of the following macromolecules

   (A) Protein
   (B) Carbohydrates
   (C) Lipid
   (D) Deoxy ribonucleic acid

5. The high affinity Ni^{2+} ions used in affinity chromatography binds proteins at which of the amino acids.

   (A) Serine
   (B) Cysteine
   (C) Histidine
   (D) Leucine

6. All of the following bioinformatics tools can be used for analysis and visualization of tertiary structure of proteins, except one. Identify which one.

   (A) Pymol
   (B) Rasmol
   (C) Sequest
   (D) SPDB viewer

7. The cyclic phosphorylation and dephosphorylation of a protein is a common cellular mechanism for regulating protein activity.The following set of amino acids participate in this process.

   (A) Serine, Lysine and Threonine
   (B) Serine, Lysine and Tyrosine
   (C) Serine, Tyrosine and Threonine
   (D) Serine, Lysine and Tyrosine

8. The ampholytes exhibit all the properties listed below, except one. Identify the false statement.

   (A) These are synthetic in nature
   (B) These are heteropolymers of oligoamino and oligocarboxylic acids
   (C) They exhibit poor buffering power
   (D) When a mixture of ampholytes is placed in an electric field, they can generate a gradient of pI

9. The Hybridoma technology exclusively uses HAT medium as a growth medium. In this medium Aminopterin is included because of the reason mentioned below. Identify the correct answer.

   (A) It inhibits the Hypoxanthine phosphoribosyl transferase activity
   (B) It inhibits the Hypoxanthine-guanine phosphoribosyl transferase activity
   (C) It inhibits the Methylene tetrahydrofolate reductase activity
   (D) It inhibits the Dihydrofolate reductase activity

10. The DNA sequencing method by chain termination method requires multiple amounts of single stranded DNA. This is done by using which of the following vector systems.

   (A) Lambda bacteriophage
   (B) M13 bacteriophage
   (C) pBR322
   (D) pUC 19

11. Glycosylation is a key modification of proteins, especially in cell transformation and tumorigenesis. Two main points of attachment of glycosylation to proteins are

   (A) N-linkage of threonine and O-linkage at serine or asparagine
   (B) N-linkage of serine and O-linkage at asparagine or threonine
   (C) N-linkage of asparagine and O-linkage at serine or threonine
   (D) N-linkage of serine or threonine or O- linkage at asparagine

12. Which of the following statements is not true for ribosomal RNA. Select the false statement.

   (A) rRNAs acquires a secondary as well as tertiary structure
   (B) Folding is driven by hydrophobic interactions
   (C) It has double helical stems and single stranded loop structures
   (D) rRNA also has nonstandard base pairs and modified nucleosides

(2)

13. During the elongation step of translation two amino acids attached to two tRNAs are aligned to interact chemically to form a peptide bond. One of the statements listed below is incorrect for this phenomenon, Identify which one.

(A) Peptide bond formation occurs spontaneously without input of energy.
(B) Peptide bond formation is accomplished as amine -nitrogen of amino acid in A site carries out a nucleophilic attack.
(C) The reaction is carried out by peptidyl transferase enzyme.
(D) The enzyme peptidyl transferase is proteinaceous in macromolecular nature.

14. Researcher isolated a novel enzyme from moong bean. Calculate the reaction velocity of this enzyme catalysed reaction when the substrate concentration [S] was 0.125 mM, the maximal velocity (Vmax) of the reaction was observed to be 2.5 $nM.s^{-1}$, having K_M of 0.5 mM;

(A) $0.005 nM.s^{-1}$
(B) $0.05\ nM.s^{-1}$
(C) $0.5\ \ nM.s^{-1}$
(D) $5.0\ \ nM.s^{-1}$

15. The conversion of L-threonine to L-isoleucine is catalyzed by a sequence of five Enzymes. The first step in this sequence is inhibited by isoleucine, the product of this pathway. This is an example of which type of inhibition, identify the correct answer.

(A) Homotropic allosteric inhibition
(B) Heterotropic allosteric inhibition
(C) Competitive inhibition
(D) Mixed inhibition

16. Some of the immune system related cells have been listed with their functions. Match the correct options

	Cells		Function
a	Macrophages	i	Produce antibodies
b	B-lymphocytes	ii	Secrete cytokines
c	Cytotoxic killer cells	iii	Ingest cells by phagocytosis
d	Helper T cells	iv	Interact with infected host cells

(A) a (i), b(ii), c (iii), d(iv)
(B) a (ii), b(i), c (iv), d(iii)
(C) a (ii), b(i), c (iv), d(iii)
(D) a (iii), b(i), c (iv), d(ii)

17. Antibiotics arethe most commonly used selective agents in biotechnology laboratories. Match the antibiotic with correct functiondescription.

	Antibiotic		Function description
a	Ampicillin	i	Inhibits cell wall formation
b	Kanamycin	ii	Binds 30S subunits, prevents translocation A->P

| c | Streptomycin | iii | Blocks protein initiation complex, causes misreading |
| d | Tetracycline | iv | Prevents bonding of aminoacyl tRNA to 30S subunits |

(A) a (i),b(ii),c (iii),d(iv)
(B) a (ii),b(i),c (iv),d(iii)
(C) a (ii),b(i),c (iv),d(iii)
(D) a (iii),b(i),c (iv),d(ii)

18. A mutant that is unable to synthesize an essential metabolite and hence the metabolite must be provided as a nutritional supplement for growth is called as

(A) Chemotroph
(B) Myxotroph
(C) Auxotroph
(D) Diazotroph

19. Two genetic conditions appearing to be inherited together are termed as.

(A) Conjugative functions
(B) Cotransfection
(C) Comorbid
(D) Cosegregation

20. Full form for the acronym BLAST, a computer program for determining a match between a query sequence and sequences in a database.

(A) Basic Long Alignment Search Tool
(B) Basic Local Alignment Search Tool
(C) Basic Long Alignment Sequence Tool
(D) Basic Local Alignment Sequence Tool

21. The gene sequences in different species that have a common origin are termed as

(A) Analogues
(B) Orthologues
(C) Paralogues
(D) Synlogues

22. The genes in the genome expressed at same copy number and constant rates at all times are termed as;

(A) Inductive genes
(B) Inducible genes
(C) Common genes
(D) Constitutive genes

23. The multiple degradative strain of genetically engineered bacteria known as "superbug" has the plasmid containing degradative genes for

(A) Camphor, Octopine, Naphthalene and xylene
(B) Camphor, butane Naphthalene and xylene
(C) Camphor, Octane, Naphthalene and xylene

(D) Camphor, Octopine, butane and xylene

24. In an organism experiencing allergic reaction, which of the following types of antibodies have been generated against the antigen;

(A) IgG
(B) IgD
(C) IgM
(D) IgE

25. In a DNA sequence a mutation has taken place in such a manner that Guanine has been replaced by Cytosine. This type of mutation will be defined as;

(A) Transition
(B) Transversion
(C) Transposition
(D) Termination

26. All of the following are not eligible for patent, except.

(A) An invention that is frivolous and claims contrary to established natural law.
(B) Any biological process for production or propagation of plants.
(C) A computer program in combination with hardware for technical application to industry.
(D) A mathematical method or algorithm.

27. The complete patent specification is a document that provides detailed description of the following information, except

(A) Date of priority
(B) Granting of patent
(C) Invention and innovation
(D) Copyright information

28. What is the probability of having a king and a queen when two cards are drawn from a pack of 52 cards?

(A) 8/663
(B) 4/663
(C) 2/52
(D) 4/52

29. A relative frequency distribution graphically displayed in the form of bar graphs is
(A) A Scatter plot
(B) A histogram
(C) A Frequency polygon
(D) A heat map

30. In a random sample of 10 subjects from a population, calculate mean and median from the data given.

A	B	C	D	E	F	G	H	I	J
40	49	61	64	63	42	60	57	58	66

(A) 56 and 59, respectively
(B) 56 and 60, respectively

(C) 58 and 59, respectively
(D) 58 and 60, respectively

31. All of the following statements are true except one, identify the false statement?

(A) USDA is responsible for protecting agriculture and the environment from pests
(B) FDA is responsible for safety of human food and animal feed
(C) EPA is responsible for regulating pesticides
(D) NCBI is responsible for genetically modified crops and plants

32. In Tissue culture laboratory, all the tissue samples and cultures carrying known human pathogens must be processed in which type of biosafety work cabinet.

(A) Class II vertical laminar flow hood
(B) Class II horizontal laminar flow hood
(C) Class III laminar flow hood
(D) Pathogen traps

33. Most animal cells need to be cryopreserved for future usage with a cryoprotectant. The cultured cell survives best if they are cooled at a rate of

(A) 1^0C /min
(B) 1^0C/sec
(C) 1^0F/min
(D) 1^0F/sec

34. In the data give below for correlation coefficients, which value represents the highest reliability score.

(A) 0.00
(B) +0.20
(C) +0.75
(D) -0.85

35. Which of the following international organization is dealing with all global rules of trades between nations?

(A) General agreement on tariffs and trade (GATT)
(B) General agreement on trade in services (GATS)
(C) World trade organization (WTO)
(D) Trade related aspects of intellectual property rights (TRIPS)

36. A statistical sampling technique in data collection, which is designed to ensure that subgroups are fairly represented is termed as.
(A) Random sampling
(B) Stratified random sampling
(C) Quota sampling
(D) Cluster sampling

37. The resolving power of a microscope can be describedby all of the following Statements, except?
(A) It is inversely dependent upon numerical aperture of objective lens
(B) It is inversely dependent upon numerical aperture of a condenser lens
(C) Wavelength of the illuminating light

(D) Wavelength of the transmitted light

38. The extinction coefficient of a compound 'X' is $1.5 M^{-1} cm^{-1}$. What will be the concentration of the solution, if in a 1 cm sample cuvette it has an absorbance of 0.60?

(A) 0.60M
(B) 0.40M
(C) 0.20M
(D) 0.10M

39. Which of the following represents a statutory body which deals with animals used for experimental purposes.

(A) Committee for the control of experimental animals
(B) Committee for the supervision of experimental animals
(C) Committee for the proper control and supervision of experimental animals
(D) Committee for the purpose of control and supervision of experimental animals

40. A scatter plot has been generated in a data analysis. The graph is extending from upper left to lower right, which suggests that the two variables being analyzed are ____ in relation to each other. Fill in the blanks.

(A) Negatively correlated
(B) Positively correlated
(C) Partial correlation
(D) Randomly correlated

41. A patent is an exclusive right of its owner to exclude others from making, using or selling the invention is granted for a period of how many years from the date of filing the patent application.

(A) Life time validity
(B) 80 Years
(C) 40 Years
(D) 20 Years

42. Which of the following was the first patented transgenic animal, that contained genes from other species.

(A) Zebra Fish
(B) Drosophila
(C) Mice
(D) Sheep

43. In orthogonal field alternating gel electrophoresis the pairs of electrodes are organized at which of the following settings

(A) At 90^0 relative to each other to create inhomogeneous electrical field
(B) At 90^0 relative to each other to create homogeneous electrical field
(C) At 180^0 relative to each other to create inhomogeneous electrical field
(D) At 180^0 relative to each other to create homogeneous electrical field

44. The term bioaugmentation pertains to.

(A) Removal of microbial culture from a specific environment for a specific function
(B) Addition of pregrown microbes to an environment to perform a specific function
(C) Breakdown of chemical constituents by microbial cultures
(D) Addition of chemical constituents by microbial cultures

45. The term to describe the event when an animal is required to be sacrificed on termination of an experiment by ethical methods.

(A) Anesthesia
(B) Euthanasia
(C) Surgical procedure
(D) Convulsion

46. The X-rays are high energy radiations, which of the following statements is true about these rays;

(A) These are rays with longer wavelengths and low frequency than ultraviolet rays
(B) These are rays with long wavelengths and high frequency than ultraviolet rays
(C) These arerays with short wavelengths and high frequency than ultraviolet rays
(D) These are rays with short wavelengths and low frequency than ultraviolet rays

47. The hypothesis predicting that no difference exists between the groups being compared is termed as

(A) Null hypothesis
(B) Alternate hypothesis
(C) Directional hypothesis
(D) Nondirectional hypothesis

48. Which of the following represents the correct ordering of the sections of a manuscript.

(A) Title, abstract, introduction, method, results, discussion
(B) Title, method, abstract, introduction, results, discussion
(C) Title, abstract, method, introduction, results, discussion
(D) Title, abstract, method, introduction, discussion, results

49. The database referring exclusively to biomedical literature and science journals is

(A) PubMed
(B) NCBI
(C) Gen Bank
(D) EMBL

50. Following radioactive isotopes are provided with their half-life. Identify which of the information is not right?

(A) $I\text{-}^{131}$ = 8.02days
(B) $P\text{-}^{33}$ = 25.34days
(C) $S\text{-}^{35}$ = 34.96 days
(D) $P\text{-}^{32}$ = 50 days

x-x-x

Bio-Chemistry(Ph.D.) (BIO-CHEM)

1. "Research is an organized and systematic inquiry" is defined by _____.
   (A)   Emory

   (B)   Marshall

   (C)   P.V. Young

   (D)   Kerlinger

2. Basing conclusion without any bias and value judgement is _____.
   (A)   Facts

   (B)   Specificity

   (C)   Values

   (D)   Objectivity

3. A small scale preliminary research undertaken for evaluating the feasibility of the key steps in a future, full-scale study is called
   (A)   Pure Research

   (B)   Pilot study

   (C)   Action research

   (D)   Survey

4. Research conducted to find solution for an immediate problem is….
   (A)   Fundamental research

   (B)   Analytical research

   (C)   Action research

   (D)   Survey

5. Population census is an example of _____ research
   (A)   Survey

   (B)   Clinical

   (C)   Diagnostic

   (D)   Empirical

6. _____ is a way to systematically solve the research problem
   (A)   Techniques

   (B)   Research Methodology

   (C)   Research Process

(D)   Operations

7. _____ is the first step of Research process.
   (A)   Collection of data

   (B)   Formulation of a problem

   (C)   Editing and coding

   (D)   Selection of a problem

8. Which one of the following statements DO NOT apply to a working hypothesis
   (A)   It is a proven hypothesis for an argument.
   (B)   It should be very specific
   (C)   It is a provisionally accepted hypothesis for further research.
   (D)   It is derived from research problem, literature review and conceptual

   framework.

9. There are two sets given below. Set - I specifies the types of research, while Set - II indicates their characteristics. Match the two and give your answer by selecting the appropriate code.

Set - I (Research types)	Set - II (Characteristics)
(a) Fundamental research (b) Applied research	(i) It is the research conducted to develop some new theories (ii) It is type of research conducted to solve a preexisting problem (iii) It is qualitative in nature (iv) It is quantitative in nature

Code: (a)   (b)

(A)   (i) (ii)   (iii)(iv)
(B)   (i)(iii)   (ii)(iv)
(C)   (ii)(iv)   (i)(iii)
(D)   (ii)(iii)   (i)(iv)

10. A hypothesis which is develops while planning the research is _____.
   (A)   Null hypothesis

   (B)   Working hypothesis

   (C)   Relational hypothesis

   (D)   Descriptive hypothesis

11. Statistical Hypotheses is derived from
    (A)   Data

    (B)   Frame

    (C)   Sample

    (D)   Facts

12. In Testing hypotheses the common type of error is _____.
    (A)   Type I

    (B)   Type I and II

    (C)   Type II

    (D)   None of these

13. Which of the following is not a suitable method for probability sampling?
    (A)   Random sampling
    (B)   Quota sampling
    (C)   Systematic sampling
    (D)   Cluster sampling

14. Which is the database reservoir of all Indian PhD theses?
    (A)   INFLIBNET
    (B)   OATD
    (C)   Shodhganga
    (D)   Science Direct

15. Type II error in hypothesis testing is-
    (A)   Incorrect decision to reject a true null hypothesis
    (B)   Incorrect decision to retain a false null hypothesis
    (C)   Incorrect decision to reject a true alternative hypothesis
    (D)   Incorrect decision to retain a false alternative hypothesis

16. A null hypothesis is rejected when p value is-
    (A) < 0.05
    (B) < 0.01
    (C) < 0.001
    (D) > 0.05

17. Which one of the following is NOT a non-parametric test-
    (A)   t-test
    (B)   Sign test
    (C)   Run test
    (D)   Chi square test

18. Workshops are meant for-
    (A)   Giving lectures
    (B)   Multiple target groups
    (C)   Hands on training / experience

(D)   Showcase new theories

19. Sampling error decrease with-
    (A)   Increase in sampling size
    (B)   Decrease in sampling size
    (C)   Process of randomization
    (D)   Process of analysis

20. Application of Information and communication technologies (ICT) in research are –
    (A)   For review of literature

    (B)   For sample size calculation

    (C)   Preparation of data

    (D)   All of these

21. Which one of the following methods is a measure of correlation between the two variables-
    (A)   Two-way table
    (B)   Coefficient of rank correlation
    (C)   Frequency distribution
    (D)   Scatter diagram
22. Which of the following is an indication of good quality journal-
    (A)   Impact factor
    (B)   H-index
    (C)   G-index
    (D)   i10-index

23. Which one of the following belongs to the category of good research ethics-
    (A)   Publishing the paper in two research journals without telling the editors
    (B)   Conducting a review of the literature that acknowledges the contributions of other
            scientists in similar fields
    (C)   Trimming outliers from a dataset without discussing your reasons in a research paper
    (D)   Including a colleague as a co-author on the research paper as a favor without contribution

24. Which of the following is susceptible to the issue of research ethics?
    (A)   Inaccurate application of statistical techniques
    (B)   Faulty research design
    (C)   Choice of sampling techniques
    (D)   Reporting of research findings

25. Which of the following statements is incorrect about a patent?
    (A)   It is an exclusive right granted for an invention.

    (B)   It can also be granted for a new process for doing something

    (C)   A patent is granted for unlimited time.

(D)   It provides protection against the commercialization of the product

26. The enzyme responsible for primary carboxylation in C3 plants is-
    (A)   Hexokinase

    (B)   Succinate dehydrogenase

    (C)   Pyruvate carboxykinase

    (D)   RuBP carboxylase oxygenase

27. In an experiment the structural genes lac ZYA of lac operon were found to be constitutively expressed. The following explanations were given for the constitutive expression
    (P) absence of a functional repressor due to mutation in the repressor gene lacI

    (Q) mutation in the operator that can no longer bind the repressor

    (R) mutation in the lacAgene

    Which of the following is CORRECT

    (A)   Only P
    (B)   Only Q
    (C)   Both P & Q
    (D)   Only R
28. Which one of the following amino acids has a higher propensity for cis peptide bond formation?
    (A)   Histidine
    (B)   Cysteine
    (C)   Glycine
    (D)   Proline

29. The length of an$\propto$-helix composed of 36 amino acid residues is
    (A)   10
    (B)   54
    (C)   27
    (D)   360

30. Which one of the following amino acid residues is specifically recognised by chymotrypsin during peptide bond cleavage?
    (A)   Phe
    (B)   Leu
    (C)   Val
    (D)   Asp

31. A person with phenylketonuria is advised not to consume which of the following products-
    (A)   Aspartame

(B)   Fat containing food

(C)   Proline containing food

(D)   Glucose

32. LINEs and SINEs are-
    (A)   Micro RNA

    (B)   Ribosomal RNA

    (C)   Transposable elements

    (D)   3'-untranslated regions

33. The primary action of steroid hormones isat the level of
    (A)   RNA export from the nucleus
    (B)   Transcription
    (C)   Pre-mRNA splicing
    (D)   mRNA degradation

34. Which of the following is NOT a proto-oncogene?
    (A)   APC

    (B)   c-myc

    (C)   ras

    (D)   n-myc

35. Deletion of the leader sequence of trp operon of E.coli would result in-
    (A)   Decreased transcription of trp operon

    (B)   No effect on trp operon

    (C)   Increased transcription of trp operon

    (D)   Decreased transcription of trp operon in the presence of tryptophan

36. Which of the following processes does not take place in 5'-3' direction?
    (A)   DNA replication

    (B)   Transcription

    (C)   Nick translation

    (D)   RNA editing

37. Inhibin from sertoli cells of testes selectively inhibits the following-
    (A)   Lutenising hormone

    (B)   Follicle stimulating hormone

    (C)   Thyroid stimulating hormone

(D)   Growth hormone

38. Which class of immunoglobulins will increase in case of a chronic infection?
    (A)   IgG

    (B)   IgA

    (C)   IgM

    (D)   IgE

39. The mode of action of the anticancer drug methotrexate is through its strong competitive inhibition on-
    (A)   Dihydrofolate reductase

    (B)   Thymidine synthase

    (C)   Thymidine kinase

    (D)   Adenylate cyclase

40. A researcher wants to clone 3 DNA fragments of sizes 1.1 Mb, 0.097 Mb and 0.045 MB.
    The choice of the vectors for cloning each of the fragments are

    (A)   Cosmid, bacteriophage lambda, bacteriophage P1
    (B)   Yeast artificial chromosome, bacteriophage P1, lambda cosmid
    (C)   Bacterial artificial chromosome, bacteriophage lambda, yeast artificial chromosome
    (D)   Only plasmids

41. Arrange the following in the increasing order of amount of ATP generated by metabolism of one molecule of the following compounds.
    (i)   Anaerobic catabolism of starch with 300 glucose units

    (ii)   Aerobic catabolism of glucose

    (iii)   Aerobic catabolism of acetate

    (iv)   Aerobic catabolism of palmitate

    (A)   (ii), (iv), (iii), (i)

    (B)   (iii), (ii), (i), (iv)

    (C)   (iv), (ii), (i), (iii)

    (D)   (iii), (ii), (iv), (i)

42. During the biosynthesis of urea in the urea cycle, the two nitrogen atoms are derived from
    (A) Two free ammonium groups
    (B) Free ammonium group and aspartate
    (C) Both nitrogen atoms are derived from arginine
    (D) One nitrogen atom is derived from citrulline and one from glutamate.

43. The following figures show the plot of reaction rate versus substrate concentration (mM) for an enzyme catalyzed reaction in the presence and absence of an inhibitor where 1 represents the activity without inhibitor and 2 represents activity in the presence of inhibitor. What kind of enzyme inhibition is this-
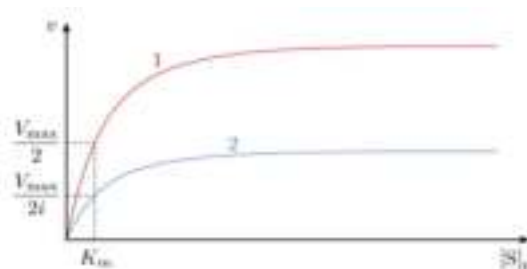
    (A) Competitive inhibition

    (B) Uncompetitive inhibition

    (C) Noncompetitive inhibition

    (D) Mixed inhibition

44. If total amount of Guanine and cytosine is 52% in a double stranded DNA, the amount of adenine in this DNA would be-
    (A) 52%
    (B) 24%
    (C) 26%
    (D) 48%

45. Acetyl CoA, the cytoplasmic substrate for fatty acid synthesis, is formed in mitochondria.
    The inner mitochondrial membrane is impermeable to acetyl CoA. Which of the following compounds is the form in which the carbon of acetyl CoA is transported to the cytoplasm?

    (A) Malate
    (B) Citrate
    (C) Acetate
    (D) Pyruvate

46. A microfibril of cellulose is composed of about 80 molecules that lie parallel to each other and close together. What type of bond holds the parallel fibers together?

(A) Vanderwaal forces
(B) Hydrophobic interactions
(C) Ionic interactions
(D) Hydrogen bonds

47. Glycogen phosphorylase is converted to its active form 'a' from its inactive form 'b' by-
(A) Proteolytic cleavage of a peptide fragment from N-terminus
(B) Phosphorylation of a specific Serine residue on each subunit by ATP
(C) Interaction of ATP on the allostearic site of the enzyme
(D) Reversible dimerisation of phosphorylase b triggered by Ca2+ ions

48. Which is the most useful experiment that can be done by using a DNA microarray?
(A) Comparing RNA produced under two physiological conditions to understand gene expression
(B) Predicting the presence of specific metabolites in a cell
(C) Evaluating the linkage relationship of two genes
(D) Comparing newly synthesized nuclear RNA with cytoplasmic RNA to locate introns

49. Which is not a property of real-time PCR assays?
(A) Incorporate dyes that bind double-stranded DNA
(B) Incorporate an internal hydrolysis probe
(C) Be performed at single temperature with no specialized instrumentation required
(D) Be interpreted as a plus / minus result or as a quantitative result

50. Cancer is often believed to arise from stem cells rather than fully differentiated cells. Following are certain views related to the above statement. Which one of the following is NOT correct?
(A) Stem cells do not divide and therefore require fewer changes to become a cancer cell.
(B) Cancer stem cells can self-renew as well as generate the non-stem cell populations of the tumor.
(C) Teratocarcinomas prove tumors arise from stem cells without further mutations.
(D) Stemness genes can often function as oncogene.

x-x-x

Bio-Physics(Ph.D.) (BIO-PHY)

1. **The research based on the measurement of quantity or amount is.**
   (A) Qualitative
   (B) Descriptive
   (C) Quantitative
   (D) Numerical

2. **The objective of _____ is the development of hypotheses rather than their testing**.
   (A) Laboratory research
   (B) Diagnostic research
   (C) Exploratory research
   (D) Empirical research

3. **A _____ refers to some difficulty that a researcher experiences in either a theoretical or practical situation**
   (A) Research hypothesis
   (B) Research experience
   (C) Research problem
   (D) Research crisis

4. A_____ is a statement of expectation or prediction that will be tested by research.
   (A) Research hypothesis
   (B) Research experience
   (C) Research problem
   (D) Research crisis

5. What is a bibliography?
   (A) A true story written about someone
   (B) Another name for writing a book
   (C) A religious book
   (D) A list of sources used in a report and where they can be found

6. APA Style, MLA Style, Chicago Manual, Harvard and Vancouver are famously known as
   (A) **Citation styles**
   (B) Directories
   (C) Abbreviation Manuals
   (D) Handbooks

7. APA Style stands for _____
   (A) American Psychological Association
   (B) American Psychologist Association
   (C) Association of Psychological of Americans
   (D) American Psychological Associates

8. Literature review is basically to bridge the gap between
   (A)   Newly established facts
   (B)   Previously established facts
   (C)   Facts established time to time
   (D)   **Previous to current established facts**

9. The two important components of research responsibility are: sincerity in work and avoiding _____.
   (A)   **Plagiarism**
   (B)   Writing the thesis
   (C)   Research techniques
   (D)   Confidentiality

10. Why is it important for a researcher to review the literature?
    (A)   Because it will find if anyone has done the work before
    (B)   Because it is traditional
    (C)   Because it identifies like-minded researchers
    (D)   Because it shows time has been spent on the subject

11. Which of the following is a measure of variation?
    (A)   Standard deviation
    (B)   Midrange
    (C)   Mode
    (D)   Median

12. To determine whether the test statistic of ANOVA is statistically significant, it can be compared to a critical value. What two pieces of information are needed to determine the critical value?
    (A)   Sample size, number of groups
    (B)   Mean, sample standard deviation
    (C)   Expected frequency, obtained frequency
    (D)   MSTR, MSE

13. In a study, subjects are randomly assigned to one of three groups: control, experimental A, or experimental B. After treatment, the mean scores for the three groups are compared The appropriate statistical test for comparing these means is:
    (A)   The Correlation Coefficient
    (B)   Chi Square
    (C)   The T-Test
    (D)   The Analysis of Variance

14. Any hypothesis which is tested for the purpose of rejection under the assumption that it is true is called:
    (A)   Null hypothesis
    (B)   Alternative hypothesis
    (C)   Statistical hypothesis
    (D)   Composite hypothesis

15. Analysis of variance is a statistical method of comparing the _____ of several populations.
    (A)   Standard Deviations
    (B)   Variances
    (C)   Means
    (D)   Proportions

16. A quantitative statement about a population is called:
    (A)   Research hypothesis
    (B)   Composite hypothesis
    (C)   Simple hypothesis
    (D)   Statistical hypothesis

17. The probability of rejecting the null hypothesis when it is true is called:
    (A)   Level of confidence
    (B)   Level of significance
    (C)   Power of the test
    (D)   Difficult to tell

18. Chi-square test was developed by
    (A)   W. S. Gosset
    (B)   Karl Pearson
    (C)   A. R. Fisher
    (D)   Pascal

19. SPSS stands for
    (A)   Simple perfect squared square
    (B)   Statistical product and service solutions
    (C)   Statistical package for social science
    (D)   Software package for statistical science

20. Article published in research journal are _____
    (A)   Reference sources
    (B)   Primary sources
    (C)   Secondary sources
    (D)   Tertiary sources

21. What is a Patent?
    (A)   An agreement to the Government
    (B)   Document of the library
    (C)   An agreement between the inventor and the Government
    (D)   An agreement between library and Publisher

22. Which of the following is not the documents?
    (A)   Manuscript
    (B)   Inscription
    (C)   Book
    (D)   Periodical

23. What abbreviation is used to mention more than four authors of a research work to be cited?
(A)   at al.
(B)   et all.
(C)   et al.
(D)   ot all.

24. ISSN stands for _____
(A)   International Standard Social Number
(B)   International Source Serial Number
(C)   Indian Standard Society Number
(D)   International Standard Serial Number

25. Two types of reference noting systems used in Citation styles are _____
(A)   Footnote and Endnote
(B)   Under note and back note
(C)   Indent note and last note
(D)   Reference note and bibliographical note

26. Protein conformational dynamics CANNOT be determined by which one of the following techniques?
(A)   NMR spectroscopy
(B)   Differential scanning calorimetry
(C)   Mass spectroscopy
(D)   Fluorescence microscopy

27. Why are thin sections of specimens necessary in TEM?
(A)   Electrons are negatively charged
(B)   Electrons have a wave nature
(C)   Electrons have no mass
(D)   Electrons have a poor penetrating power

28. In an electrocardiogram, the QRS complex represents the
(A)   Depolarisation of the atria
(B)   Repolarisation of the atria
(C)   Depolarisation of the ventricles
(D)   Repolarisation of ventricles

29. Skin cancer is induced by which type of DNA damage caused by exposure to harmful UV rays in sunlight.
(A)   Alkylation
(B)   Deamination
(C)   Depurination
(D)   Pyrimidine dimer formation

30. Malignant cancer cells have all of the following properties except:
(A)   Unregulated cell division
(B)   Inhibition of angiogenesis
(C)   Resistance to apoptosis
(D)   Cellular immortality

31. Estrogen and testosterone are steroid hormones, and are most likely to bind to
    (A)   Membrane ion channel
    (B)   Enzyme linked membrane receptor
    (C)   G-protein linked membrane receptor
    (D)   Cytoplasmic receptors

32. Cell mediated immune response are
    (A)   Enhanced by depletion of complement
    (B)   Suppressed by corticosteroids
    (C)   Enhanced by depletion of T-cells
    (D)   Enhanced by depletion of macrophages

33. Which of the following permits the rapid diffusion of small water-soluble molecules between the cytoplasm of adjacent cells?
    (A)   Tight junctions
    (B)   Anchoring junctions
    (C)   Adherence junctions
    (D)   Gap junctions

34. Which of the following statements is true about size-exclusion chromatography?
    (A)   During the separation of a mixture of proteins, the protein with the smallest molecular weight is eluted first
    (B)   During the separation of a mixture of proteins, the protein with the largest molecular weight is eluted first
    (C)   During the separation of a mixture of proteins, the protein with the largest molecular weight is eluted last
    (D)   During the separation of a mixture of proteins, the protein with the largest molecular weight flows around the beads

35. The plasmid used by Cohen and Boyer for their transformation experiment was:
    (A)   pSC 101
    (B)   PUC 17
    (C)   pBR 322
    (D)   E. coli plasmids

36. DNA replication in *E.coli* requires
    (A)   Primase to make small primers containing deoxyribonucleotides
    (B)   DNA polymerase III to join Okazoki fragments
    (C)   DNA polymerase α to synthesize DNA
    (D)   DNA polymerase I to remove primers and fill in gaps in the lagging strand

37. Which of the following technique doesn't involve electrophoresis for the separation of biomolecules?
    (A)   Dot blotting
    (B)   Southern blotting
    (C)   Northern blotting
    (D)   Western blotting

38. Which of the following event does not occur during pre tRNA processing?
    (A)   5' end cleavage by the RNaseP
    (B)   Addition of poly(A) site
    (C)   Addition of CCA sequence at 3' end
    (D)   Chemical modification of bases

39. PCR based DNA amplification is an essential feature of which of the following combination of molecular markers?
    (A)   RFLP, AFLP and SSR
    (B)   AFLP, SSR and RAPD
    (C)   RFLP, RAPD and SSR
    (D)   RAPD, RFLP and SSR

40. Which of the following is not correct about freeze-fracture technique?
    (A)   It involves physical breaking of frozen biological sample
    (B)   Fixation in gluteraldehyde
    (C)   Involve vacuum sublimation of ice
    (D)   Cryoprotection with glycerol

41. Which of the following types of microscopes should be used to view a specimen at 50,000 X magnification?
    (A)   A dark-field microscope
    (B)   A phase-contrast microscope
    (C)   A transmission electron microscope
    (D)   A confocal microscope

42. Variation in two characters in two or more species can be best represented by
    (A)   Histogram
    (B)   Scattered diagram
    (C)   Triagular box
    (D)   Linear curve

43. An example of Homology & similarity tool is
    (A)   PROSPECT
    (B)   BLAST
    (C)   EMBOSS
    (D)   RASMOL

44. Berger waves are produced by
    (A)   Magnet (7 Tesla)
    (B)   In P.E.T scan
    (C)   Brain
    (D)   In sonography

45. Which of the following characteristics is undesirable in cloning vectors?
    (A)   Self-replicating
    (B)   High copy number
    (C)   Vulnerable at several sites to a restriction enzyme
    (D)   Small in size

46. In the context of biological effects of radiation, the unit of the collective effective dose is:
    (A)   Person-Sievert
    (B)   Roentgen
    (C)   Gray
    (D)   Sievert

47. Literature databases include
    (A)   MEDLINE and PubMED
    (B)   MEDLINE and PDB
    (C)   PubMED and PDB
    (D)   MEDLINE and PIR

48. The term used to refer something 'performed on computer or computer simulation'
    (A)   Dry lab
    (B)   Web Lab
    (C)   Invitro
    (D)   Insilico

49. First database in bioinformatics was developed by
    (A)   J D Watson
    (B)   Margaret Dayhoff
    (C)   Pauline Hogeweg
    (D)   Frederic Sanger

50. Which one of the following assay systems can specifically detect apoptotic cells?
    (A)   Tetrazolium dye (MTT) based colorimetric assay
    (B)   FITC - annexin V based FACS analysis
    (C)   51Cr release assay
    (D)   Trypan blue exclusion assay

x-x-x

Biotechnology(Ph.D.)   (BIOT)

1. Which of the following techniques is used to study Protein –Protein interaction
   (A)   Surface Plasmon Resonance
   (B)   Foot Printing
   (C)   *In situ* Hybridization
   (D)   Q-TOF

2. Mark the incorrect combination
   (A)   Biosafety level 1   *Bacillus subtilis*
   (B)   Biosafety level 2   *Staphylococcus aureus*
   (C)   Biosafety level 3   *Mycobacterium tuberculosis*
   (D)   Biosafety level 4   Yellow fever virus

3. Which of the following fusion tags helps in purification and enhance solubility of heterologous proteins produced in *E.coli*
   (A)   His tag
   (B)   MBP tag
   (C)   GFP tag
   (D)   myc tag

4. Which ion gets released in cation exchange column
   (A) Na^+
   (B) H^+
   (C) K^+
   (D) Ca^{++}

5. In gel filtration chromatography proteins are separated on the basis of
   (A)   Size and net charge
   (B)   Size and shape
   (C)   Size and specific affinity
   (D)   Shape and net Charge

6. Which of the following combination of molecular markers requires PCR amplification
   (A)   AFLP, RFPL, SSR
   (B)   AFLP,SSR, SNP
   (C)   RFLP, RAPD, SSP
   (D)   RFLP,SSR, SNP

7. Which of the following procedures does not generate aerosols
   (A)   Pipetting with autopipette
   (B)   Sonication of tissue culture cells
   (C)   Cell sorting
   (D)   Freeze drying

8. Which of the following is false regarding working in class II Biosafety cabinet
   (A)   Culture is kept sterile because air in the cabinet is filtered through HEPA filters
   (B)   Exhaust air from cabinet is filtered to remove the contaminants
   (C)   Use of Bunsen burner is not recommended inside the cabinet
   (D)   UV light in the cabinet ensures no contamination while working

9. What would be the Tm of 21 bases long oligonucleotide with sequence AGGCTAATCGATCGGACTCAC under standard conditions in the presence of 50nM Na ions
   (A)   42 ^{0}C
   (B)   53 ^{0}C
   (C)   64 ^{0}C
   (D)   66 ^{0}C

10. In Sanger sequencing by chain termination which of the polymerases would require high concentration of dideoxynucleotide
    (A)   Klenow fragment
    (B)   T7 polymerase
    (C)   Taq polymerase
    (D)   Sequanase 2.0

11. Which of the following is ineffective against bacterial spores
    (A)   Autoclaving
    (B)   Ethanol
    (C)   Formaldehyde
    (D)   Glutaraldehyde

12. All the following statements regarding Surface Plasmon resonance are correct except
    (A)   An optical technique used for detection of molecular interactions
    (B)   It requires fluorescent labelling of analyte for detection
    (C)   It detects change in mass
    (D)   It gives real time analysis

13. What will happen to the fluorescence spectrum of a protein dissolved in PBS (7.2) on exposure to low pH (0.1MHCl)
    (A)   There will be no change in the fluorescence
    (B)   There will be increase in fluorescence
    (C)   There will be decrease in fluorescence
    (D)   Increase or decrease in fluorescence will depend on the protein

14. Which statement you disagree with regard to genetic manipulations in animals
    (A)   Sheep was one of the first animals subjected to embryo splitting technique
    (B)   Somatic cell cloning enables gene targeting in species lacking embryonic stem cells
    (C)   Pronuclear Injection is most commonly used technique that generates high level of transgene integration
    (D)   TALENs and CRISPRs are site specific endonucleases that can be used for gene editing in animals

15. What will happen if dinitrophenol (DNP), a hapten is chemically linked with BSA and used for immunization of mice
    (A)   No antibodies will be formed
    (B)   Antibodies only to BSA will be formed
    (C)   Anti-DNP antibodies will dominate
    (D)   Anti-BSA antibodies will dominate

16. Which of the *E.coli* strains is best suited for expression of eukaryotic protein cloned in pET vector
    (A)   DH5α
    (B)   HB101
    (C)   BL21(DE3)
    (D)   Rosetta (DE3)

17. Which of the following strategies will work best to overcome killing of *E.coli* due to leaky expression of cloned toxic protein
    (A)   Use of low copy plasmid to express toxic protein
    (B)   Growing the transformed culture at high temperature to denature toxic protein
    (C)   Use *E coli* host strain that expresses T7 polymerase inhibitor protein (LysS)
    (D)   Express toxic protein as inclusion bodies

18. Which of the following actions are not recommended in case of an accidental spill of hazardous biological material while working in biosafety cabinet
    1) Turn off the cabinet flow to avoid the spread of hazardous material
    2) Restrict lab entry and put on the gloves and lab coat
    3) Spray the cabinet walls and work surface with disinfectant
    4) Cover the spill with disinfectant and soak up with paper towel immediately

    (A)   1 and 2
    (B)   2 and 3
    (C)   2 and 4
    (D)   1 and 4

19. Contamination with which of the following is difficult to detect in cell culture
    (A)   Yeast
    (B)   Bacteria
    (C)   Mycoplasma
    (D)   Molds

20. To establish adherent cell culture which recombinant protein from basement membrane dominates the available commercial matrices
    (A)   Fibronectin
    (B)   Vitronectin
    (C)   Laminin
    (D)   Heparan Sulphate proteoglycans

21. SMRT, which is a platform for Single Molecule Sequencing, has following features except
    (A)   Provides long reads (1-100kb)
    (B)   Requires amplification of template
    (C)   Gives real time analysis
    (D)   Has low error rates than short read NGS platforms

22. Which type of enzyme inhibition will decrease affinity for the substrate
    (A)   Competitive inhibition
    (B)   Un-competitive
    (C)   Non-competitive
    (D)   Feed back inhibition

23. In prokaryotes which of the following antibiotics can be used to study the function of elongation factor EF-TU
    (A)   Kirromycin
    (B)   Puromycin
    (C)   Chloramphenicol
    (D)   Erythromycin

24. An immunotoxin is prepared by conjugating monoclonal antibody specific for colon cancer to cholera toxin subunit exhibiting cytotoxic activity only. If the conjugate separates *in vivo* then what would happen
    (A)   Toxin will act on both normal and tumour cells
    (B)   No effect on tumour and normal cells
    (C)   Toxin will affect normal cells only
    (D)   Toxin will act on tumour cells only

25. Which of the following can be used as B cell mitogen
    (A)   Concanavalin A protein from jack beans
    (B)   Phytohaemagglutinin from kidney beans
    (C)   LPS in cell wall of *Salmonella typhi*
    (D)   *Staphylococcus aureus* enterotoxin

26. Which of the following is not correct
    (A)   Tight Junctions   Claudins and Occludens seal gap between epithelial cells
    (B)   Adherens Junctions   Connect actin filaments in one cell to another
    (C)   Desmosomes   Connect intermediate filaments in one cell to another
    (D)   Hemidesmosomes   Anchor actin filaments in a cell to basal Lamina

27. Which statement is not correct for protein domains
    (A)   They can be used for classification of proteins
    (B)   They help in functional annotation of a protein
    (C)   They are independently stable functional units of a protein
    (D)   They cannot be swapped to another protein by genetic engineering

28. Which of the following is not seen during apoptosis
    (A)   Cell shrinkage and cellular fragmentation
    (B)   Activation of Bax and Bak proteins
    (C)   Activation of Bcl-2 and Bcl-XL proteins
    (D)   Presentation of phosphatidylserine on cell surface

29. World biodiversity day is celebrated on May 22 every year with different themes .What was the theme for 2021?
    (A)   Our biodiversity, Our food ,Our health
    (B)   Our solutions are in nature
    (C)   We are part of the solution for nature
    (D)   Biodiversity for sustainable development

30. Who received the nobel prize for CRISPR technology in 2020
    (A)   Yoshinori Ohsumi
    (B)   Alfred Gilmer and Martin Rodbell
    (C)   Frances Arnold and Gregory Winter
    (D)   Jennifer Doudana and Emmaneulle Carpentier

31. Beta turns that cause change in the direction of the polypeptide chain generally consists of four amino acids. Which of the following combinations is likely to be present in beta turn
    (A)   Alanine, Proline, leucine, asparagine
    (B)   Glycine, proline, asparagine, aspartic acid
    (C)   Cysteine, glycine, histidine, leucine
    (D)   Cysteine, alanine, asparagine, glycine

32. Zymogens are best defined as:
    (A)   Enzyme from different sources but with similar function
    (B)   Enzymes from same source showing different properties.
    (C)   Enzymes existing in functionally inactive form as proenzymes
    (D)   Enzymes are synthesized as inactive precursors that require ATP to get activated

33. Which of the following food chemicals exhibits dual role as preservative and antioxidant
    (A)   Benzoic acid
    (B)   Lactic acid
    (C)   Ascorbic acid
    (D)   Sorbic acid

34. Sodium nitrite which is used for curing of meat is not used for
    (A)   Preservation of red colour of meat
    (B)   Addition of flavour to meat
    (C)   Inhibition of germination of *Clostridium botulinum* spores in meat
    (D)   Killing Trichinosis parasite in meat

35. Which of the following subtypes of Influenza A virus causes Avian Flu in humans
    (A)   H5N1,H7N9
    (B)   H1N1,H5N1
    (C)   H1N1,H3N2
    (D)   H1N2,H9N2

36. What is not true about SCID
    (A)   It is caused by autosomal dominant mutation in a single enzyme
    (B)   ADA enzyme of purine salvage pathway is defective
    (C)   ADA is most active in Lymphocytes
    (D)   ADA deficiency can be treated by Hematopoietic Stem Cell Transplantation

37. Viruses bind to specific receptors on cell surface to initiate infection. Which of the following pairs is not correctly matched
    (A)   Polio virus   GM3
    (B)   HIV   CD4
    (C)   Influenza A virus   CCR5
    (D)   SARS -CoV2   ACE2
38. Cyclins in association with CDKs regulate the cell cycle. Find the mismatch
    (A)   G1   Cyclin D and CDK4
    (B)   G1/S transition   Cyclin D and CDK2
    (C)   S phase   Cyclin A and CDK2

    (D)   G2 /M   Cyclin B and CDK1

39. All statements regarding arabinose operon are correct except
    (A)   It is positively regulated by CAP-cAMP in the absence of glucose
    (B)   Ara C protein in the presence of arabinose activates transcription by binding to inducer
    (C)   AraC in the absence of arabinose binds to both inducer and operator sites
    (D)   Ara C a regulator of ara operon is transcribed from PBAD promoter

40. Which of the following statements is incorrect
    (A)   The active site of an enzyme usually occupies only a small fraction of protein
    (B)   Catalysis by some enzymes involves covalent bond formation between amino acid side chain and the substrate
    (C)   Allosteric enzymes have two or more binding sites
    (D)   Feedback inhibition is an irreversible negative regulation of an enzyme

41. In 2021, the UN climate summit COP26 is scheduled to be held in
    (A)   India
    (B)   Germany
    (C)   France
    (D)   UK

42. Which of the following requires deposition of microorganisms for the purpose of patent procedure
    (A)   Paris convention
    (B)   Strasbourg convention
    (C)   European patent convention
    (D)   Budapest treaty

43. Regarding energy generation from glucose, which statement is not correct
    (A)   Normal cells produce more ATP through oxidative phosphorylation in the presence of O2
    (B)   Normal cell produce less ATP in the absence of O2 through anaerobic glycolysis
    (C)   Cancer cells produce less energy in the presence of O2 through aerobic glycolysis
    (D)   Cancer cells produce high energy in the presence of O2 through aerobic glycolysis

44. Mark the incorrect statement
    (A)   B cells bind soluble antigens
    (B)   B and T cells form antibodies against proteins, polysaccharides and lipid antigens
    (C)   B cell epitopes are hydrophobic and that of T cells are hydrophilic
    (D)   T cells recognise processed antigens displayed by MHC

45. Cytokines according to their action cannot be called
    (A)   Pleotropic if they elicit different activities from different targets
    (B)   Synergistic if combined effect of two cytokines on cellular activity is more than additive
    (C)   Redundant if different cytokines can mediate different effects on a cell
    (D)   Antagonistic if effect of one cytokine inhibits the effect of another cytokine

46. What change will be observed when bacteria growing in warm conditions are shifted to cold conditions
    (A)   It will increase its metabolic rate
    (B)   It will make thicker cell wall
    (C)   Increase the content of unsaturated fatty acids in the cell wall
    (D)   Increase the content of long chain fatty acids

47. In glycoproteins, attachment of carbohydrate moiety is mediated through which amino acids
    (A)   Tryptophan, aspartate, leucine
    (B)   Lysine, serine, threonine
    (C)   Cysteine, alanine, lysine
    (D)   Asparagine, serine, threonine

48. Which statement is not correct regarding the regulation of phosphofructokinase (PFK)
    (A)   AMP is a positive regulator of PFK
    (B)   Citrate inhibits PFK
    (C)   Fructose 2,6-bisphosphate is an allosteric activator of PFK
    (D)   Lactic acid inhibits PFK

49. Who created the world's first synthetic bacterium named Synthia
    (A)   Randy Lewis
    (B)   Ian Wilmut
    (C)   Craig Venter
    (D)   Ron Weiss

50. Bacteriophage SPO1 of *Bacillus subtilis* is a lytic phage that transcribes its genes discontinuously (Temporal gene expression). Early, middle and late gene expression is controlled by different
    (A)   RNA polymerases
    (B)   Sigma factors
    (C)   Transcription factors
    (D)   Signal molecules

x-x-x

Botany(Ph.D.)   (BOT)

1. **Which of the following chemicals are most widely used for protoplast fusion?**
   (A) Mannitol   (B) Polyethylene glycol
   (C) Sorbitol   (D) Xylitol

2. Downward movement of methylene blue drop during Chardakov's method experiment indicates solution is
   (A) Hypertonic   (B) Hypotonic
   (C) Isotonic   (D) Suspension

3. Glyphosate-based herbicides, such as Roundup, target which enzyme of the plants?
   (A) DAHP synthase   (B) EPSP synthase
   (C) Shikimate synthase   (D) Chorismate synthase

4. Which of the following genetic engineering methods is best suited for addition of gene into plants?
   (A) Plasmid method   (B) Vector method
   (C) Biolistic (gene gun) method   (D) Microinjection

5. Standard deviation of a sample is 320 and number of individuals of the sample are 64. Find out the Standard Error of Mean (SEM)?
   (A) 30   (B) 50
   (C) 40   (D) 60

6. If the seeds of plants are treated with polyethylene glycol (PEG) during germination phase, then it would results in?
   (A) Delayed germination and slow growth   (B) Vigorous germination
   (C) No effect on germination   (D) Vigorous seedling growth

7. FlavrSavr tomato was produced by using
   (A) Transformation   (B) Transduction
   (C) Gene silencing by Antisense RNA   (D) *Agrobacterium* Transformation

8. YAC behaves similar to normal chromosomes because it has
   (A) Centromere   (B) Centromere and telomere
   (C) Telomere and ARS   (D) Centromere, telomere and ARS

9. Which of the following combinations of molecular markers is of co-dominant type?
   (A) SNP and RFLP   (B) SSR and RAPD
   (C) RAPD and RFLP   (D) AFLP and SSR

10. Inducer of "vir" operon is
    (A) Kanamycin   (B) Hygromycin
    (C) Penicillin   (D) Acetosyringone

11. If for a distribution, the difference of first quartile and median is greater than difference of median and third quartile then distribution is classified as
    (A) Absolute open end   (B) Positively skewed
    (C) Negatively skewed   (D) Not skewed at all

12. If an investigator commits Type I error in testing hypothesis then he/ she accepts or rejects following hypothesis
(A) Accepts null hypothesis when it is false
(B) Rejects null hypothesis when it is true
(C) Accepts null hypothesis when it is true
(D) Rejects null hypothesis when it is false

13. Transmission electron microscopy is most often used to reveal.
(A) Surface structures
(B) Internal structures
(C) Both surface and internal structures simultaneously
(D) Either surface or internal structures, but not simultaneously

14. Temperature and pressure maintained during autoclaving sterilization technique in plant tissue culture is:
(A) 15 Psi pressure, 121 °C
(B) 15 Psi pressure, 21 °C
(C) 5 Psi pressure, 121 °C
(D) 10 Psi pressure, -196 °C

15. **Which of the following methods uses high voltage electrical impulses for gene transfer?**
(A) Liposome fusion
(B) Microinjectile
(C) Electroporation
(D) Silicon carbide fibers

16. The basis of the technique of chromatography for separating components of a mixture is?
(A) The differing movement of particles of different mass in an electrical field
(B) The interaction of the components with a stationary and a mobile phases
(C) The absorption of infrared radiation by the components
(D) The deflection of charged particles in a magnetic field

17. The results for precision studies in Analytical Method Validation, are expressed in terms of?
(A) % Relative error
(B) Correlation coefficient
(C) % Relative standard deviation
(D) Mean

18. Which of the following is used as a spraying reagent in paper chromatography?
(A) conc. HCl
(B) NaCl solution
(C) Ninhydrin solution
(D) $CuSO_4$ solution

19. The fluorescent dye such as Ethidium bromide is used for visualization of DNA, binds to DNA at
(A) Stacked between histone molecules
(B) Binds to nucleotide base
(C) Intercalated between the stacked bases
(D) Binds to the phosphodiestester backbone

20. Function of β-mercaptoethanol in SDS-PAGE is
(A) To give negative charges to amino acids in the proteins
(B) For the oxidation of disulphide bonds in the proteins

(C) For breaking hydrogen bonds in the proteins
(D) For the reduction of disulphide bonds in the proteins

21. Which of the following will migrate faster if the molecular weight of the following is equal
(A) Nicked circular DNA
(B) Supercoiled circular DNA
(C) Single stranded DNA
(D) Double stranded DNA

22. Red colour appears on the seeds and pollen grains by TTC (Triphenyl Tetrazolium Chloride) is due to formation of
(A) Formazon   (B) Ninhydrin
(C) Aniline blue   (D) Saffranin

23. Cell A has osmotic potential of -10 bars and pressure potential of 8 bars, whereas, cell B has osmotic potential of -18 bars and pressure potential 6 bars. The direction of flow of water will be:
(A) From cell B to cell A   (B) From cell A to cell B
(C) No flow of water   (D) In both directions

24. When the seeds of crop plants are treated at low temperature under moist conditions to break seed dormancy, the technique is called:
(A) Scarification   (B) Vernalization
(C) Chelation   (D) Stratification

25. Photosynthetic pigments are separated by using paper chromatography; the order of pigments on chromatogram is as follows:
(A) Chl b Chl a Xanthophylls   Carotenes
(B) Chl a Chl b Xanthophylls   Carotenes
(C) Chl a Chl b   Carotenes   Xanthophylls
(D) Carotenes Chl a Chl b   Xanthophylls

26. Synzoospores are found in alga
(A) Oedogonium   (B) Vaucheria
(C) Nostoc   (D) Spirogyra

27. Flask shaped fruiting body of Ascomycotina is known as
(A) Cleistothecium   (B) Apothecium
(C) Perithecium   (D) Sclerotium

28. Which of the following is an aquatic species of *Riccia?*
(A) Riccia discolor   (B) Riccia crystallina
(C) Riccia fluitans   (D) Riccia himalayensis

29. Which of the following is NOT true for monocots?
(A) Sieve tube element with companion cell
(B) Atactostele
(C) Tricolpate pollen
(D) Absence of vascular cambium

30. Anther culture was first time reported in which plant?
    (A) Calotropis procera   (B) Datura innoxia
    (C) Ocimum sanctum   (D) Jatropha curcas

31. The plants which are mostly found in arid zone and have their buds completely hidden in soil as bulbs or rhizomes are known as
    (A) Therophytes   (B) Chaemophytes
    (C) Cryptophytes   (D) Phanerophytes

32. Which of following aquatic pteridophytes represents heterospory?
    (A) Azolla   (B) Selaginella
    (C) Equisetum   (D) Psilotum

33. In case of heteroecious rust (*Puccinia graminis tritici*), the following infection strategy is observed
    (A) Haploid basidiospores infect wheat, dikaryotic aecidiospores infect barberry
    (B) Haploid aecidiospore infect wheat, dikaryotic basidiospore infect barberry
    (C) Haploid basidiospores infect barberry, dikaryotic aecidiospores infect wheat
    (D) Haploid teleutospore infect wheat, dikaryotic basidiospore infect barberry

34. Heteromorphic alternation of generation occur in
    (A) Ectocarpus   (B) Ulva
    (C) Draparnaldiopsis   (D) Laminaria

35. In case of dihybrid cross, F_2 phenotypic ratio, 15:1 results due to
    (A) Supplementary genes   (B) Duplicate genes
    (C) Inhibitory genes   (D) Complementary genes

36. A plant has 2n=12 chromosome which form 6 bivalents at meiosis. A chromosomal variant of this plant with 4 bivalents and 2 univalents at meiosis would be called
    (A) Disomic   (B) Double monosomic
    (C) Double trisomic   (D) Nullisomic

37. The development of a sporophyte from gametophyte without gamete formation is called
    (A) Apospory   (B) Parthenogenesis
    (C) Apogamy   (D) Hyperplasia

38. In two species population interaction, when one population is benefited and other remains unaffected, then it is called
    (A) Commensalism   (B) Proto-cooperation
    (C) Amensalism   (D) Mutualism

39. Species showing non-heritable differences in morphology of plants due to varied natural environment are called
    (A) Ecophenes   (B) Ecotypes
    (C) Environmental types   (D) Phenotype

(4)

40. The rate of storage of organic matter in plant tissues in excess of respiratory utilization during the period of measurement in the ecosystem is termed as
(A) Net primary productivity
(B) Secondary productivity
(C) Biomass
(D) Net gross productivity

41. At the time of seed germination in cereals, GA induced amylase synthesis occurs in
(A) Aleurone layer
(B) Radicle
(C) Coleoptile
(D) Hypocotyl

42. Tropical regions may have more species diversity because of the following possible reasons, EXCEPT
(A) Tropical regions had more time to diversify under stable climate conditions than temperate regions
(B) Tropical regions have high spatial heterogeneity
(C) Greater biological competition in the tropics leads to narrower niches
(D) Lower predation intensity in the tropics allows survival of more prey species

43. Saffron commonly called 'Kesar' is obtained from
(A) Dried stigma and pollen grains of *Crocus sativus*
(B) Dried stigma as well as top of style of *Crocus sativus*
(C) Dried stigma as well as anther of *Crocus sativus*
(D) Dried anthers as well as petals of *Crocus sativus*

44. 'Reserpine' an alkaloid commonly used for lowering the blood pressure is obtained from
(A) Roots of Rauvolfia
(B) Rhizome of Rauvolfia
(C) Roots of Withania
(D) Stem of Withania

45. Interxylary phloem and intraxylary phloem are present in which of the following plants?
(A) Bignonia
(B) Strychnos
(C) Nyctanthes
(D) Dracaena

46. The plant family, which is characterized by squarish stem, zygomorphic bilabiate flower, verticillaster inflorescence, gynobasic style and carcerulus fruit is
(A) Apiaceae
(B) Solanaceae
(C) Lamiaceae
(D) Asclepiadaceae

47. Which of the following statements about phylogenetic system of plant classification is false?
(A) Placing of Gymnosperms prior to angiosperms
(B) Inferior ovary is treated as primitive character
(C) Orchidaceae of monocot and Compositae of dicots are considered as most advanced
(D) Amentiferae is treated more primitive than Ranunculaceae

48. Which of the following statements about LEAFY (LFY), a regulatory gene in *Arabidopsis thaliana* is correct?
(A) LEAFY (LFY) is involved in floral meristem identity
(B) LEAFY (LFY) is involved in leaf expansion
(C) LEAFY (LFY) is involved in root meristem identity
(D) LEAFY (LFY) is responsible for far red light mediated growth of seedlings

49. Pioneer seral communities of succession are characterized by
(A) Low species diversity, short life cycle, r-strategist
(B) Low species diversity, narrow niche specialization, predominant detritus food chain
(C) High species diversity, broad niche specialization, predominant grazing food chain
(D) Low species diversity, long life cycle, k-strategist

50. Which one of the following statements is true for competitive inhibition?
(A) It increases the Km of an enzyme
(B) It decreases the Km of an enzyme
(C) It Increases both the Vmax and Km of an enzyme
(D) It decreases the Km but increases the Vmax of an enzyme

x-x-x

Faculty of Business Management & Commerce (BMC)

1. Research is defined as
   (A)   A systematic, self-critical enquiry
   (B)   A systematic inquiry to describe, explain, predict, and control the observed phenomenon
   (C)   The creation of new knowledge and/or the use of existing knowledge in a new and   creative way so as to generate new concepts, methodologies and understandings
   (D)   All of the above

2. As a general rule, researchers should first
   (A)   Investigate previous research to see whether or not others may have already addressed similar research problems
   (B)   Conduct a pilot study
   (C)   Logically derive hypotheses from objectives
   (D)   Formally state the research objectives

3. Research design is a
   (A)   Multidimensional concept
   (B)   Literary concept
   (C)   Unilateral concept
   (D)   Hypothetical concept

4. 'Do you own a car- yes/no' is an example of
   (A)   Nominal Scales
   (B)   Ordinal Scales
   (C)   Interval Scales
   (D)   Ratio scales

5. In essence a ration scale is an _____ scale with a natural origin.
   (A)   Interval
   (B)   Ordinal
   (C)   Nominal
   (D)   None of the above

6. Which of the following statement is correct
   (A)   Validity is concerned with a wide range of factors of economy, convenience and interpretability
   (B)   Validity is the accuracy and precision of a measurement procedure
   (C)   Validity refers to the extent to which a test/instrument measures what we actually wish to measure
   (D)   Validity is an ability of a researcher to construct a research instrument

7. Literature review is not usually concerned with helping in
   (A)   Subsequent data collection
   (B)   Setting of research objectives
   (C)   Appreciation of literature
   (D)   Designing of research instrument

8. It is important for a researcher to review the literature because_____
   (A)   It helps in understanding the time spent on the research domain
   (B)   It is tradition to carry on literature review
   (C)   It helps in identifying the like-minded researchers in the related domain
   (D)   It will help in finding if anyone has done the work before

9. The goals of theory is
   (A)   To understand the relationships among various phenomenon
   (B)   To predict what will happen if one factor is changed
   (C)   Both (A) and (B)
   (D)   Neither (A) nor (B)

10. A theory consists of
   (A)   A coherent set of precise prepositions that offer an explanation of some phenomena by describing the way other things correspond to this phenomenon
   (B)   A coherent set of specific prepositions that offer an explanation of some phenomena by describing the way other things correspond to this phenomenon
   (C)   A coherent set of narrow prepositions that offer an explanation of some phenomena by describing the way other things correspond to this phenomenon
   (D)   A coherent set of general prepositions that offer an explanation of some phenomena by describing the way other things correspond to this phenomenon

11. The primary purpose of _____ is to provide insights into the problem.
   (A)   Conclusive Research
   (B)   Exploratory Research
   (C)   Descriptive
   (D)   Cross Sectional

12. _____ is conducted to test specific hypotheses and examine specific relationships.
   (A)   Conclusive Research
   (B)   Exploratory Research
   (C)   Qualitative research
   (D)   Research Design

13. A _____refers to some difficulty that a researcher experiences in wither a theoretical or practical situation.
   (A)   Research Crises
   (B)   Research Hypothesis
   (C)   Research Experience
   (D)   Research Problem

14. The choice of research design is influenced by the _____
   (A)   The nature of the research problem
   (B)   The audiences for the study
   (C)   The researchers' personal experiences
   (D)   All of the above

15. Area sampling is the forms of
   (A)   Stratified Sampling
   (B)   Cluster Sampling
   (C)   Random Sampling
   (D)   Convenience Sampling

16. Non-probability sampling does not include
   (A)   Convenience sampling
   (B)   Purposive sampling
   (C)   Snowball sampling
   (D)   Systematic sampling

17. Which of the following is not a characteristic of Quota Sampling?
   (A)   The researcher chooses who to approach and so might bias the sample
   (B)   Those who are available to be surveyed in public places are unlikely to constitute a representative sample
   (C)   The random selection of units makes it possible to calculate the standard error
   (D)   It is a relatively fast and cheap way of finding out about public opinions

18. When Type-I error is committed, _____
   (A)   One fails to reject a false null hypothesis
   (B)   The result is an unjust acquittal with the guilt person going free
   (C)   A true null hypothesis is rejected
   (D)   A true null hypothesis is accepted

19. While testing for single population mean when the sample size n is less than 30 and population standard deviation is unknown
   (A)   Z test is used
   (B)   t-test with n-2 degree of freedom is used
   (C)   t-test with n-1 degree of freedom is used
   (D)   F-test is used

20. Which of the following is not a non-parametric measures of association
   (A)   Spearman's rank correlation
   (B)   Linear regression
   (C)   Kendall's Tau
   (D)   Contingency coefficient

21. If X may be considered to be the cause of Y, then X is described as explanatory variable and Y is described as _____
   (A)   Causal variable
   (B)   Independent variable
   (C)   Criterion variable
   (D)   None of the above

22. How can $p<.05$ be interpreted?
- (A) There is a less than 1 in 20 probability of the result occurring by chance alone if the null hypothesis were true
- (B) The probability of obtaining the data if the null hypothesis were true is less than 5%
- (C) There is a 5% chance of making a type one error
- (D) All of the above

23. If the Critical region is evenly distributed then the test is referred as?
- (A) Two tailed
- (B) One tailed
- (C) Three tailed
- (D) Zero tailed

24. _____ is the first step in data processing
- (A) Tabulation
- (B) Coding
- (C) Editing
- (D) Classification

25. Before starting writing a report it is advisable to develop
- (A) A theme
- (B) A research design
- (C) A model
- (D) An outline

26. Creating Provision against fluctuation in the price of investment is an example of which accounting convention
- (A) Convention of conservatism
- (B) Convention of full disclosure
- (C) Convention of materiality
- (D) Convention of consistency

27. Accounting does not record non-financial transactions because of:
- (A) Accrual concept
- (B) Cost concept
- (C) Continuity concept
- (D) Money measurement concept

28. Which one of the following is an example of personal account?
- (A) Capital account
- (B) Building account
- (C) Cash account
- (D) Investment account

29. A business has following items in it Land:-

Vehicles	Rs.	6,00,000
Debtors	Rs.	1,20,000
Cash	Rs.	30,000
Owners' Equity	Rs.	10,00,000
Loan		5,00,000
Creditors	Rs.	50,000

What is the value of the land _____
- (A) 1,000,000
- (B) 1,550,000
- (C) 800,000
- (D) 50,000

30. GST is a consumption of goods and service tax based on.
- (A) Development
- (B) Dividend
- (C) Duration
- (D) Destination

31. What does financial leverage measure?
- (A) No change with EBIT and EPS
- (B) The sensibility of EBIT with % change with respect to output
- (C) The sensibility of EPS w.r.t % change in the EBIT level
- (D) % variation in the level of production

32. When appraisals are made by superiors, peers, subordinates and clients then it is called _____.
- (A) 360 degree feedback
- (B) 180 degree feedback
- (C) Self - appraisal
- (D) All of these

33. In India the Labour is Classified majorly of _____ categories
- (A) 2
- (B) 3
- (C) 4
- (D) 5

34. KSA represents
- (A) Knowledge, Skill, Aptitude
- (B) Knowledge, System, Aptitude
- (C) Knowledge, Skill, Approach
- (D) Knowledge, Skill, Attitude

35. Human resource management is amalgam of
- (A) Job analysis, recruitment and selection
- (B) Social behaviour and business ethics
- (C) Organisational behaviour, personal management and industrial relation
- (D) Employer and employees

36. _____ is a performance appraisal technique in which appraisers rate critical employee behaviour.
(A)   MBO
(B)   BARS
(C)   BOS
(D)   BOSS

37. Ego states referred to in transactional analysis does not include
(A)   Child
(B)   Parent
(C)   Adult
(D)   Sibling

38. Chimney Sweeps employs people to clean fireplaces and chimneys in homes and apartments. The firm is primarily the marketer of which one of the following?
(A)   An image
(B)   A service
(C)   A good
(D)   An idea

39. What is the last stage of the consumer decision process?
(A)   Problem recognition
(B)   Post purchase behaviour
(C)   Alternative evaluation
(D)   Purchase

40. The _____ holds that the organization's task is to determine the needs, wants, and interests of target markets and to deliver the desired satisfactions more effectively and efficiently than competitors in a way that preserves or enhances the consumer's and the society's wellbeing.
(A)   Customer-centered business
(B)   Focused business model
(C)   Societal marketing concept
(D)   Ethically responsible marketing

41. What do reference groups do in the process of consumer buying behaviour?
(A)   They recommend to individual a particular product or service
(B)   They provide benchmarks for comparing and evaluating group and personal characteristics
(C)   They buy product or service first and an individual buys them later
(D)   They dissuade an individual from buying a particular product or service

42. State true/false
   1. One advantage of branding is that it helps create customer loyalty
   2. One disadvantage of branding is that customer does not pay extra for a branded item
   (A)   1-T, 2-T
   (B)   1-F, 2-F
   (C)   1-T, 2-F
   (D)   1-F, 2-T

43. Match the following
1. Retailer	:	I	Low margin, high volume
2. Manufacturer	:	II	Does not take title to goods
3. Distributor	:	III	The direct link with the customer
4. Agent	:	IV	Gives products to distributes

   (A)   1-III, 2-IV, 3-I, 4-II
   (B)   1-II, 2-I, 3-IV, 4-III
   (C)   1-III, 2-IV, 3-II, 4-I
   (D)   1-IV, 2-III, 3-II, 4-I

44. The following are the steps of the personal selling process.
   1. Follow up
   2. Generation of clues
   3. Lead evaluation
   4. Presentation and demonstration
   5. Buyer analysis
   6. Providing solutions to customer
   7. Solving problems of the team
   8. Order generation
   9. Approaching customer
   10. Lead generation

   (A)   2, 9, 3, 5, 10, 6, 2
   (B)   10, 3, 5, 9, 4, 6, 8, 1
   (C)   10, 7, 3, 5, 6, 2, 4, 1
   (D)   None of these

45. The origins of Strategic Management can be retraced to _____
   (A)   1930
   (B)   1911
   (C)   1879
   (D)   1938

46. "V" in VUCA stands for _____
   (A)   Viability
   (B)   Volatility
   (C)   Violent
   (D)   Vicinity

47. The concept of 'Strategic window' was introduced by _____ .
   (A)   Michael Porter
   (B)   Peter Drucker
   (C)   Hamel
   (D)   **Abell**

48. A basic advantage of the _____ approach is that it generates enough information and employs scientific tools of analysis that enable planners and decision-makers to find solutions even in complex situations
   (A)   Formal-structured
   (B)   Adaptive
   (C)   Entrepreneurial-opportunistic
   (D)   Combination

49. In order to improve the competitive position, companies are adopting _____ , that is, moving one or more of the functions in the value chain outside.
   (A)   Strategic outsourcing
   (B)   Business process re-engineering
   (C)   Corporate restructuring
   (D)   Subcontracting

50. The competitive threat model or the five forces model was developed by _____
   (A)   Michael E Porter
   (B)   Hamel
   (C)   C K Prahlad
   (D)   Peter Drucker

x-x-x

Chemical Engineering(Ph.D) (CHE-ENGG)

1. In centrifugal pumps, cavitation occurs, when pressure of the impeller eye or vane becomes
   (A) Less than atmospheric pressure
   (B) More than liquid vapor pressure
   (C) Less than liquid vapor pressure
   (D) More than atmospheric pressure

2. Fluid flow through a packed bed is represented by the _____ equation.
   (A) Fanning's
   (B) Ergun's
   (C) Hagen-Poiseuille's
   (D) Colburn

3. The terminal velocity of a spherical particle in gravitational settling under Stokes regime varies
   (A) Linearly with the particle diameter
   (B) Linearly with the viscosity of the liquid
   (C) Directly with the square of particle diameter
   (D) Inversely with the density of particle

4. In a throttling process, pressure of an ideal gas reduces by 50%. If C_P and C_v are heat capacities at constant pressure and constant volume, respectively ($\gamma = Cp/Cv$), the specific volume will change by factor of
   (A) 2
   (B) $2^{1/\gamma}$
   (C) $2^{\gamma-1/\gamma}$
   (D) 0.5

5. A hollow sphere of internal diameter ID = 20 cm and outer diameter OD = 30 cm contains hot fluid. What should be the critical radius of insulation for maximum rate of heat transfer? Thermal conductivity k = 0.86 W/mK and convection heat transfer coefficient of outer fluid h_o = 20 W/m²K.
   (A) 0.086 cm
   (B) 0.86 m
   (C) 8.6 mm
   (D) 8.6 cm

6. The payback method for the measurement of return on investment
   (A) Gives a correct picture of profitability
   (B) Underemphasises liquidity
   (C) Does not measure the discounted rate of return
   (D) Takes into account the cash inflows after the recovery of investments

7. Segmental baffles in a 2-4 shell and tube heat exchanger
   (A) Change the flow pattern of the tube side fluid and increase the overall heat transfer coefficient
   (B) Increase the heat transfer coefficient in the shell side and support the tubes
   (C) Help to reduce the thermal expansion of the tubes and increase the heat transfer coefficient in the tube side
   (D) Increase the number of passes in the shell side and increase the heat transfer coefficient in the tube side

8. Condensation polymerization of _____ produces Bakelite.
   (A) Propylene
   (B) Phenol & formaldehyde
   (C) Phenol & acetaldehyde
   (D) Urea & formaldehyde

9. The volume of an ideal CSTR, in order to achieve the same conversion under identical reaction conditions and feed flow rate for a non-autocatalytic reaction of positive order, is
   (A) Always greater than that of an ideal PFR
   (B) Always smaller than that of an ideal PFR
   (C) Same as that of an ideal PFR
   (D) Smaller than that of an ideal PFR only for first order reaction

10. For foaming liquids, packed towers are preferred for gas-liquid mass transfer operations because
    (A) In packed towers, high liquid to gas ratios are best handled
    (B) In packed towers, continuous contact of gas and liquid takes place
    (C) Packed towers are packed with random packings
    (D) In packed towers, the gas is not bubbled through the liquid pool

11. The heat of combustion of methane, carbon monoxide and hydrogen are A, B and C respectively. For the reaction below,
    $CH_4 + H_2O \rightarrow CO + 3H_2$ the heat of reaction is given by
    (A) A - B - 3C
    (B) B + 3C - A
    (C) A – C - B
    (D) B + C – A

12. Styrene is produced from ethylbenzene by the process of
    (A) Dehydrogenation
    (B) Oxidation
    (C) Alkylation
    (D) Dehydration

13. Which is the most efficient and best for measuring very small flow rate of gases?
    (A) Venturimeter
    (B) Orificemeter
    (C) Rotameter
    (D) Flow nozzle

14. Teflon is
   (A) Phenol formaldehyde
   (B) An inorganic polymer
   (C) Polytetrafluroethylene (PTFE)
   (D) A monomer

15. A unit IMPULSE response of a first order system with time constant τ & steady state gain K_p is given by
   (A) $\frac{1}{K_p\tau} e^{\frac{t}{\tau}}$
   (B) $K_p e^{\frac{-t}{\tau}}$
   (C) $\tau K_p e^{\frac{-t}{\tau}}$
   (D) $\frac{K_p}{\tau} e^{\frac{-t}{\tau}}$

16. For a chemical reaction, the ratio of rate constant at 500 K to that at 400 K is 2.5. Given R= 8.314 J mol^{-1} K^{-1}, the value of activation energy (in kJ/mol) is
   (A) 10.5
   (B) 12.0
   (C) 15.2
   (D) 18.4

17. Saturated vapor is condensed to saturated liquid in a condenser. The heat capacityratio is $C_r=(C_{min}/C_{max})$. The effectiveness (ε) of the condenser is
   (A) $\frac{1-\exp[-NTU(1+C_r)]}{1+C_r}$
   (B) $\frac{1-\exp[-NTU(1-C_r)]}{1-C_r \exp[-NTU(1-Cr)]}$
   (C) $\frac{NTU}{1+NTU}$
   (D) $1 - \exp[-NTU]$

18. A pure drug is administered as a sphere and as a cube. The amount of drug is the same in the two tablets. Assuming that the shape and size do not influence the mass transfer, the ratio of rate of dissolution in water at t = 0 for the cubic to spherical tablet is
   (A) 1.04
   (B) 1.24
   (C) 1.94
   (D) 0.54

19. Reciprocal of sphericity is termed as the
   (A) Specific surface ratio
   (B) Shape factor
   (C) Sauter diameter
   (D) Surface area per unit mass

20. Which of the following is used for primary crushing of very hard lumpy materials?
    (A) Toothed roll crusher
    (B) Gyratory crusher
    (C) Ball mill
    (D) Tube mill

21. Pick out the wrong statement.
    (A) Diameter of randomly packed tower is normally more than 1.2 metres.
    (B) Packed towers are preferred for vacuum operation, because the pressure drop through the packing is less and they (packings) also lessen the possibility of tower wall collapse.
    (C) Packed towers are preferred over plate towers for handling corrosive and foamy liquids.
    (D) Due to uneven supply and improper distribution of liquid, problem of channeling, loading & flooding is generally encountered in packed towers.

22. Which of the following is a component of working capital investment?
    (A) Utilities plants
    (B) Maintenance and repair inventory
    (C) Process equipments
    (D) Depreciation

23. A reactor having a salvage value of Rs. 10000 is estimated to have a service life of 10 years. The annual interest rate is 10%. The original cost of the reactor was Rs. 80000. The book value of the reactor after 5 years using sinking fund depreciation method will be Rs.
    (A) 40,096
    (B) 43,196
    (C) 53,196
    (D) 60,196

24. A hot liquid is to be cooled in a 1-1 shell and tube heat exchanger from 80 to 50ºC. Cooling water enters the tube side at 30ºC and exits at 45ºC. The properties of the liquids are constant. Also, the overall heat transfer coefficient is same for counter-current and co-current modes. The percentage saving in heat transfer area for counter-current option with respect to the area of co-current option is _____.
    (A) 31.2
    (B) 27.1
    (C) 25.8
    (D) 35.5

25. Which of the following is a detergent?
    (A) Benzene hexachloride
    (B) Cellulose nitrate
    (C) Polyvinyl chloride
    (D) Alkyl benzene sulphonate

26. _____ is a preferred sampling method for the population with finite size.
    (A) Systematic sampling
    (B) Purposive sampling
    (C) Cluster sampling
    (D) Area sampling

27. Pre-testing a questionnaire is
    (A) testing questionnaire before its administration
    (B) testing its benefit after the administration
    (C) Useful in Data compilation
    (D) Useful in Data analysis

28. When the questionnaire is open ended, it is called as
    (A) Structured
    (B) Formal
    (C) Unstructured
    (D) Informal

29. A Hypothesis which develops while planning the research is
    (A) Null Hypothesis
    (B) Working Hypothesis
    (C) Relational Hypothesis
    (D) Descriptive Hypothesis

30. The purpose of a goodness-of-fit test is to assess
    (A) Whether several categorical variables are related
    (B) Whether there is a significant difference between a collection of categorical data
    (C) Whether central tendency, variability and distribution of sample is different from that of the population
    (D) Significant effects of various parameters

31. These are the examples of secondary data _____.
    (A) Statistical survey, respondents' answers, judgement of the researcher
    (B) Telephone survey, mail survey, opinion polls
    (C) Statistical survey reports, Government publications, trade journals
    (D) questionnaires, interviews, email survey

32. A value which is most repeated in a distribution is _____.
    (A) Mode
    (B) Median
    (C) Mean
    (D) Frequency

33. Usually confidence intervals are set at what figure?
    (A) 100%.
    (B) 95%.
    (C) 5%.
    (D) 55%.

34. The difference between the mean of a researcher's sample and the mean of the population of the sample is known as the:
    (A) Significance level
    (B) Confidence interval
    (C) Standard deviation
    (D) Sampling error

35. Which of the following features are considered as critical in qualitative research?
    (A) Collecting data with the help of standardized research tools
    (B) Design sampling with probability sample techniques
    (C) Collecting data with bottom-up empirical evidence
    (D) Gathering data with top-down schematic evidence

36. What are the conditions in which Type-I error occurs?
    (A) The null hypotheses get accepted even if it is false
    (B) The null hypotheses get rejected even if it is true
    (C) Both the null hypotheses as well as alternative hypotheses are rejected
    (D) None of the above

37. Quantitative content analysis is an approach that aims to:
    (A) Objectively and systematically measure the content of a text.
    (B) Reach an interpretive understanding of social action.
    (C) Engage in a critical dialogue about ethical issues in research.
    (D) Provide a feminist alternative to 'male-stream' quantitative methods.

38. Closed ended questions are those that:
    (A) Have a fixed range of possible answers
    (B) Prevent respondents from allocating themselves to a category
    (C) Encourage detailed, elaborate responses
    (D) Relate to the basic demographic characteristics of respondents

39. A number calculated with complete population data and quantifies a characteristic of the population is called which of the following?
    (A) A datum
    (B) A statistic
    (C) A parameter
    (D) A population

40. To test linear relationship of y (dependent) and x (independent) continuous variables, which of the following plot best suited?
    (A) Scatter plot
    (B) Bar chart
    (C) Histograms
    (D) None of these

41. One of the following search engine is exclusively meant for scientific information:
    (A) Google
    (B) Yahoo
    (C) SCIRUS
    (D) Altavista

42. Which of the following is not covered under Intellectual Property Rights?
    (A) Copyrights
    (B) Patents
    (C) Thesaurus
    (D) Trade Marks

43. Which Statistical tool comes under Bivariate Analysis?
    (A) Linear Regression Analysis
    (B) Association of Attributes
    (C) Two-way ANOVA
    (D) All of the above

44. A technique of building up a list or a sample of a special population by using an initial set of acquaintances as informants is called
    (A) Quota sampling
    (B) Convenience Sampling
    (C) Snow ball Sampling
    (D) Purposive sampling

45. In which analysis, when there is a single measurement of each of the n sample objects or where there are several measurements of each of the n observations but each variable is analysed in isolation?
    (A) Univariate Analysis
    (B) Bivariate Analysis
    (C) Multivariate Analysis
    (D) None of these

46. When the correlation coefficient, r, is close to one:
    (A) There is no relationship between the two variables
    (B) There is a strong linear relationship between the two variables
    (C) It is impossible to tell if there is a relationship between the two variables
    (D) The slope of the regression line will be close to one

47. If the sum of squares of the deviations of 10 observations taken from mean 50 is 250, then C.V is
    (A) 10%
    (B) 12%
    (C) 20%
    (D) 15%

48. The median of a frequency distribution is found graphically with the help of:
    (A) Histogram
    (B) Frequency curve
    (C) Frequency polygon
    (D) Ogive

49. In statistical testing of the hypothesis, what happens to the region of rejection when the level of significance α is reduced?
(A) The answer depends on the form of alternate hypothesis
(B) The rejection region is reduced in size
(C) The rejection region is increased in size
(D) The rejection region is unaltered

50. The ratio of the standard deviation to the arithmetic mean expressed as a percentage is called:
(A) Coefficient of standard deviation
(B) Coefficient of skewness
(C) Coefficient of kurtosis
(D) Coefficient of variation

x-x-x

Chemistry(Ph.D.) (CHM)

1. The measurement of reproducibility of a scientific instrument gives an indication of its
   - (A) Accuracy
   - (B) Precision
   - (C) Efficiency
   - (D) Resolution

2. Information acquired by experience or experimentation is called
   - (A) Empirical
   - (B) Factual
   - (C) Theoretical
   - (D) Hypothetical

3. Which of the following can be a source of primary data in research?
   - (A) Survey
   - (B) Experiment
   - (C) Survey or experiment
   - (D) Survey or scientific literature

4. What is the main aim of interdisciplinary research?
   - (A) To over simplify the problem of research
   - (B) To bring out the holistic approach to research
   - (C) To create a new trend in research methodology
   - (D) To reduce the emphasis on a single subject in the research domain

5. What are the core elements of a dissertation?
   - (A) Introduction; Data Collection; Data Analysis; Conclusions and Recommendations
   - (B) Executive Summary; Literature Review; Data Gathered; Conclusions; Bibliography
   - (C) Research Plan; Research Data; Analysis; References
   - (D) Introduction; Literature Review; Research Methodology; Results; Discussions and Conclusions

6. Research pertaining to pure sciences or natural laws is also called
   - (A) Action research
   - (B) Fundamental research
   - (C) Empirical research
   - (D) Qualitative research

7. Which of the following is true regarding the values of correlation coefficient (r) and its square (r^2):
   - (A) $r = -1$ to 1 and $r^2 = 0$ to 1
   - (B) $r = 0$ to 1 and $r^2 = -1$ to 1
   - (C) $r = -1$ to 1 and $r^2 = -1$ to 1
   - (D) $r = 0$ to 1 and $r^2 = 0$ to 1

8. Before starting his/her research, an experimental chemistry researcher must be aware of the "MSDS" document. What does "MSDS" stand for?
   (A)   Mass Safety Data Sheet
   (B)   Material Security Data Sheet
   (C)   Material Safety Data Sheet
   (D)   Master Security Data Sheet

9. Which of the following statements best describe the importance of "Literature review" in a scientific report or research paper?
   (A)   It Is not always necessary in a research paper or report; it is sometimes optional
   (B)   It is like a references list; it is a sequential ordering of each study a researcher reads
   (C)   It is a short, written synthesis of previous research on a topic
   (D)   It identifies what the purpose of your paper is

10. Bibliography means
   (A)   Foot Note
   (B)   Quotations
   (C)   List of literature referred
   (D)   Biography

11. Action-research can be understood as
   (A)   A longitudinal research
   (B)   An applied research
   (C)   A kind of research being carried out to solve a specific problem
   (D)   All of the above

12. In chemical research literature, the term "CAS" stands for
   (A)   Common Area Survey
   (B)   Chemical Area Services
   (C)   Chemical Abstracts Service
   (D)   Common Abstracts Station

13. In writing up the results of a recent experiment for publication, a scientist comes across a study in which the authors describe a similar experiment with different results. What would be the most appropriate way for the scientist to address this in her journal article?
   (A)   Avoid citing the study since the results differed
   (B)   Cite the study to say that the experiment was done and avoid discussing the different results
   (C)   Cite the study and offer an explanation why the results might have differed
   (D)   Cite the different results as evidence that her experiment was better

14. Which of the following statements best describes the role of the scientific literature in conducting research?
    (A)   The literature is usually consulted only at the beginning of the research process in order to formulate a question
    (B)   The literature is rarely consulted by scientists as they conduct research
    (C)   Old contributions to the scientific literature are no longer useful in modern research
    (D)   Consulting and adding to the scientific literature is an integral part of the research process

15. A research paper by several scientists was published in *Science* (a prestigious scientific journal). One year later, other scientists in the same research area discovered mistakes in the procedures used and alerted the authors. The authors agreed to the inadvertent mistakes. They could no longer be confident in their results, so they asked *Science* to retract their paper, or remove it from publication. Which of the following statements best describes this situation?
    (A)   The literature is an archive of knowledge; thus, any known mistakes should be removed.
    (B)   The authors simply made a mistake; there is no need to retract the paper.
    (C)   The scientists who found the mistakes were just being picky.
    (D)   The authors should be punished for their ignorance.

16. Which of the following publications would be considered part of the primary scientific literature?
    (A)   A peer reviewed article in a scientific journal
    (B)   A peer reviewed textbook written by a scientist
    (C)   A newspaper article about a new scientific breakthrough
    (D)   A science fiction book written by a scientist

17. How do most scientists search for and find relevant information in the scientific literature?
    (A)   By browsing in a bookstore
    (B)   By subscribing to several journals in their discipline
    (C)   Through databases that archive titles and abstracts
    (D)   Through web search engines like Yahoo!

18. Citing others in your research papers is good practice because
    (A)   It fills in the gaps of your own knowledge.
    (B)   It shows that you don't think you have all of the answers.
    (C)   It shows that you have been thorough in your research.
    (D)   Other researchers know more about your topic than you.

19. Quality of research can be assessed on the basis of
    (A)   Time spent for research
    (B)   Experience of the researcher
    (C)   Resources used for research
    (D)   Methodology adopted for research

20. How can a problem be selected for research?
    (A)   Asking researchers who have already worked in the research field
    (B)   Asking researchers who have supervised the ongoing or completed research

           projects in the area
    (C)   Reviewing available literature in library or online
    (D)   Moulding the completed research work to make it sound like something new

21. Which of the following is not a reputed scientific journal?
    (A)   *Nature*
    (B)   *Science*
    (C)   *Cell*
    (D)   *Tissue*

22. Drawing information or content from the work of another without acknowledging the source by citing a reference is considered to be plagiarism in all of the following cases except:
    (A)   Using the exact words of the author.
    (B)   Using data that another author had compiled through his/her independent investigation.
    (C)   Using information from the author's work that is regarded as common knowledge in the discipline.
    (D)   Reproducing in your paper a chart contained in the author's work.

23. There has been a steep rise in plagiarism these days due to
    (A)   Increase in publication growth
    (B)   Increase in enrolment for research work
    (C)   Availability of digital documents
    (D)   Use of computers in research

24. Which of the following organizations does not publish research in Chemical Sciences?
    (A)   ACS
    (B)   Wiley
    (C)   RSC
    (D)   ICSSR

25. Which of the following tools is most useful for literature search in Chemical Sciences?
    (A)   SciFinder
    (B)   Web of Science
    (C)   Google Scholar
    (D)   Research gate

26. A submicroscopic particle is confined in a box of length L. How will the energy of the particle change if the length of the box is halved?
    (A) The energy will quadruple
    (B) The energy will reduce by a factor of 0.25
    (C) The energy by reduce by a factor of 0.5
    (D) The energy will double

27. What will happen to the vibrational frequency of a covalent bond if its force constant doubles?
   (A)   The vibrational frequency remains unaltered
   (B)   The vibrational frequency increases by a factor of 1.404
   (C)   The vibrational frequency is halved
   (D)   The vibrational frequency is doubled

28. The polydispersity index of a polymer solution is defined as
   (A)   The ratio of number average molecular weight and its weight average molecular weight.
   (B)   The ratio of weight average molecular weight and its number average molecular weight
   (C)   The product of number average molecular weight and weight average molecular weight
   (D)   The difference in number average molecular weight and weight average molecular weight

29. For the general reaction A → B, which of the following represents the integrated rate equation for zero order kinetics ([A] represents reactant concentration at time t and $[A]_0$ represents initial reactant concentration)?
   (A) $[A] = -kt + [A]_0$
   (B) $\ln [A] = -kt + \ln [A]_0$
   (C) $0.5[A] = kt + 0.5[A]_0$
   (D) $\log [A] = -kt + \log [A]_0$

30. In view of the signs of $\Delta_r G°$ for the following reactions
   $PbO_2 + Pb \rightarrow 2\ PbO$, $\Delta_r G° < 0$
   $SnO_2 + Sn \rightarrow 2\ SnO$, $\Delta_r G° > 0$,
   Which oxidation states are more characteristic for lead and tin?
   (A)   +2 for Pb, +4 for Sn
   (B)   +4 for Pb, +2 for Sn
   (C)   +2 for Pb, +2 for Sn
   (D)   +4 for Pb, +4 for Sn

31. Which of the following is true for the entropy of a spontaneous reaction?
   (A) $\Delta S(\text{system}) - \Delta S(\text{surroundings}) > 0$
   (B) $\Delta S(\text{system}) + \Delta S(\text{surroundings}) > 0$
   (C) $\Delta S(\text{surroundings}) > 0$ only
   (D) $\Delta S(\text{system}) > 0$ only

32. What is the total energy of one mole of an ideal monoatomic gas in terms of Boltzmann's Constant (k), Avogadro's number (N) and temperature (T)?
   (A)   3 NkT
   (B)   1.5 NkT
   (C)   0.5 NkT
   (D)   NkT

33. According to the Michaelis Menten equation for unimolecular reactions:
    (A)   The rate is first order at low pressure, but becomes zero order at high pressure
    (B)   The rate is zero order at both low and high pressures
    (C)   The rate is zero order at low pressure, but becomes first order at high pressure
    (D)   The rate is first order at both low and high pressures

34. Consider the following compounds—
    (1) K_2CO_3 (2) $MgCO_3$ (3) $CaCO_3$ (4) $BeCO_3$
    Which one of the following arrangements in the increasing order of their thermal stabilities is correct?
    (A) $1 < 2 < 3 < 4$ (B) $2 < 4 < 3 < 1$
    (C) $3 < 2 < 1 < 4$ (D) $4 < 2 < 3 < 1$

35. The number of S-S bonds in Sulphur trioxide trimer (S_3O_9) is :
    (A) One   (B) Two   (C) Three   (D) Zero

36. In $TeCl_4$ the central atom tellurium involves:
    (A) sp^3 hybridisation   (B) sp^3d hybridisation
    (C) sp^3d^2 hybridisation   (D) dsp^2 hybridisation

37. Which one of the following alkaline earth metal ion has highest ionic mobility in aqueous solution?
    (A) Be^{2+} (B) Mg^{2+} (C) Ba^{2+} (D) Ca^{2+}

38. Crystal field stabilization energy for high spin d^4 octahedral complex is -
    (A) $-1.8 \Delta_o$ (B) $-1.6 \Delta_o + P$ (C) $-1.2 \Delta_o$ (D) $-0.6 \Delta_o$

39. Which among of the following complex ion is not expected to absorb visible light?
    (A) $[Ni(CN)_4]^{2-}$ (B) $[Cr(NH_3)_6]^{3+}$
    (C) $[Fe(H_2O)_6]^{2+}$ (D) $[Ni(H_2O)_6]^{2+}$

40. The set of ions expected to show Jahn-Teller distortion in their complexes is –
    (A)   Ti(III), Cu(II), High spin Fe(III)
    (B)   Cu(I), Ni(II), High spin Fe(III)
    (C)   Cu(II), low spin Fe(III). Ti(III)
    (D)   Low spin Fe(III), Mn(II), Cu(I)

41. Which the following lanthanoid does not show luminesense?
    (A) Eu^{3+} (B) Lu^{3+}
    (C) Tb^{3+} (D) Pm^{3+}

42. Assign R / S configuration at C-1and C-2 in the following compounds.
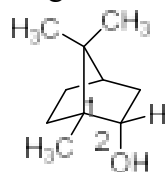
    (A)   1R,2S   (B)   1R,2R
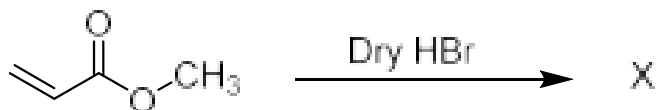   (C)   1S,2S   (D)   1R,2S

(6)

43. Singlet and triplet carbene can be distinguish by reaction with :
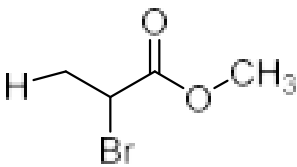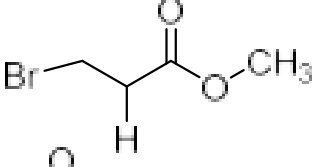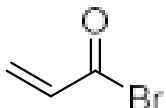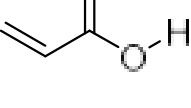   (A)   Cyclobutane   (B)   cis-Butene
    (C)   Iso-Butane   (D)   n-Butane

44. Which of the following alkyl halide is least reactive towards nucleophilic substitution through S_N2 mechanism:
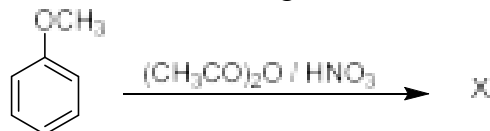   (A) CH_3CH_2Cl (B) $(CH_3)_2CHCl$
    (C) $(CH_3)_3CCl$ (D) $(CH_3)_3CH_2Cl$

45. The product X in the following reaction is:

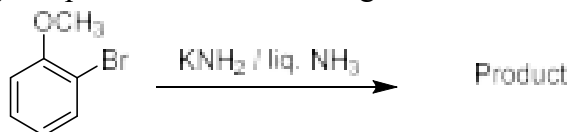   (A)   (B)

    (C)   (D)

46. The major product X in the following reaction is:

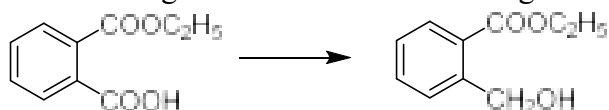   (A)   o-Nitro anisole   (B)   p-Nitroanisole
    (C)   m-Nitroanisole   (D)   p-Nitro phenyl acetate

47. Identify the product in the following reaction:

    (A) m-Anisidine   (B)   o-Anisidine
    (C) o-Phenylenediamine   (D)   o-Bromoaniline

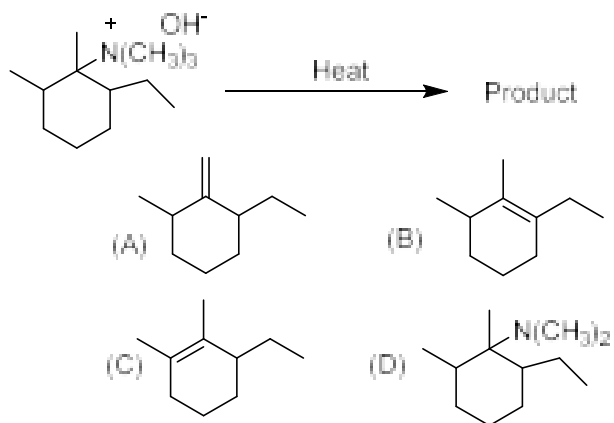48. The best reagent to achieve the following transformation is:

    (A)   NaBH$_4$ (B)   LiAlH$_4$
    (C)   Hg(OAc)$_2$ / NaBH$_4$ (D)   B$_2$H$_6$ / H$_2$O$_2$ –NaOH

49. The selective reagent for conversion of acid chloride to aldehyde is:
   (A)   Na(OAc)3BH   (B)   LiH
   (C)   AlH$_3$ (D)   LiAl[OC(CH$_3$)]$_3$H

50. The Hofmann elimination of quaternary ammonium hydroxide result in formation of which product:

x-x-x

Community Education and Disablity Studies(Ph.D)

1. "External validity" refers to:
   (A) Genuine effect of treatment variable on the dependent variable
   (B) The findings are relevant to the researchers' everyday lives
   (C) The extent to which the findings are generalized on the population
   (D) How accurately the measurements represent underlying concepts

2. In accepting a null hypothesis (Ho) by marking a difference not significant although there is a true difference, a researcher is likely to commit which type of error?
   (A) Type I error
   (B) Type II error
   (C) Both Type I error & Type II error
   (D) Neither Type I error & Type II error

3. The total area of Normal Probability Curve is _____
   (A) 6 SD
   (B) 4 SD
   (C) 3 SD
   (D) 8 SD

4. " There is a difference between students in high school who studied with ICT tools and those who did not study with ICT tools in terms of academic achievement" what type of hypothesis is this?
   (A) Null hypothesis
   (B) Directional hypothesis
   (C) Non – directional hypothesis
   (D) Research hypothesis

5. What does Triangulation refers to?
   (A) Triangulation refers to the replication of findings within settings, using different methods of data collection or analysis
   (B) Triangulation refers to a stage of the literature reviewing process
   (C) Triangulation refers to something you use a map and compass for
   (D) Triangulation refers to the attempt to dispute prior findings

6. O_1 O_2 O_3 O_4 X O_5 O_6 O_7 O_8
   The above design is an example of……….
   (A) One group pre-test-post-test design only
   (B) Pre-test-post-test control group design
   (C) Time series design
   (D) Post test control group design only

7. If the researcher is studying the effects of Blended learning design instruction on higher education students with learning problems, one is likely to conduct which type of research?
   (A) Ex Post facto research
   (B) Survey
   (C) Correlational
   (D) Field experiment

8. A p value of 0.05 means……..
   (A) There is only 5% chance that the results are incorrect
   (B) There is probability of 5 in 100 that this result would occur if the null hypothesis is true
   (C) There is only 5% chance of getting this result
   (D) All of the above are true

9. If the researcher wants to know how the life of people suffering from sex abuse have changed due to forced incidents, one is likely to use which sampling method?
   (A) Snowball sampling
   (B) Simple random sampling
   (C) Quota sampling
   (D) Systematic random sampling

10. The split-half method is used as a test of:
    (A) Inter-observer consistency
    (B) Internal consistency
    (C) External validity
    (D) Constancy

11. Which among the following is not the criterion of using -parametric statistical tests?
    (A) If the sample size is very large
    (B) If the data to be analyzed is in ranks
    (C) If the data is drawn from the normally distributed population
    (D) If the data is in ratio scale

12. Which of the following helps in improving day to day functioning of the practitioners rather than developing corpus of knowledge.
    (A) Fundamental research
    (B) Basic research
    (C) Applied research
    (D) Action research

(2)

13. What is the full form of APA (bibliography formatting), is termed as-
    (A) American Political Association
    (B) American Physiological Association
    (C) American Psychological Association
    (D) American People's Association

14. Which among the following is not a qualitative technique?
    (A) Ethnography
    (B) Field experiments
    (C) Grounded theory
    (D) Phenomenological

15. If there were a perfect positive correlation between two interval/ratio variables, the Pearson's r test would give a correlation coefficient of:
    (A) -0.328
    (B) +1
    (C) +0.328
    (D) -1

16. What is the percentile rank of the student if the raw score of a student of class X on an achievement test is 60 and the mean of the whole class is 50 with standard deviation 5?
    (A) 98
    (B) 90
    (C) 85
    (D) 95

17. Myra is conducting interviews in order to develop a customer profile for her client. She focuses on her objective but take the liberty to change the nature of questions while interviewing participants rather than asking fixed questions. What type of interview format is Myra using?
    (A) Structured
    (B) Semi structured
    (C) Unstructured
    (D) Close-ended

18. What does correlation refers to?
    (A) An estimate of frequency with which a characteristic appears
    (B) Establishing of the direction of causality between two variables
    (C) Describes characteristics associated with a subject population
    (D) Degree of relationship exists between two or more variables

19. People who are available, volunteer or can be easily available are used in which of the following sampling method?
    (A) Simple random sampling
    (B) Cluster sampling
    (C) Systematic sampling
    (D) Convenience sampling

20. Which of the following is not a characteristic of experimental research?
    (A) Description
    (B) Control
    (C) Manipulation
    (D) Prediction

21. The population on which the investigator intend to conduct the investigation, is termed as
    (A) Target population
    (B) Infinite population
    (C) Sampling population
    (D) Finite population

22. If the researcher creates a new test for depression levels, and compares its performance with previous standardized depression tests, then he is likely conduct which type of validity.
    (A) Face validity
    (B) Concurrent validity
    (C) Construct validity.
    (D) Content validity

23. In historical research, while doing external criticism (for establishing the authenticity of data) a researcher must verify:
    (A) The signature and handwriting of the author
    (B) The paper and ink test
    (C) Style of prose writing of that period
    (D) All of the above

24. What is the variance of the following distribution of scores:

    4, 6, 3, 7, 5

    (A) 10
    (B) 5
    (C) 25
    (D) 2

25. Which among the following is an example of negative correlation?
    (A) An increase in population will lead to a shortage of food grains
    (B) Poor intelligence means poor achievement in school
    (C) Corruption in India is increasing
    (D) Poor working condition retards output

26. Which statement is not true for the term community?
    (A) Group of people living in a particular local area
    (B) A group of nations having common interests
    (C) Group of people living in distant area
    (D) Group of organisms sharing an environment

27. What is the nature of all communities?
    (A) Dynamic
    (B) Rigid
    (C) Artificial
    (D) Complex

28. Communities are now increasingly developed by which of the following approach?
    (A) Systematic approach
    (B) Bottom up approach
    (C) Bottom down approach
    (D) Horizontal approach

29. Community development is which type of intervention that gives communities greater control over the conditions that affect their lives?
    (A) Unstructured
    (B) Structured
    (C) Specific
    (D) Critical

30. An overall impression of the village situation can then be revealed and formed through which of the following?
    (A) Atlas
    (B) Globe
    (C) Map
    (D) Compass

31. Which of the following encompasses the set of beliefs, moral values, traditions, language, and laws (or rules of behavior) held in common by a nation, a community?
    (A) Social factor
    (B) Religious factor
    (C) Cultural factor
    (D) Geographical factor

32. Which of the following is not the part of gender?
    (A) Roles
    (B) Stereotypes
    (C) Values
    (D) Emotions

33. Which of the following is the key to discussion of gender roles?
    (A) Societal role
    (B) Gender division of labour
    (C) Cultural influence
    (D) Religion

34. Who defines community organization as a "process by which a community identifies its needs or objectives, gives priority to them, develops confidence and will to work at them"?
    (A) Murray G. Ross
    (B) Max Weber
    (C) Peter Blau
    (D) George Herbert Mead

35. Who has presented a statement of 28 suggested principles of community organization?
    (A) Dunham
    (B) Ann Swidler
    (C) Talcott Parsons
    (D) Max Weber

36. Which is the time period of The Charity Organisation Period?
    (A) 1870-1917
    (B) 1860-1912
    (C) 1870-1914
    (D) 1970-1990

37. In which year the community development project was launched by the government of India?
    (A) 1960
    (B) 1952
    (C) 1964
    (D) 1965

38. Who emphasise the concept of community work as the reconstruction of the community rather than on organising an unorganised or disorganised community or on the development of an entirely new community?
    (A) Rabindera Nath Tagore
    (B) Mahatma Gandhi
    (C) Aurobindo Gosh
    (D) Jawahar Lal Nehru

39. A feudalistic system of prescribed, hereditary obligations of payment and of occupational and ceremonial duties between two or more specific families of different castes in the same locality is known as
    (A) Monarchy System
    (B) Jamidari System
    (C) Jajmani System
    (D) Democratic System

40. Which is the power determinant in the *jajmani* system?
    (A) Money
    (B) Land
    (C) Caste
    (D) Religion

41. Whose income is derived primarily from property rights in the soil?
    (A) Kisans
    (B) Mazdoors
    (C) Maliks
    (D) Zamidars

42. Middle farmers possess how much land?
    (A) Above 20 acres
    (B) Above 50 acres
    (C) Between 5 acres and 10/15 acres
    (D) Between 15 acres and 20/25 acres

43. In which year Green revolution is commenced in India?
    (A) 1956
    (B) 1965
    (C) 1975
    (D) 1966

44. What is the full form of PIL?
    (A) Public interest litigation
    (B) Private interest litigation
    (C) Personal interest litigation
    (D) Public interest law

45. PIL can be filed in High Court or Supreme Court under which article?
    (A) Article 228
    (B) Article 226
    (C) Article 229
    (D) Article 231

46. The Committee on Tribal Economy in Forest Areas is established in which year?
    (A) 1967
    (B) 1957
    (C) 1977
    (D) 1987

47. Which article speaks of special provisions meant for the administration and control of scheduled areas and tribals for their welfare and protection for promoting the welfare of the ST and for raising the level of administration of - ST and tribal areas to the state level?
(A) Article- 15 (4) 46, 244, 339
(B) Article- 12 (2) 36, 44, 138
(C) Article 226
(D) Article 228

48. The original word for conscientization is conscientizacao in which language?
(A) Portuguese
(B) Latin
(C) German
(D) Spanish

49. The term "society" is rooted in which Latin word?
(A) Societas
(B) Socitious
(C) Societamus
(D) Social

50. From which oldest and largest civilization we can trace the evolution of Indian Society?
(A) Indus valley civilization
(B) Mesopotamian
(C) Vedic civilization
(D) Ancient Greek civilization

x-x-x

Computer Science & Engineering(Ph.D.)

1. The problem of fragmentation arises in

    (A) Static storage Allocation

    (B) Stack allocation of storage

    (C) Stack allocation with dynamic binding

    (D) Heap allocation

2. The process of organizing the memory into two banks to allow 8 and 16-bit data operation is called

    (A) Bank Switching

    (B) Indexed Mapping

    (C) Two-way memory interleaving

    (D) Memory segmentation

3. Thrashing occurs when

    (A) Too much of the time is spent in waiting to swap between memory and disk

    (B) Two processes try to access the same resource

    (C) The size of the data to be inserted is less than the size of a page in memory

    (D) The processor's mapping table discovers that the program is trying to use an address that doesn't currently exist

4. Which of the following contains a complete record of all activity that affected the contents of a database during a certain period of time?

    (A) Report writer

    (B) Query language

    (C) Data manipulation language

    (D) Transaction log

5. A software that allows a personal computer to pretend as a terminal is

    (A) Auto-dialing

    (B) Bulletin-board

    (C) Modem

    (D) Terminal emulation

6. A field width specifier in a printf() function

      (A) Specifies the maximum value of a number

      (B) Controls the size of type used to print numbers

      (C) Controls the margins of the program

      (D) Specifies how many character positions will be used for a number

7. Which of the following algorithms has running time $O(n^2)$ in the worst case but $O(n \log n)$ on average?

      (A) Bubble sort

      (B) Merge sort

      (C) Heap sort

      (D) Quick sort

8. Which of the following is the name of the data structure in a compiler that is responsible for managing information about variables and their attributes?

      (A) Abstract Syntax Tree (AST)

      (B) Attribute Grammar

      (C) Symbol Table

      (D) Parse Table

9. Which of the following comes closest to being a perfectly secure encryption scheme?

      (A) The Caesar Cipher

      (B) DES

      (C) One-time pad

      (D) RSA

10. Company X shipped 5 computer chips, 1 of which was defective and Company Y shipped 4 computer chips, 2 of which were defective. One computer chip is to be chosen uniformly at random from the 9 chips shipped by the companies. If the chosen chip is found to be defective, what is the probability that the chip came from company Y?

      (A) 2/9

      (B) 4/9

      (C) 1/2

      (D) 2/3

11. An Euler circuit of an undirected graph is a circuit in which each edge of the graph appears exactly once. Which of the following undirected graphs must have an Euler circuit?

    (A) A complete graph with 12 vertices

    (B) A complete graph with 13 vertices

    (C) A tree with 13 vertices

    (D) both (A) and (B)

12. Which of the following is NOT a reasonable justification for choosing to busy-wait on an asynchronous event?

    (A) The wait is expected to be short

    (B) A busy-wait loop is easier to code than an interrupt handler

    (C) The task must meet some hard real-time deadlines

    (D) The program executes on a time-sharing system

13. In a pipelined RISC computer where all arithmetic instructions have the same CPI (cycles per instruction), which of the following actions would improve the execution time of a typical program?

    (A) Increasing the clock cycle rate

    (B) Disallowing any forwarding in the pipeline

    (C) Doubling the sizes of the instruction cache and the data cache without changing the clock cycle time

    (D) both (A) and (C)

14. Which of the following is NOT a property of bitmap graphics?

    (A) Fast hardware exists to move blocks of pixels efficiently

    (B) Realistic lighting and shading can be done

    (C) All line segments can be displayed as straight

    (D) Polygons can be filled with solid colors and textures

15. Consider the following grammar.

      i. S → (S)

     ii. S → x

Which of the following statements is (are) true?

(A) The grammar is ambiguous

(B) The grammar is suitable for top-down parsing

(C) The grammar is suitable for bottom-up parsing

(D) Both (B) and (C)

16. Consider the following pseudocode.

x := 1;

i := 1;

while (x ≤ 1000)

begin

    x := 2^x ;

    i := i+1;

end;

What is the value of i at the end of the pseudocode?

(A) 4

(B) 5

(C) 6

(D) 8

17. Which of the following statements about Ethernets is typically FALSE?

(A) Ethernets use circuit switching to send messages

(B) Ethernets use buses with multiple masters

(C) Networks connected by Ethernets are limited in length to a few hundred meters

(D) Packets sent on Ethernets are limited in size

(4)

18. A k-ary tree is a tree in which every node has at most k children. In a k-ary tree with n nodes and height h, which of the following is an upper bound for the maximum number of leaves as a function of h, k and n?

   (A) $\log_k n$

   (B) $\log_k h$

   (C) $n / \log_k n$

   (D) k^h

19. Hash tables can contribute to an efficient average-case solution for all of the problems described below EXCEPT:

   (A) Counting distinct values

   (B) Dynamic dictionary

   (C) Range search

   (D) Symbol table lookup

20. Which of the following is NOT part of the root set in a typical garbage collector?

   (A) Actual parameters of the active procedures

   (B) Dynamically allocated objects on the heap

   (C) Global variables of the program

   (D) Local variables on the call stack

21. Which of the following conditions can be expressed by a Boolean formula in the Boolean variables p_1, p_2, p_3, p_4 and the connectives $\wedge$, $\vee$ (without $\neg$) ?

   (A) At least three of p_1, p_2, p_3, p_4 are true

   (B) Exactly three of p_1, p_2, p_3, p_4 are true

   (C) An even number of p_1, p_2, p_3, p_4 are true

   (D) Both (A) and (C)

(5)

22. Which of the following refers to the term "residual error rate"?

(A) The number of bit error per twenty four hours of continuous operation on an asynchronous line

(B) The probability that one or more errors will be undetected when an error detection scheme is used

(C) The probability that one or more errors will be detected when an error detection mechanism is used

(D) Signal to noise ratio divided by the ratio of energy per bit to noise per hertz

23. A standalone program that has been modified to work on a LAN by including concurrency controls such as file and record locking is an example of

(A) LAN intrinsic software

(B) LAN aware software

(C) Groupware

(D) LAN ignorant software

24. The support of point-to-point and mesh topology is observed in which of the following standard?

(A) IEEE 802.16c

(B) IEEE 802.16d

(C) IEEE 802.16e

(D) IEEE 802.16a

25. Consider the collection of all undirected graphs with 10 nodes and 6 edges. Let M and m, respectively, be the maximum and minimum number of connected components in any graph in the collection. If a graph has no self-loops and there is at most one edge between any pair of nodes, which of the following is true?

(A) M=10, m=10

(B) M=10, m=1

(C) M=7, m=4

(D) M=6, m=4

26. Which of the following is a form of research typically conducted by teachers, counsellors, and other professionals to answer questions they have and to specifically help them solve local problems?
    (A) Action research
    (B) Basic research
    (C) Predictive research
    (D) Orientational research

27. Which form of reasoning is the process of drawing a specific conclusion from a set of premises?
    (A) Rationalism
    (B) Deductive reasoning
    (C) Inductive reasoning
    (D) Probabilistic

28. A variable that is presumed to cause a change in another variable is called a:
    (A) Categorical
    (B) Dependent
    (C) Independent
    (D) Intervening

29. All of the following are common characteristics of experimental research except:
    (A) It relies primarily on the collection of numerical data
    (B) It can produce important knowledge about cause and effect
    (C) It uses the deductive scientific method
    (D) It rarely is conducted in a controlled setting or environment

30. Which of the following can best be described as a categorical variable?
    (A) Age
    (B) Annual income
    (C) Grade point average
    (D) Religion

31. What kind of ideas can't be empirically researched?
    (A) Effectiveness of different methods of instruction
    (B) Description of educational practices
    (C) Issues of values and morality such as the correctness of having prayer in schools
    (D) Factors helpful in predicting future drug use

32. A formal statement of the research question or "purpose of research study" generally _____.
    (A) Is made prior to the literature review
    (B) Is made after the literature review
    (C) Will help guide the research process
    (D) Both (B) and (C)

33. Let's say that a test accurately indicates participants' scores on a future criterion (e.g., the PSAT is used to indicate high-school GPA scores). This test would clearly have which of the following?
    (A) Face validity
    (B) Concurrent validity
    (C) Predictive validity
    (D) Content validity

34. Which of the following statements accurately describes test-retest reliability?
    (A) Measure of degree of agreement between two or more scorers, judges, or raters
    (B) Measure of consistency of scores obtained from two equivalent halves of the same test
    (C) Measure of consistency with which a test measures a single construct or concept
    (D) Measure of consistency of test scores over time

35. Researchers use both open-ended and closed-ended questions to collect data. Which of the following statements is true?
    (A) Open-ended questions directly provide quantitative data based on the researcher's predetermined response categories
    (B) Closed-ended questions directly provide qualitative data in the participants' own words
    (C) Closed-ended questions provide quantitative data in the participant's own words
    (D) Open-ended questions provide qualitative data in the participant's own words

36. Which of the following techniques yields a simple random sample?
    (A) Choosing volunteers from an introductory psychology class to participate
    (B) Listing the individuals by ethnic group and choosing a proportion from within each ethnic group at random
    (C) Numbering all the elements of a sampling frame and then using a random number table to pick cases from the table
    (D) Randomly selecting schools, and then sampling everyone within the school

37. In which of the following nonrandom sampling techniques does the researcher ask the research participants to identify other potential research participants?
    (A) Snowball
    (B) Convenience
    (C) Purposive
    (D) Quota

38. A number calculated with complete population data and quantifies a characteristic of the population is called which of the following?
    (A) A datum
    (B) A statistic
    (C) A parameter
    (D) A population

39. A researcher was interested in studying why the "new math" of the 1960s failed. She interviews several teachers who used the new math during the 1960s. These teachers are considered:
    (A) Primary sources
    (B) Secondary sources
    (C) Theoretical sources
    (D) Opinion sources

40. Analysis of covariance is:
    (A) A statistical technique that can be used to help equate groups on specific variables
    (B) A statistical technique that can be used to control sequencing effects
    (C) A statistical technique that substitutes for random assignment to groups
    (D) Adjusts scores on the independent variable to control for extraneous variables

41. If a research finding is statistically significant, then
    (A) The observed result is probably not due to chance
    (B) The observed result cannot possibly be due to chance
    (C) The observed result is probably a chance result
    (D) The null hypothesis of "no relationship" is probably true

42. If a correlation coefficient is .96, we would probably be able to say that the relationship is
    (A) Weak
    (B) Strong
    (C) Statistically significant
    (D) (B) is true and (C) is probably true

43. _____ results if you fail to reject the null hypothesis when the null hypothesis is actually false.
   (A) Type I error
   (B) Type II error
   (C) Type III error
   (D) Type IV error

44. A statistical test used to determine whether a correlation coefficient is statistically significant is called the _____.
   (A) One-way analysis of variance
   (B) t-test for independent samples
   (C) Chi-square test for contingency tables
   (D) t-test for correlation coefficients

45. What is the key question in the field of statistical estimation?
   (A) Based on my random sample, what is my estimate of the population parameter?
   (B) Based on my random sample, what is my estimate of normal distribution?
   (C) Is the value of my sample statistic unlikely enough for me to reject the null hypothesis?
   (D) There is no key question in statistical estimation.

46. When referencing other works you have cited within the text of the report you should
   (A) State the first and last name of the author
   (B) Use the author, date citation method
   (C) Use an asterisk and a footnote
   (D) Insert the complete citation in parenthesis

47. A _____ is a subset of a _____.
   (A) Sample, population
   (B) Population, sample
   (C) Statistic, parameter
   (D) Parameter, statistic

48. The Pearson product moment correlation measures the degree of _____ relationship present between two variables.
   (A) Curvilinear
   (B) Nonlinear
   (C) Linear and quadratic
   (D) Linear

49. Editorial style specifies that _____ should be used infrequently or sparingly.
   (A) Italics
   (B) Abbreviations
   (C) Headings
   (D) Both (A) and (B)

50. It is best to use the method of working multiple hypotheses when
   (A) You are finished with your research
   (B) You are planning your research study
   (C) You are hoping to publish your already obtained research results
   (D) You have published your research results

x-x-x

(11)

(DANCE)

1. What is Research?
   (A) Value Oriented Process
   (B) Self Contained Process
   (C) Passive Process
   (D) All the above
2. Who was the author of the book name problem and area of research in music?
   (A) Kerlingee
   (B) Subhadra Chawdhary
   (C) C K Kothari
   (D) Wilkinson
3. A brief summary of a research article is
   (A) Index
   (B) Abstract
   (C) Reference
   (D) Footnotes
4. The depth of any research can be judged by:
   (A) Title of the research
   (B) Objective of the research
   (C) Total Expenditure of the research
   (D) Duration of the research
5. Research can be conducted by a person who:
   (A) Has Studied research methodology
   (B) Hold a postgraduate degree
   (C) Possesses thinking & researching
   (D) Is hard work
6. Which of the following is not the method of research?
   (A) Historical
   (B) Survey
   (C) Philosophical
   (D) Observation
7. The first step of research is
   (A) Identify a problem
   (B) Selecting a problem
   (C) Searching a problem
   (D) Finding a problem

8. Research can be classified as
   (A) Basic, Applied, and Action Research
   (B) Quantitative and Qualitative Research
   (C) Philosophical, Historical Survey and Experimental Research
   (D) All of the above
9. The main characterization of Scientifical Research
   (A) Empirical
   (B) Theoretical
   (C) Experimental
   (D) All of the above

10. How Bibliography give in a research report?
    (A) Shows vast knowledge of the research
    (B) Helps those interested in further research
    (C) Has no relevance in research
    (D) All of the above

11. Field work based research is classified as:
    (A) Historical
    (B) Empirical
    (C) Experimental
    (D) Biographical

12. The research is always
    (A) Verifying the old knowledge
    (B) Exploring new knowledge
    (C) Filling the gap between knowledge
    (D) All of the above

13. The main objective of research in dance is
    (A) To propagate the musicological aspects
    (B) To bring out the historical aspects
    (C) To discover the new fact
    (D) To strengthen the practical aspects

14. Correct order of writing footnotes is
    (A) Book, Author's name, Page number
    (B) Author's name, Book, Page number
    (C) Page number, Author's name, Book
    (D) None of the above

15. Research is born out of :
    (A) Human Curiosity
    (B) Human Requirements
    (C) Natural Incidents
    (D) None of above

16. Which of the following is recording source of data?
    (A) Books
    (B) Journals, Newspapers
    (C) Internet Clipping
    (D) All of the above

17. Where is the foot note located?
    (A) At the bottom
    (B) On side
    (C) On the middle
    (D) On the top

18. What are the methods of collecting data?
    (A) Questionnaires
    (B) Survey
    (C) Interview
    (D) All of the above

19. What are the main objective of research?
    (A) Form the core of study
    (B) To address the purpose of project
    (C) State the main purpose of the research study
    (D) All of the above

20. Why do we need research?
    (A) Expand the knowledge
    (B) Keep you upto date
    (C) Build the credibility
    (D) All of the above

21. Which is the main source is used for research in dance?
    (A) Thesis
    (B) Natyashastra
    (C) Astronomy
    (D) Teaching

22. Direct interview method helps in collective_____.
    (A) Primary data
    (B) Secondary data
    (C) Territory data
    (D) All of the above

23. Research done on particular person is _____.
    (A) Historical study
    (B) Survey method
    (C) Case study
    (D) Experimental study

24. Pick the odd one out
    (A) Book
    (B) Encyclopedias
    (C) Magazines
    (D) Films

(3)

25. Discussion method can be used when :
    (A) The topic is very difficult
    (B) The topic is difficult
    (C) The topic is easy
    (D) All of the above

26. Katha abhinaya and updesha belongs to which dance form?
    (A) Odissi
    (B) Kathak
    (C) Kathakali
    (D) Manipuri

27. Popular nritya natya of Karnataka.
    (A) Raas
    (B) Yakshgan
    (C) Lasya
    (D) Mandal

28. Name the sister of guru Kamalni ji?

    (A) Uma Sharma
    (B) Vidhalal
    (C) Nalini
    (D) Roshan Kumari

29. What is "Jamnka" in Dance?
    (A) Parda
    (B) Lehnga
    (C) Dupatta
    (D) Shinghar

30. The book of kathak "Gyaneshwari" written by?
    (A) Dr. Ashok Sharma
    (B) Dr. Arjun Mishra
    (C) Dr. Tirath Ram Azad
    (D) Dr. Bharata
31. In which chapter of natya Shastra mandal explains?
    (A) 32
    (B) 61
    (C) 12
    (D) 4
32. Which dance term creates with the boles of nagara, jhanj, manjeera, tasha, duff or awanadh vadhya?
    (A) Kavit
    (B) Tora
    (C) Premelu
    (D) Tarana

33. All the classical dances of India are based on:
    (A) Sangeet parijat
    (B) Natya Shastra
    (C) Samved
    (D) Nardiya shiksha

34. Nalanda dance research center is founded by:
    (A) Kanak Rele
    (B) Brij Mohan
    (C) Kiran Sehgal
    (D) Krishan Lal

35. Dr. Puru Dadhich had written which book?
    (A) Kathak shinghar
    (B) Kathak natwari nritya
    (C) Kathak nritya
    (D) Kathak nritya ka udhabhav or vikas

36. How many mantras are there in Matt Taal ?
    (A) 18
    (B) 22
    (C) 9
    (D) 11

37. Origin of taal.
    (A) Doha
    (B) Chandh
    (C) Kavit
    (D) Geet

38. How many types of Nayika are there according to nature?
    (A) 8
    (B) 11
    (C) 5
    (D) 3

39. In which year Rajender Gangani received one of the most prestigious awards in the field of performing arts in India?
    (A) 2010
    (B) 1999
    (C) 2003
    (D) 2001

40. Who's the writer of sangeet ratnakar grantha?
    (A) Bharta
    (B) Mattang
    (C) Sharangdev
    (D) Kalidass

41. Who is the Heroine of Malvikagnimitra natak?
   (A) Malvika
   (B) Usha
   (C) Urvashi
   (D) Uma

42. "Kase Khelu Piya Ghar Nahi" thumri belongs to which nayika:-
   (A) Khandita Nayika
   (B) Uttama
   (C) Padhmni
   (D) Proshit Patika

43. Which among the following is incorrect :-
   (A) Sitara Devi
   (B) Urmila Nagar
   (C) Malbilca Mitra
   (D) Uma Sharma

44. Term 'Tillana' belongs to which classical dance form:-
   (A) Kuchi Pudi
   (B) Odissi
   (C) Kathak
   (D) Bharat Natyam

45. Which among the following classical dance styles is the highest Pinnacle of the dance drama?
   (A) Mohiniattam
   (B) Khatakali
   (C) Odissi
   (D) Yakshgan

46. Name the mudra related to Drishti bhedas:-
   (A) Pralokita
   (B) Sama
   (C) Alokita
   (D) Kampita

47. Which of the dance style is associated with Guru Urmila Nagar:-
   (A) Odissi
   (B) Kathak
   (C) Kuchipudi
   (D) Manipuri

48. Name the son of Pt. Birju Mahraj?
   (A) Binda Deen
   (B) Deepak Mahraj
   (C) Shambhu Mahraj
   (D) Krishan Mahraj

(6)

49. Which of the following taals contains eleven beats & eleven divisions?
    (A) Rudra Taal
    (B) Sool Taal
    (C) Dadra Taal
    (D) Rupak Taal

50. What is Bhav?
    (A) Inner thoughts
    (B) Allure in gait
    (C) Numerous body movements
    (D) Expression of moods and rasas

x-x-x

Defence Studies(Ph.D. & M.Phil.) (DS)

1. Who, among the following scholars observed that 'For a country to choose not to become a great power is a structural anomaly'?
   (A)   Geoffrey Hawthorn
   (B)   Kenneth Waltz
   (C)   Henry Kissinger
   (D)   Francis Fukuyama

2. When is International Day of Remembrance and Tribute to the Victims of Terrorism observed?
   (A)   August 21
   (B)   August 22
   (C)   August 23
   (D)   August 24

3. Who is the head of the committee set up by the Defence Ministry, to review AFHQ CS cadre?
   (A)   Bipin Rawat
   (B)   DB Shekatkar
   (C)   R Chandrashekhar
   (D)   AN Das

4. How many countries are associated with the Nordic–Baltic co-operation framework?
   (A)   Five
   (B)   Eight
   (C)   Twelve
   (D)   Fifteen

5. Navy Day is celebrated each year to commemorate which operation?
   (A)   Operation Black Thunder
   (B)   Operation Blue Star
   (C)   Operation Tornado
   (D)   Operation Trident

6. The Inaugural Meeting of Counternarcotics Working Group was held between which countries?
   (A)   India – China
   (B)   India - Russia
   (C)   India – Bangladesh
   (D)   India - USA

7. Who among the following, opined that nuclear weapons provide the glue that has held the Western alliance together?
   (A)   Richard Nixon
   (B)   James Schlesinger
   (C)   Harry Truman
   (D)   George P. Schultz

8. Which of the following is the equivalent rank in Army of the Naval rank of Lieutenant?
   (A)   Colonel
   (B)   Brigadier
   (C)   Major
   (D)   Captain

9. What is being referred to as "SANT" that is in news recently?
   (A)   Surface to Air Missile
   (B)   Drone
   (C)   Unmanned Aircraft
   (D)   Anti-Tank Missile

10. India officially became the member of MTCR on
    (A)   27 June 2016
    (B)   27 July 2016
    (C)   27 June 2018
    (D)   27 July 2018

11. Who said "The influence of air power on the ability of one nation to impress its will on another in armed contest will be decisive"?
    (A)   William "Billy" Mitchell
    (B)   Giulio Douhet
    (C)   B.H. Liddell Hart
    (D)   Arjan Singh

12. What was the code name for the Allied invasion of Europe?
    (A)   Operation Barbarossa
    (B)   Operation Watchtower
    (C)   Operation Overlord
    (D)   Operation Bagration

13. Who is the author of the book "The Generalship of Alexander the Great"?
    (A)   J.F.C. Fuller
    (B)   Peter Green
    (C)   Henry Kissinger
    (D)   Carl von Clausewitz

14. **Which of the following was the first aircraft inducted by the Indian Air Force (then Royal Indian Air Force) in 1932?**
    (A)   de Havilland Tiger Moth
    (B)   Westland Wapiti
    (C)   Supermarine Spitfire
    (D)   Fairchild Packet

15. Which two countries signed the "Reciprocal Access Agreement" to counter the growing influence of China in the South China sea and in the Pacific Island Nations?
(A)   Japan and Australia
(B)   India and Japan
(C)   India and USA
(D)   Japan and Vietnam

16. Lieutenant Kumudini Tyagi and Sub Lieutenant Riti Singh, who were making news recently, are related to which of the following Indian forces?
(A)   Indian Army
(B)   Indian Air Force
(C)   Indian Navy
(D)   Central Paramilitary Forces

17. 'Sharang', which is to be inducted into the Indian Army, is an upgraded version of which weapon?
(A)   Artillery gun
(B)   Assault rifle
(C)   Combat Shotgun
(D)   Sniper rifle

18. The Chemical Weapons Convention (CWC) was adopted by the conference on Disarmament (CD) in Geneva on:
(A)   September 3, 1992
(B)   September 3, 1993
(C)   April 30, 1997
(D)   January 3, 1993

19. How many ways to embezzlement of government money have been mentioned by Kautilya?
(A)   20
(B)   40
(C)   60
(D)   80

20. Which one among the following is the unit raised to protect the naval assets?
(A)   Sagar Rakshak Bal
(B)   Sagar Suraksha Bal
(C)   Sagar Prahari Bal
(D)   Sagar Nigrani Bal

21. As per which UNSC committee, JeM Chief Masood Azhar has been designated as global terrorist?
(A)   UNSC 1265 Committee
(B)   UNSC 1266 Committee
(C)   UNSC 1267 Committee
(D)   UNSC 1268 Committee

22. The 2019 Balakot airstrike was conducted by India in the early morning hours of:
   (A)   February 24
   (B)   February 25
   (C)   February 26
   (D)   February 28

23. Which country has become the first NATO nation to appoint a female Chief of Armed Forces?
   (A)   Slovenia
   (B)   Belgium
   (C)   Italy
   (D)   Luxembourg

24. The term "The Revolt in the Desert" (Arab Revolt) refers to which one of the following:-
   (A)   The Arab uprising led by the Sherif of Mecca and his son against the Ottoman Empire during World War I
   (B)   Democratic upsurge in the Arab World against their authoritarian rulers
   (C)   Arab antagonism against European powers for their 'Anti-Islamic Policies'
   (D)   The Arab decision of invasion on newly born Israel

25. Who among the following leaders was real hero of the Chechen war?
   (A)   Ramzan Kadyrov
   (B)   Dzhokar Dudayev
   (C)   Boris Yeltsin
   (D)   Yuri Andropov

26. Research is
   (A)   Searching again and again
   (B)   Finding solution to any problem
   (C)   Working in a scientific way to search for truth of any problem
   (D)   None of the above

27. In the process of conducting research 'Formulation of Hypothesis" is followed by
   (A)   Statement of Objectives
   (B)   Analysis of Data
   (C)   Selection of Research Tools
   (D)   Collection of Data

28. Information is_____
   (A)   Raw Data
   (B)   Processed Data
   (C)   Input data
   (D)   Organized data

29. Conference proceedings are considered as _____ documents.
    (A)   Conventional
    (B)   Primary
    (C)   Secondary
    (D)   Tertiary

30. One of the following search engines is exclusively meant for scientific information:
    (A)   Google
    (B)   Yahoo
    (C)   SCIRUS
    (D)   Altavista

31. Questionnaire is a:
    (A)   Research method
    (B)   Measurement technique
    (C)   Tool for data collection
    (D)   Data analysis technique

32. "Controlled Group" is a term used in_____.
    (A)   Survey research
    (B)   Historical research
    (C)   Experimental research
    (D)   Descriptive research

33. Which of the following is not a "Graphic representation" ?
    (A)   Pie Chart
    (B)   Bar Chart
    (C)   Table
    (D)   Histogram

34. Which of the following is not covered under Intellectual Property Rights?
    (A)   Copyrights
    (B)   Patents
    (C)   Trade Marks
    (D)   Thesaurus

35. The transmission of receiver's reaction back to the sender is known as _____.
    (A)   Noise
    (B)   Feedback
    (C)   Medium
    (D)   Source

36. Which of the following is not true about e-journals?
    (A)   They are distributed through digital methods
    (B)   They also have editors or editorial boards
    (C)   They are publications of serial nature
    (D)   They are always free of cost

37. _____ is referred to as "the father of modern research on teaching"?
   (A)   N. L. Gage
   (B)   David Berliner
   (C)   Egon Brunswik
   (D)   Donald T. Campbell

38. **A researcher is interested in studying the prospects of a particular political party in an urban area. What tool should he prefer for the study?**
   (A)   Rating scale
   (B)   Interview
   (C)   Questionnaire
   (D)   Schedule

39. **Ethical norms in research do not involve guidelines for:**
   (A)   Thesis format
   (B)   Copyright
   (C)   Patenting policy
   (D)   Data sharing policies

40. Converting a question into a Researchable problem is called _____
   (A)   Solution
   (B)   Examination
   (C)   Problem formulation
   (D)   Problem Solving

41. Who said, "Social Science research begins and ends with observation"
   (A)   P.V. Young
   (B)   Sidney Webb
   (C)   Kaplan
   (D)   Rose

42. Camera, tape recorder, video tape etc are _____ devices of observation
   (A)   Casual
   (B)   Mechanical
   (C)   Technical
   (D)   Manual

43. A two way systematic conversation between an investigator and respondent is called
   (A)   Observation
   (B)   Schedule
   (C)   Interview
   (D)   Simulation

44. Facts, figures and other relevant materials serving as bases for a study is called
   (A)   Sample
   (B)   Method
   (C)   Data
   (D)   Theory

45. Data related to human beings are called
    (A)   Territorial data
    (B)   Organizational data
    (C)   Peripheral data
    (D)   Demographic data

46. "Methods and issues in Social Research" is written by
    (A)   Black James and Champions
    (B)   P.V. Young
    (C)   Mortan Kaplan
    (D)   William Emory

47. Research help in explaining the _____ with which something operates.
    (A)   Velocity
    (B)   Momentum
    (C)   Frequency
    (D)   Gravity

48. **A researcher attempts to evaluate the effect of method of feeding on anxiety - proneness of children. Which method of research would be appropriate for this?**
    (A)   Case study method
    (B)   Experimental method
    (C)   Ex-post-facto method
    (D)   Survey method

49. One of the aims of the scientific method in research is to:
    (A)   Improve data interpretation
    (B)   Eliminate spurious relations
    (C)   Confirm triangulation
    (D)   Introduce new variables

50. In web search, finding a large number of documents with very little relevant information is termed:
    (A)   Poor recall
    (B)   Web crawl
    (C)   Poor precision rate
    (D)   Poor web response

x-x-x

Electronics & Communication Engineering(Ph.D.) (ECE)

1. In paired comparison Technique:
   (A) Each option is evaluated
   (B) Hot spot is identified
   (C) Each option is compared with every other option
   (D) Logic is developed

2. Innovation involves:
   (A) Commercialization of a new idea
   (B) Development of a new process
   (C) Development of a new product
   (D) Generation of a new idea

3. Which one of the following is 'NOT' a characteristic of a team?
   (A) Similar Skills
   (B) Collaboration
   (C) Shared goals
   (D) Small groups of people

4. The step 'Describe Methodology of Research' includes
   (A) Selecting research design, selecting sample, selecting instruments, selecting methods of analysis to be used and the procedure for conducting research
   (B) Generating hypotheses, selecting research design, selecting sample and the procedure for conducting research
   (C) Selecting research design, administering instruments, and the procedure for conducting research
   (D) Defining variables in the problems, selecting sample, selecting instruments and the procedure of conducting research

5. Experimental research aims at determining
   (A) Relationship between two or more two variables
   (B) Tentative cause and effect relationships
   (C) True cause effect and relationships
   (D) The current status of processes opinion etc.

6. There are several criteria which must be met when writing a hypothesis. Which of the following criteria does 'NOT' complete the statement? The hypothesis should.
   (A) Clearly written as a statement
   (B) Written prior to the collection of data
   (C) Include all variables in the problem
   (D) Indicate the relationship between variables

7. If two variables are highly correlated, it means
   (A) that they always go together
   (B) high value on one variable lead to high value on other variable
   (C) that there are no other variables responsible for the relationship
   (D) that change in one variable is accompanied by predictable change in the other variable

8. For a perfect positive Correlation, the value of "r" is
   (A)-1.0
   (B)+1.0
   (C)0
   (D)0.3

9. Which of the following is NOT true about the standard error of a statistic?
   (A) The standard error measures, roughly, the average difference between the statistic and the population parameter.
   (B) The standard error is the estimated standard deviation of the sampling distribution for the statistic.
   (C) The standard error can never be a negative number.
   (D) The standard error increases as the sample size(s) increases.

10. Consider a random sample of 100 females and 100 males. Suppose 15 of the females are left-handed and 12 of the males are left-handed. What is the estimated difference between population proportions of females and males who are left-handed (females − males)? Select the choice with the correct notation and numerical value.
   (A) $p1 - p2 = 3$
   (B) $p1 - p2 = 0.03$
   (C) $\hat{p} - \hat{p} = 3$
   (D) $\hat{p} - \hat{p} = 0.03$

11. A test of H0: $\mu = 0$ versus Ha: $\mu > 0$ is conducted on the same population independently by two different researchers. They both use the same sample size and the same value of $\alpha = 0.05$. Which of the following will be the same for both researchers?
   (A) The p-value of the test
   (B) The power of the test if the true $\mu = 6$
   (C) The value of the test statistic
   (D) The decision about whether or not to reject the null hypothesis

12. A random sample of 25 college males was obtained and each was asked to report their actual height and what they wished as their ideal height. A 95% confidence interval for μd = average difference between their ideal and actual heights was 0.8" to 2.2". Based on this interval, which one of the null hypotheses below (versus a two-sided alternative) can be rejected?
   (A) H0: $\mu d = 0.5$
   (B) H0: $\mu d = 1.0$
   (C) H0: $\mu d = 1.5$
   (D) H0: $\mu d = 2.0$

13. Which of the following is not a correct way to state a null hypothesis?
   (A) H0: $\hat{p1} - \hat{p2} = 0$
   (B) H0: $\mu d = 10$
   (C) H0: $\mu1 - \mu2 = 0$
   (D) H0: $p = 0.5$

14. Ex-Post Facto research means the research which is carried out:
    (A) After the incident
    (B) Along with happening of the incident
    (C) Keeping in mind the possibilities of the incident
    (D) Prior to the incident

15. Which of the following sampling methods is based on probability?
    (A) Stratified Random Sampling
    (B) Quota Sampling
    (C) Judgemental Sampling
    (D) Convenience Sampling

16. Measuring Instruments are:
    (A) Devices used to quantify information
    (B) Devices used to record information
    (C) Both (A) and (B)
    (D) Neither (A) Nor (B)

17. To arrive at the content of the questionnaire, researcher should start from
    (A) Criterion question
    (B) Study purpose
    (C) Research question
    (D) Questionnaire item

18. If the researcher is interested in answering why and how questions, the preferred measuring instrument will be
    (A) Interview Schedule
    (B) Observation Schedule
    (C) Questionnaire
    (D) Standardized test

19. If you are interested in finding out an achievement score in your subject below which and above which fifty percent of your student lie, you will calculate:
    (A) Mode
    (B) Mean
    (C) Median
    (D) Range

20. Which of the following scales of measurement has an absolute zero?
    (A) Interval scale
    (B) Ordinal scale
    (C) Nominal scale
    (D) Ratio scale

21. When the data on two variables are available on nominal scale, the correlation method used will be :
    (A) Chi-Square
    (B) Pearson-product moment correlation
    (C) Bi-serial correlation
    (D) Partial correlation

22. The purpose of the conclusion in a research report is to:
    (A) Give an outline of the methodological procedures that were employed
    (B) Summarize the key findings in relation to the research questions
    (C) Provide just a summary of what the article already said
    (D) Provide a useful review of the relevant literature

23. Which one of the following is 'NOT' a characteristic of the Normal Probability Curve?
    (A) It is bilaterally symmetrical
    (B) Mean, Median and Mode are at different points
    (C) It is asymptomatic to x-axis
    (D) It is unimodal

24. In case, you are interested in determining the differences in utilization of mobile phones for education purposes in hours per day among students of 6-14 years, 15-25 years, 26-40 years and 40 years and above, the statistical technique preferred will be
    (A) t-test
    (B) ANOVA
    (C) Person product moment correlation
    (D) Chi -square test

25. Which section of the proposal is intended to describe the purpose with a full statement of the research questions?
    (A) Proposed Methodology
    (B) References
    (C) Introduction
    (D) Literature Review

26. The eigen values of a skew-symmetric matrix are
    (A) always zero
    (B) always pure imaginary
    (C) either zero or pure imaginary
    (D) always real

27. $\iint (\nabla X P) \cdot ds$, where P is a vector, is equal to
    (A) $\oint P \cdot dl$
    (B) $\oint \nabla X \nabla X P \cdot dl$
   (C) $\oint \nabla X P \cdot dl$
    (D) $\iiint \nabla \cdot P dv$

28. The z-transform of a system is $H(z) = \frac{z}{z - 0.2}$. If the ROC is $z < 0.2$, then the impulse response of the system is
   (A) $(0.2)^n u[n]$
   (B) $(0.2)^n u[-n-1]$
   (C) $-(0.2)^n u[n]$
   (D) $-(0.2)^n u[-n-1]$

29. For an n-channel enhancement type MOSFET, if the source is connected at a higher potential than that of the bulk (i.e. $VSB > 0$), the threshold voltage VT of the MOSFET will
   (A) Remain unchanged
   (B) Decrease
   (C) Change polarity
   (D) Increase

30. Which of the following is NOT associated with a p-n junction ?
   (A) Junction Capacitance
   (B) Charge Storage Capacitance
   (C) Depletion Capacitance
   (D) Channel Length Modulations

31. The bandgap of Silicon at room temperature is
   (A) 1.3 eV
   (B) 0.7 eV
   (C) 1.1 eV
   (D) 1.4 eV

32. Thin gate oxide in a CMOS process in preferably grown using
   (A) Wet oxidation
   (B) Dry oxidation
   (C) Epitaxial oxidation
   (D) Ion implantation

33. Assuming the OP-AMP to be ideal, the voltage gain of the amplifier shown below is
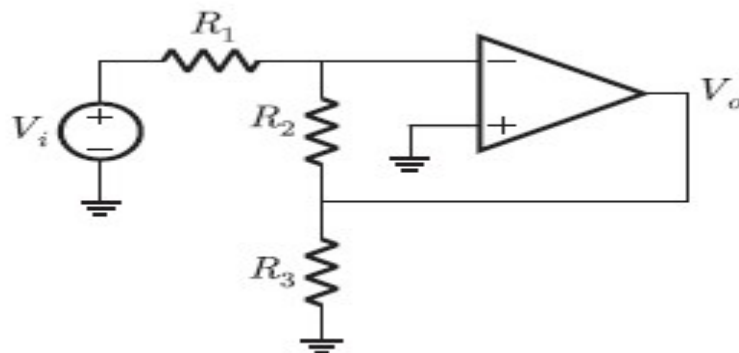
(A) $\dfrac{-R2}{R1}$

(B) $\dfrac{-R3}{R1}$

(C) $\dfrac{-(R2\,||R1)}{R1}$

(D) $\dfrac{-(R2+R1)}{R1}$

34. For a Hertz dipole antenna, the half power beam width (HPBW) in the *E*-plane is
   (A) 360c
   (B) 180c
   (C) 90c
   (D) 45c

35. Consider the given circuit. In this circuit, the race around
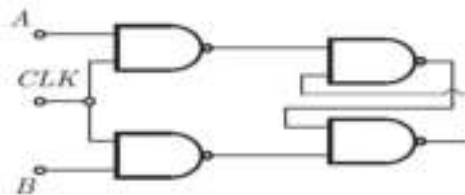
   (A) does not occur
   (B) occur when $CLK = 0$
   (C) occur when $CLK = 1$ and $A = B = 1$
   (D) occur when $CLK = 1$ and $A = B = 0$

36. Which digital system translates coded characters into a more useful form?
   (A) Encoder
   (B) Display
   (C) Counter
   (D) Decoder

37. Don't care conditions can be used for simplifying Boolean expression in
   (A) Logic diagram
   (B) Minterms
   (C) K-maps
   (D) Maxterms

38. How many clock pulses will be required to completely load serially a 5-bit shift register?
   (A) 2
   (B) 3
   (C) 4
   (D) 5

39. In A/D converter, what is the time relation between sampling period T and the duration of the sample mode and the hold mode?
   (A) Should be larger than the duration of sample mode and hold mode
   (B) Should be smaller than the duration of sample mode and hold mode
   (C) Should be equal to the duration of sample mode and hold mode
   (D) Should be larger than or equals to the duration of sample mode and hold mode

40. A system has the characteristic equation $q(s) = s^3 + 4Ks^2 + (5 + K)s + 10 = 0$. The range of K for a stable system is:
(A) $K < 0.46$
(B) $K > 0.46$
(C) $0 < K < 0.46$
(D) Unstable for all K

41. State space analysis is applicable even if the initial conditions are
(A) Zero
(B) Non-zero
(C) Equal
(D) Not equal

42. Bits 1 and 0 are transmitted with equal probability. At the receiver, the power density function of the respective received signals for both bits are as shown below
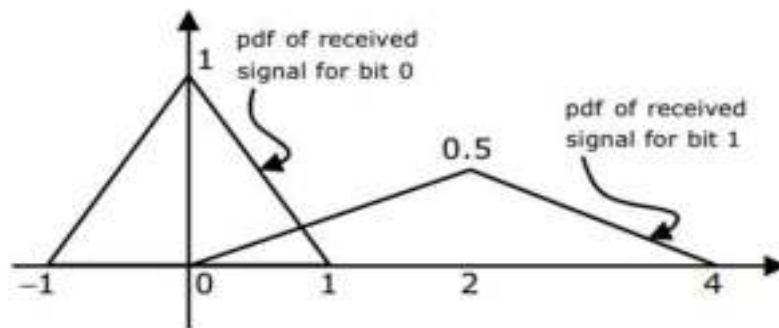
If the detection threshold is 1, the BER will be:
(A) 1/2
(B) 1/4
(C) 1/8
(D) 1/16

43. The quantizing error of PCM systems for weak signals can be made less significant by:
(A) Companding
(B) Using time-division multiplexing
(C) Using frequency-division multiplexing
(D) Filtering out the alias frequency

44. Which of the following systems is the most bandwidth efficient?
(A) AM
(B) FM
(C) SSB-SC
(D) VSB

45. If the baud rate is 400 for a QPSK signal, the bit rate is
(A) 100bps
(B) 400bps
(C) 800bps
(D) 1600bps

(7)

46. The return loss of a device is found to be 20 dB. The voltage standing wave ratio (VSWR) and magnitude of reflection coefficient are respectively
    (A) 1.22 and 0.1
    (B) 0.81 and 0.1
    (C) – 1.22 and 0.1
    (D) 2.44 and 0.2

47. A uniform plane wave in air is normally incident on infinitely thick slab. If the refractive index of the glass slab is 1.5, then the percentage of incident power that is reflected from the air-glass interface is
    (A) 0%
    (B) 4%
    (C) 20%
    (D) 100%

48. A transmission line is feeding 1 watt of power to a horn antenna having a gain of 10 dB. The antenna is matched to the transmission line. The total power radiated by the horn antenna into the free space is
    (A) 10 Watts
    (B) 1 Watts
    (C) 0.1 Watts
    (D) 0.01 Watt

49. The unit of $\nabla \times H$ is
    (A) Ampere
    (B) Ampere/meter
    (C) Ampere/meter2
    (D) Ampere-meter

50. The depth of penetration of electromagnetic wave in a medium having conductivity s at a frequency of 1 MHz is 25 cm. The depth of penetration at a frequency of 4 MHz will be
    (A) 6.25 dm
    (B) 12.50 cm
    (C) 50.00 cm
    (D) 100.00 cm

x-x-x

(Economics)

1. According to Keynes, a rise in the aggregate demand indicated by an upward shift in aggregate demand function may result in a mild increase in the?
    (A)   Employment
    (B)   Factor Prices
    (C)   Prices
    (D)   Wages

2. Which of the following is portrayed in the population pyramid of a country?
    (A)   Rural-urban distribution of population
    (B)   Young-old distribution of population
    (C)   Age and sex distribution of population
    (D)   None of the above

3. Limit pricing is an entry condition in the Theory of Firm by:
    (A)   J.S. Bain   (B)   Cournot
    (C)   Chamberlin   (D)   W.J. Baumol

4. The instruments used by RBI for Quantitative Control are:
    (i) CRR
    (ii) SLR
    (iii) Open Market Operations
    (iv) Margin Requirements

    Which of the statements given above are correct?
    (A)   (i), (ii) and (iii)   (B)   (i), (iii) and (iv)
    (C)   Both (i) and (ii)   (D)   Both (ii) and (iv)

5. Which trade model posits that trade flows between countries will be larger as the economic size of the two are larger and the geographic distance between the two countries is smaller?
    (A)   Heckscher-Ohlin Model
    (B)   The Product Differentiation Model
    (C)   The Gravity Model
    (D)   The Stolper- Samuelson Model

6. The _____ of the capital equipment in the short run is zero :
    (A)   Transfer Earnings
    (B)   Economic Rent
    (C)   Quasi-Rent
    (D)   Differential Rent

7. What is the name of the new platform launched by the Prime Minister, for managing Livestock?
   (A) e-Gopala App
   (B) e- Livestock App
   (C) e-Gau Mata App
   (D) e-Animal Info

8. Match the following in List-I and List-II:

List-I	List –II
A. Goldfeld-Quandt Test	1. Stationarity
B. Durbin-Watson Test	2. Heteroscedasticity
C. Granger Test	3. Autocorrelation
D. Augmented-Dickey-Fuller Test	4. Causality

   Select the correct answer using the codes given below:

	A	B	C	D
(A)	4	2	3	1
(B)	3	1	2	4
(C)	1	3	4	2
(D)	2	3	4	1

9. The market demand curve for a factor is derived by summing the _____ curves of all the firms in the market:
   (A) Marginal Physical Product
   (B) Value of Marginal Product
   (C) Marginal Revenue Product
   (D) None of the above

10. Who among the following said 'Population increases in Geometric progression, food increases in Arithmetic progression' :
    (A) Malthus   (B) Greshan
    (C) Baumol   (D) Keynes

11. By which law the relationship between changing rate in real GNP (or GDP) and unemployment is shown:
    (A) Say's Law   (B) Okun's Law
    (C) National Income calculation rules (D) Demand's Law

12. Which of the following is not included in Human Development Index?
    (A) Longevity (B) Knowledge
    (C) Standard of Living (D) Employment

13. Benefits or harm caused by a firm without payment/ penalty is called:
    (A) Externality (B) Loss
    (C) Investment (D) None of these

14. Which of the following regression models is used to estimate the growth rate from time series data on a variable:
    (A) y = a + bTime (B) y = a + bLogTime
    (C) y = Log a + bTime (D) Log y = a + bTime

15. In a two-variable regression, Y is the dependent variable and X is the independent variable. The correlation coefficient between Y and X is 0.8. For this, which of the following is correct?
    (A) 8% variations in Y are explained by X
    (B) 64% variations in Y are explained by X
    (C) 0.8% variations in Y are explained by X
    (D) 80% variations in Y are explained by X

16. Incidence of tax can be passed on to others in case of:
    (A) Direct Taxes (B) Indirect Taxes
    (C) Both (A) and (B) (D) None of the above

17. As per capita real income of a country increases, the share of agriculture in GDP:
    (A) Increases
    (B) Remains constant
    (C) Declines
    (D) Traces an inverted U-shaped curve

18. The slope of an ISOCOST line $C = P_K K + P_L L$ is?
    (A) $(-P_L/P_K)$ (B) $(-P_K/P_L)$
    (C) (C/P_K) (D) $(-C/P_K)$

19. 'Bandwagon Effect' is found in which of the following?
    (A) Life Cycle Hypothesis (B) Permanent Income Hypothesis
    (C) Absolute Income Hypothesis (D) Relative Income Hypothesis

(3)

20. Chenery's process of economic development depends upon :
    (A) Accumulation Process
    (B) Resource Allocation Process
    (C) Demographic and Distributional Process
    (D) All of the above

21. 'Pump Priming is associated with:
    (A) Pricing   (B) Budgeting
    (C) Public Expenditure   (D) None of the above

22. NABARD was established on the recommendation of:
    (A) Public Account Committee
    (B) Sivaraman Committee
    (C) Narasimham Committee
    (D) None of the above

23. The number of live births per thousand persons in a year is termed as?
    (A) Death rate   (B) Birth rate
    (C) Growth rate   (D) None of the above

24. Which of the following are part of the 'Index of Industrial Production (IIP) '?
    (i) Mining and Quarrying
    (ii) Electricity Generation
    (iii) Construction
    (iv) Forestry

    Select the correct answer using the codes given below:
    (A) (i) and (ii) only   (B) (ii) and (iii) only
    (C) (i), (ii) and (iii) only   (D) All of the above

25. An increase in National Income because of an increase in prices only, is called an increase in?
    (A) National Income in real terms
    (B) National Income at constant prices
    (C) Nominal National Income
    (D) National Income at base year prices

26. The first step in formulating a research problem is?
    (A) Statement of the problem
    (B) Gathering of data
    (C) Measurement
    (D) Survey

(4)

27. A correlational study determines:
    (A) The relationship between independent and dependent variable
    (B) Impact of the observer on the participant
    (C) Cause and effect relationship
    (D) The relationship between two events

28. Assigning numerals or other symbols to the categories or responses is called:
    (A) Editing   (B) Coding
    (C) Transcription   (D) Tabulation

29. Which of the following p-values will lead us to reject the null hypothesis if the significance level of the test is 5%?
    (A) 0.15   (B) 0.10
    (C) 0.06   (D) 0.025

30. Which of the following are the basic rules of the APA style of referencing format?
    (A) Alphabetically index reference list
    (B) Invert author's name (last name first)
    (C) Italicize titles of books and journals
    (D) All of the above

31. Nine years old children are taller than 7 years old ones. It is an example of:
    (A) Vertical studies
    (B) Cross-sectional studies
    (C) Experimental studies
    (D) Case studies

32. The process of selecting a subset of a population for a survey is known as:
    (A) Representation   (B) Triangulation
    (C) Sampling   (D) None of the above

33. The frequency distribution of a research data which is symmetrical in shape similar to a normal distribution but the center peak is much higher, is:
    (A) Skewed   (B) Mesokurtic
    (C) Leptokurtic   (D) Platykurtic

34. A research paper is a brief report of the research work based on:
    (A) Primary data only
    (B) Secondary data only
    (C) Both Primary and Secondary data
    (D) None of the above

35. Statistic is a characteristic of a _____ and Parameter is a characteristic of a
    _____.
    (A)   Sample, Universe
    (B)   Universe, Sample
    (C)   Population, Universe
    (D)   None of the above

36. Which of the following sampling methods is not based on probability?
    (A)   Quota sampling   (B)   Cluster sampling
    (C)   Stratified sampling   (D)   Simple Random sampling

37. Not rejecting the null hypothesis, when it is infact false is:
    (A)   Type I error   (B)   Type II error
    (C)   Two-tailed error   (D)   None of these

38. The practice of showing someone's work/ idea/ paper as one's own, without proper
    acknowledgment is termed as:
    (A)   Citation   (B)   Plagiarism
    (C)   Referencing   (D)   None of the above

39. In the purposive method of sampling design, items are selected according to:
    (A)   Law of probability
    (B)   Personal judgment
    (C)   Law of certainty
    (D)   None of the above

40. Which scientific method is a top-down or general-to-specific approach to research?
    (A)   Deductive method   (B)   Inductive method
    (C)   Pattern method   (D)   Hypothesis method

41. For testing the significance of overall regression, the test to be used is:
    (A)   t-test   (B)   F-test
    (C)   g-test   (D)   d-test

42. As the value of one variable is increasing, the value of the second variable is also
    increasing, then the correlation coefficient will be:
    (A)   Positive   (B)   Negative
    (C)   Zero   (D)   None of the above

43. A primary data collection method that involves tracking behaviour over a period of
    time is called:
    (A)   Browsing   (B)   Observation
    (C)   Sampling   (D)   Testing

44. Which of the following belongs to the category of good 'Research Ethics'?
    (A) Publishing the same paper in two research journals without telling the editors
    (B) Trimming outliers from a data set without discussing your reasons in a research paper
    (C) Conducting a review of literature that acknowledges the contribution of other people in the relevant field or relevant prior work
    (D) Including a colleague as an author of a research paper in return for a favor even though the colleague did not make a serious contribution to the paper

45. Which of the following describes a Meta-analysis?
    (A) Analyze very large studies
    (B) Analysis of the methods of statistical analysis
    (C) Establish external validity
    (D) Detect trends across studies that may have used different procedures, number of participants, types of control procedures and different forms of measurement

46. Consider a hypothesis H_0, where $\sigma_0 = 5$ against H_1, where $\sigma_1 > 5$. This test is?
    (A) Right tailed   (B) Left tailed
    (C) Centre tailed   (D) Cross tailed

47. 'Controlled group' is a term used in:
    (A) Survey research
    (B) Historical research
    (C) Experimental research
    (D) Descriptive research

48. Hypothesis refers to:
    (A) The outcome of an experiment
    (B) A conclusion drawn from an experiment
    (C) A form of bias in which subject tries to outguess the experimenter
    (D) A tentative statement about the relationship

49. In a Ph.D. Thesis which one is the correct sequence for showing the scheme of chapterisation?
    (A) Introduction, References, Design of study, Data analysis and Interpretation, Generalizations, Conclusions and Survey of related studies and Suggestions for future research, Appendix.
    (B) Survey of related studies, Introduction, Design of study, Data analysis and Interpretation, Conclusions and Generalizations, Suggestions for future research, Appendix.

(7)

(C)   Survey of related studies, References Introduction, Design of study, Data analysis and Interpretation, Conclusions and Generalizations, Suggestions for future research, Appendix.

(D)   Introduction, Survey of related studies, Design of study, Data presentation; Analysis and Interpretation, Formulation of Generalizations and Conclusions, Suggestions for future research, References and Appendix.

50.   Match the following in List-I and List-II:

	List-I		List –II
A.	Simple Random Sampling	1.	Non-probability sampling
B.	Systematic Sampling	2.	Random choice of all items from each stratum
C.	Quota sampling	3.	Random selection of first and Systematic of the rest
D.	Stratified Random Sampling	4.	Equal probability of each item in all trials

Select the correct answer using the codes given below:

	A	B	C	D
(A)	1	2	3	4
(B)	2	4	1	3
(C)	4	3	1	2
(D)	3	1	2	4

x-x-x

Electrical & Electronics Engineering(Ph.D.)

1. Determine the inverse Fourier Transform of $X(\omega) = 4\pi\delta(\omega) - 2\pi\delta(\omega-2\pi) + 2\pi\delta(\omega+2\pi)$
   - (A) $2[1 - \sin2\pi t]$
   - (B) $2j[1 - \sin2\pi t]$
   - (C) $2[1 - j\sin2\pi t]$
   - (D) $2j[1 - j\sin2\pi t]$

2. Fourier Transform of a Gaussian pulse is
   - (A) Sinc pulse
   - (B) Sin function
   - (C) Gaussian pulse
   - (D) Impulse train

3. Delaying a signal by t seconds in time does
   - (A) Not change its amplitude and phase spectrum
   - (B) Not change its amplitude spectrum but the phase spectrum is changed by -ωt
   - (C) Not change its phase spectrum but the amplitude spectrum is scaled by t
   - (D) Change phase spectrum by ωt and amplitude spectrum by t

4. A single-phase fully controlled line commutated AC to DC converter operates as an inverter, when
   - (A) $0 \leq \alpha \leq 90^{\circ}$
   - (B) $90^{\circ} \leq \alpha \leq 180^{\circ}$
   - (C) It supplies to a back emf load
   - (D) $90^{\circ} \leq \alpha \leq 180^{\circ}$ and there is a suitable DC source in the load circuit

5. In a current commutated chopper
   - (A) Peak commutating current should be less than maximum load current
   - (B) Peak commutating current should be equal to maximum load current
   - (C) Peak commutating current should be greater than maximum load current
   - (D) There is no relation between peak commutating current and maximum load current

6. The output line voltage of a three phase VSI operating under 180° conduction mode is free from:
   - (A) Even harmonics
   - (B) Odd harmonics
   - (C) Even and triplen harmonics
   - (D) Third Order harmonics

7. A 220V, 1400rpm, 40A separately excited DC motor has an armature resistance of 0.4Ω. The motor is fed from a single phase circulating current dual converter with an input AC line voltage of 220V(rms). The approximate firing angles of the dual converter for motoring operation at 50% of rated torque and 1000rpm will be:
   - (A) 43°, 137°
   - (B) 43°, 47°
   - (C) 39°, 141°
   - (D) 39°, 51°

8. Which is true for steady state, transient and sub-transient reactances for a synchronous machine?
   - (A) $X_d > X_d' > X_d''$
   - (B) $X_d'' > X_d' > X_d$
   - (C) $X_d' > X_d'' > X_d$
   - (D) $X_d > X_d'' > X_d'$

9. For a line-to-line fault analysis using symmetrical components
   - (A) The positive-, negative- and zero-sequence networks at the fault point are connected in series
   - (B) The positive-, negative- and zero-sequence networks at the fault point are connected in parallel
   - (C) The positive-, and negative-sequence networks at the fault point are connected in series
   - (D) The positive-, and negative-sequence networks at the fault point are connected in parallel

10. The fuel costs of two unit plants are given by
$$C_1 = 50 + 5P_1 + 0.5\ P_1^2$$
$$C_2 = 10 + 15P_2 + P_2^2$$
where P_1, P_2 are in MW. The plant supplies load of 100MW. The economic load scheduling of the two units will be
   - (A) $P_1 = 70$, $P_2 = 30$
   - (B) $P_1 = 30$, $P_2 = 70$
   - (C) $P_1 = 50$, $P_2 = 50$
   - (D) $P_1 = 60$, $P_2 = 40$

11. The load flow studies is performed using Y bus matrix rather than Z bus matrix. This is because
   - (A) Y bus is a square matrix
   - (B) Y bus is a sparse matrix
   - (C) Z bus is a sparse matrix
   - (D) Z bus is a singular matrix

12. The number of iterations required for solving load flow problems in Gauss-Siedel and Newton-Raphson methods is
    (A) Both directly proportional to number of buses
    (B) Directly proportional to number of buses and independent of number of buses respectively
    (C) Independent of number of buses and directly proportional to number of buses respectively
    (D) Both independent of number of buses

13. In a high-voltage DC transmission system, reactive power is needed for rectifier at sending end and inverter at receiving end. During the operation of such a DC link,
    (A) Inverter supplies leading reactive power and rectifier receives lagging reactive power
    (B) Inverter supplies lagging reactive power and rectifier receives leading reactive power
    (C) Inverter supplies lagging reactive power and rectifier receives lagging reactive power
    (D) Inverter supplies leading reactive power and rectifier receives leading reactive power

14. The angle δ in the swing equation of a synchronous generator is the
    (A) Angle between stator voltage and current
    (B) Angular displacement of the rotor with respect to the stator
    (C) Angular displacement of the stator mmf with respect to a synchronously rotating axis
    (D) Angular displacement of an axis fixed to the rotor with respect to a synchronously rotating axis

15. An 800kV transmission line has a maximum power transfer capacity of 'P'. If it is operated at 400kV with the series reactance unchanged, the new maximum power transfer capacity is approximately
    (A) 4P
    (B) 2P
    (C) P/2
    (D) P/4

16. The open loop transfer function of a unity feedback system is given below
$$G(s) = \frac{K(s+4)}{(s+1)(s+2)}$$
The range of positive values of 'K' for which the closed loop system will remain stable is
    (A) 2 < K < 3
    (B) 2/4 < K < 3
    (C) 0 < K < ∞
    (D) 2/4 < K < ∞

(3)

17. The per-unit values of positive-, negative-, and zero-sequence reactance of a network at fault are 0.2, 0.17 and 0.12pu respectively. The fault current for double line to ground fault is
   (A) 4.718 pu
   (B) 2.04 pu
   (C) 1.57 pu
   (D) 16.26 pu

18. A power system consists of 40 buses with 9 voltage controlled buses, the size of the Jacobian matrix is
   (A) 70 x 70
   (B) 80 x 80
   (C) 62 x 62
   (D) 79 x 79

19. Consider two buses connected by an impedance of $(0 + j5)\Omega$. The bus1 voltage is $100\angle30°V$, and bus2 voltage is $100\angle0°V$. The real and reactive powers supplied by bus1, respectively are:
   (A) 1000W, 268VAR
   (B) -1000W, -134VAR
   (C) 276.9W, -56.7VAR
   (D) -276.9W, 56.7VAR

20. In an unbalanced three-phase system, phase current $I_a = 1\angle(-90°)$pu, negative sequence current $I_{b2} = 4\angle(-150°)$pu, zero sequence current $I_{c0} = 3\angle(90°)$pu. The magnitude of phase current I_b in pu is,
   (A) 1.00
   (B) 7.81
   (C) 11.53
   (D) 13.00

21. Which of the following is not a method of defuzzification?
   (A) Mean-max membership
   (B) Weighted average
   (C) Least mean square method
   (D) Centre of sums

22. The membership functions in fuzzy systems are generally and most commonly represented in
   (A) tabular form
   (B) mathematical form
   (C) graphical form
   (D) logical form

23. Name the activation function which is described by the equation: f(Net)=Net for all values of Net
    - (A) Purelin
    - (B) Hardlim
    - (C) Satlin
    - (D) Logsig

24. In a typical AC microgrid, which of the following helps to regulate voltage and frequency in the islanded mode of operation?
    - (A) Diesel Generator
    - (B) Connected Inverter
    - (C) Grid
    - (D) PMSG Wind

25. What is the full form of WAMS and PMU in the context of Smart Grid
    - (A) Wide Area Management System, Phasor Management Unit
    - (B) Wide Area Measurement System, Phasor Measurement Unit
    - (C) World Area Measurement System, Power Measurement Unit
    - (D) Wide Access Management System, Power Measurement Unit

26. _____ is main part of experimental research
    - (A) Data Analysis
    - (B) Selection of variables
    - (C) Review of Literature
    - (D) Sampling

27. Hypothesis is _____
    - (A) Conclusion drawn from existing literature
    - (B) Interpretation of data
    - (C) Relation between variables
    - (D) Comparison of assumptions

28. Applied Research is also called
    - (A) Analytical research
    - (B) Empirical research
    - (C) Action research
    - (D) Qualitative research

29. **What is the major attribute of Correlation Analysis?**
    - (A) **Association among variables**
    - (B) Difference among variables
    - (C) Regression among variables
    - (D) Variations among variables

30. **What is the name of the conceptual framework in which the research is carried out?**
    - (A) Research hypothesis
    - (B) Synopsis of Research
    - (C) Research paradigm
    - (D) **Research design**

31. **What is the main role of research in education?**
    (A)   To upsurge one's social status.
    (B)   To increase one's job prospects.
    (C)   To augment one's personal growth.
    (D)   **To help an applicant in becoming a renowned educationalist.**

32. **Which one is called non-probability sampling?**
    (A)   **Quota sampling**
    (B)   Cluster sampling
    (C)   Systematic sampling
    (D)   Stratified random sampling

33. Significance of hypothesis is tested on _____ level in Social Sciences.
    (A)   0.01
    (B)   0.05
    (C)   0.50
    (D)   0.1018

34. Which of the following is the first step in starting the research process?
    (A)   Searching sources of information to locate problem
    (B)   Survey of related literature
    (C)   Identification of problem
    (D)   Searching for solutions to the problem

35. When a hypothesis is stated negatively it is called
    (A)   Relational Hypothesis
    (B)   Situational Hypothesis
    (C)   Null Hypothesis
    (D)   Casual Hypothesis

36. **What is the use of Factorial Analysis?**
    (A)   For setting the hypotheses
    (B)   **To understand the difference among the many variables**
    (C)   To understand the relationship between two variables
    (D)   To understand the difference between two variables

37. Determining the relationship between two or more variables occurs in _____
    (A)   Survey research
    (B)   Action research
    (C)   Correlation research
    (D)   Naturalistic observations

38. Probability sampling is otherwise called _____
    (A)   Multiple choice
    (B)   Uni-variate Analysis
    (C)   Random Sampling
    (D)   Bi-variate Analysis

39. Sampling which provides for a known non zero chance of selection is _____
    (A) Probability sampling
    (B) Non probability sampling
    (C) Multiple Choice
    (D) Analysis

40. **Which of the following is not a type of non-probability sampling?**
    (A) Quota sampling
    (B) Convenience sampling
    (C) Snowball sampling
    (D) Stratified random sampling

41. **The difference between the expected value of a statistic and the value of the parameter being estimated is called a:**
    (A) Standard error
    (B) Bias
    (C) Sampling error
    (D) Non-sampling error

42. A list of 5 pulse rates is: 70, 64, 80, 74, 92. What is the median for this list?
    (A) 74
    (B) 76
    (C) 77
    (D) 80

43. Which of the following would indicate that a dataset is not bell-shaped?
    (A) The range is equal to 5 standard deviations.
    (B) The range is larger than the interquartile range.
    (C) The mean is much smaller than the median.
    (D) There are no outliers.

44. The value of a correlation is reported by a researcher to be $r = -0.5$. Which of the following statements is correct?
    (A) The x-variable explains 25% of the variability in the y-variable.
    (B) The x-variable explains −25% of the variability in the y-variable.
    (C) The x-variable explains 50% of the variability in the y-variable.
    (D) The x-variable explains −50% of the variability in the y-variable.

45. One use of a regression line is
    (A) to determine if any x-values are outliers.
    (B) to determine if any y-values are outliers.
    (C) to determine if a change in x causes a change in y.
    (D) to estimate the change in y for a one-unit change in x.

46. A chi-square test of the relationship between personal perception of emotional health and marital status led to rejection of the null hypothesis, indicating that there is a relationship between these two variables. One conclusion that can be drawn is:
  - (A) Marriage leads to better emotional health.
  - (B) Better emotional health leads to marriage.
  - (C) The more emotionally healthy someone is, the more likely they are to be married.
  - (D) There are likely to be confounding variables related to both emotional health and marital status.

47. A chi-square test involves a set of counts called "expected counts." What are the expected counts?
  - (A) Hypothetical counts that would occur of the alternative hypothesis were true.
  - (B) Hypothetical counts that would occur if the null hypothesis were true.
  - (C) The actual counts that did occur in the observed data.
  - (D) The long-run counts that would be expected if the observed counts are representative.

Questions 48 to 50: A survey asked people how often they exceed speed limits. The data are then categorized into the following contingency table of counts showing the relationship between age group and response.

Age	Exceed Speed Limit if Possible?		
	Always	Not Always	Total
Under 30	100	100	200
Over 30	40	160	200
Total	140	260	400

48. Among people with Age 'Over 30', what is the risk of 'Always Exceeding the Speed Limit'?
  - (A) 0.20
  - (B) 0.40
  - (C) 0.33
  - (D) 0.50

49. Among people with Age 'Under 30', what are the odds that they always exceed the speed limit?
  - (A) 1 to 2
  - (B) 2 to 1
  - (C) 1 to 1
  - (D) 50%

50. What is the relative risk of 'Always Exceeding the Speed Limit' for people 'Under 30' compared to people 'Over 30'?
  - (A) 2.5
  - (B) 0.4
  - (C) 0.5
  - (D) 30%

x-x-x

(English)

1. Annotation is a
   (A) Methodology
   (B) Technique
   (C) Perspective
   (D) Criteria

2. A filter question is one that:
   (A) Helps the interviewer to avoid asking irrelevant questions
   (B) Leaves a space for respondents to write long and detailed answers
   (C) Ensures that all respondents are asked every question on the schedule and in the same order
   (D) Allows supervisors to distinguish between good and bad interviewers

3. Sources in research are of two kinds
   (A) Primary and secondary
   (B) Basic and applied
   (C) True and false
   (D) Good and bad

4. Desk research is another term for
   (A) Basic Research
   (B) Pure Research
   (C) Secondary Research
   (D) Primary Research

5. A tentative explanation or answer to a research question is the
   (A) Objective
   (B) Hypothesis
   (C) Goal
   (D) Solution

6. Why do you need to review the existing literature?
   (A) To make sure you have a long list of references
   (B) Because without it, you could never reach the required word-count
   (C) To find out what is already known about your area of interest
   (D) To help in your general studying

7. An inductive theory means:
   (A) Testing an explicitly defined hypothesis
   (B) Not allowing findings to feed back into the stock of knowledge
   (C) Using quantitative methods whenever possible
   (D) Allowing theory to emerge out of the data

8. Reading critically involves
   (A) Taking an opposing point of view to the ideas and opinions expressed
   (B) Skimming through the material because most of it is just padding
   (C) Evaluating what you read in terms of your own research questions
   (D) Being negative about something before you read it

9. The word 'research' originates from the
   (A) Italian
   (B) Greek
   (C) French
   (D) Spanish

10. Research method and research methodology are
    (A) Synonymous
    (B) Identical
    (C) Opposite
    (D) Different

11. Research is conducted with this conceptual framework:
    (A) Research hypothesis
    (B) Abstract of Research
    (C) Research paradigm
    (D) Research design

12. Action Research refers to
    (A) Qualitative Research
    (B) Quantitative Research
    (C) Research designed to address an issue
    (D) Research designed to address a theory

13. Research that explores the effect of one variable on another is named
    (A) Causal research
    (B) Applied research
    (C) Conclusive research
    (D) Exploratory research

14. Choose the first step in starting the research process:
    (A) Searching for sources of information to locate problem
    (B) Survey of related literature
    (C) Identification of the problem
    (D) Searching for solutions to the problem

15. What is a pilot study?
    (A) Small scale study
    (B) Study involving testing pilots
    (C) First of its kind study
    (D) Study for testing the data collection tools

16. Definition of hypothesis:
    (A) Research question that results will answer
    (B) Theory underpinning the study
    (C) Statement to be tested through the study
    (D) Statistical method for testing results

17. What is the difference between research and audit?
    (A) An audit does not need too many people
    (B) Research can be carried out on inanimate objects
    (C) An audit does not increase our understanding of a topic
    (D) Research has no practical value

18. If a researcher selected five schools at random and then interviewed each of the teachers in those five schools, the researcher used
    (A) Simple random sampling
    (B) Stratified random sampling
    (C) Cluster random sampling
    (D) Two-stage random sampling

19. The horizontal axis of the bar graph is also known as
    (A) v-axis
    (B) x-axis
    (C) y-axis
    (D) h-axis

20. An Ellipsis has _____
    (A) Three periods
    (B) Four periods
    (C) Two periods
    (D) Indentation

21. 'Race, moment, milieu' is the main concern of the_____ approach
    (A) Psychological
    (B) New Critical
    (C) Archetypal
    (D) Historical

22. The full form of MLA is _____
    (A) Modern Language Association
    (B) Modern Lingual Associate
    (C) Modern Linguistics Association
    (D) Modern Language Associate

23. Data collected from published books is called
    (A) Primary data
    (B) Secondary data
    (C) Tertiary data
    (D) Bibliography

24. The academic field concerned with the application of computational tools and methods to traditional humanities is _____
    (A) Digitization
    (B) Digital Research
    (C) Digital Humanities
    (D) Corpus Linguistics

(3)

25. Misquoting a quotation undermines
    (A) Reputation
    (B) Credibility
    (C) Argument
    (D) Language

26. According to M.A.K. Halliday, cohesion is actualized through:
    (A) Allusion, imagery, simile, and questions
    (B) Ellipsis, comparison, simile, and rhyme
    (C) Substitution, lexical cohesion, ellipsis, and reference
    (D) Ellipsis, comparison, simile, and reference

27. "Night's candles are burnt out, and jocund day Stands tiptoe on the misty mountain tops."
    (A) Metaphor and personification
    (B) Simile and Symbol
    (C) Comparison and allusion
    (D) Allegory and paradox

28. The meaning of discourse is largely dependent on the dynamics between:
    (A) Author and Reader
    (B) Addresser and addressee
    (C) Speaker and hearer
    (D) Symbols and their interpretation

29. Suprasegmentals include prosodic phenomena such as:
    (A) Vowels, diphthongs, consonants, and syllables
    (B) Parts of speech, word structure, sentence structure, and punctuation
    (C) Phonetics, morphology, semantics and syntax
    (D) Stress, pitch, information and juncture

30. An effective model of communication, comprising six functions of language, was evolved by:
    (A) Noam Chomsky
    (B) Roman Jakobson
    (C) Karl Buhler
    (D) Ferdinand Saussure

31. The "Spenserian Stanza" consists of
    (A) Seven Lines
    (B) Nine Lines
    (C) Eight Lines
    (D) Six Lines

32. For the general idea of *The Canterbury Tales,* Chaucer was indebted to
    (A) Petrarch
    (B) Boccaccio
    (C) Dante
    (D) Homer

(4)

33. *Sexual/Textual Politics* is a book written by
    (A) Simone De Beauvoir
    (B) Elaine Showalter
    (C) Julia Kristeva
    (D) Toril Moi

34. What is 'Aporia'?
    (A) Lucidity
    (B) Close reading of a text
    (C) Clarity of thought
    (D) Deadlock of meaning

35. Who is NOT a confessional poet?
    (A) Philip Larkin
    (B) Anne Sexton
    (C) Sylvia Plath
    (D) Allen Ginsberg

36. W. B. Yeats used the phrase 'the artifice of eternity' in his poem _____
    (A) Sailing to Byzantium
    (B) Byzantium
    (C) The Second Coming
    (D) Leda and the Swan

37. Ezra Pound is associated with which aesthetic movement?
    (A) Imagism
    (B) Expressionism
    (C) Realism
    (D) Surrealism

38. The term homology means a correspondence between two or more structures. Who of the following developed a theory of relations between literary works and social classes in terms of homologies?
    (A) Raymond Williams
    (B) Christopher Caudwell
    (C) Lucien Goldmann
    (D) Antonio Gramsci

39. "All great literature is, at bottom, a criticism of life" – this statement is attributed to
    (A) Thomas Carlyle
    (B) Matthew Arnold
    (C) J.S. Mill
    (D) John Ruskin

40. Victor Shlovsky's name is associated with
    (A) Post-modernism
    (B) New Historicism
    (C) Reader Response Theory
    (D) Russian Formalism

41. "Two eyes serve a movement, that now and again now, and now, and now sets neat prints in the snow, Between trees..." This is an extract from Ted Hughes's
   (A) The Thought Fox
   (B) Wodwo
   (C) Hawk Roosting
   (D) The Bull Moses

42. Leon Trotsky, George Lukacs, Antonio Gramsci and Louis Althusser are all
   (A) Russians
   (B) Marxists
   (C) Novelists
   (D) Expressionists

43. T.S. Eliot's 'dissociation of sensibility' signifies
   (A) Separation of mind and body
   (B) Subordination of the senses
   (C) Disjunction of intellect and emotion
   (D) Dissociation of the self from the other

44. 'Who knows but the world may end tonight'. This line occurs in
   (A) `Porphyria's Lover'
   (B) 'Rabbi Ben Ezra'
   (C) 'The Last Ride Together'
   (D) 'My Last Duchess'

45. Which of the following was a characteristic feature of Medieval literature?
   (A) A large body of personal literature
   (B) Realism in representation of time and space
   (C) Absence of alliteration in poetry
   (D) The popularity of the bird and the beast fable

46. The first skill of language acquired by a baby is
   (A) Speaking
   (B) Writing
   (C) Reading
   (D) Listening

47. The number of sounds in English is _____ the number of alphabets.
   (A) Equal to
   (B) More than
   (C) Less than
   (D) Double

48. Animals and human beings both use language. This statement is
   (A) True
   (B) False
   (C) Partially true
   (D) Unverified

49. The study of meaning is termed
    (A) Pragmatics
    (B) Neurolinguistics
    (C) Semantics
    (D) Sociolinguistics

50. The first known and surviving work on dramaturgy in the Indian tradition is
    (A) Natak bhoomi
    (B) Natya shastra
    (C) Kavya shastra
    (D) Natak Mandala

x-x-x

Food Technology(Ph.D) (FT)

1. Which is not the fat modification Process?
   (A) Hydrogenation   (B) Winterization
   (C) Inter-esterification   (D) Fractionation

2. Which is not the step of parboiling?
   (A) Soaking   (B) Steaming
   (C) Drying   (D) Roasting

3. _____ is the hydratable gum recovered from oil industry
   (A) Pectin   (B) Hemicellulose
   (C) Lecithin   (D) Bleaching earth

4. Packaging material which not only enhances the shelf life but also communicate is called
   (A) Active Packaging   (B) Antimicrobial packaging
   (C) Retort packaging   (D) TTI packaging

5. To control ripening _____ is used
   (A) Oxygen scavengers   (B) Moisture scavengers
   (C) Ethylene absorber   (D) Ethylene releaser

6. Processing conditions of canning is
   (A) 120°C, 20 psi, 15 min   (B) 121°C, 15 psi, 15 min
   (C) 121°C, 15 psi, 10 min   (D) 121°C, 10 psi, 10 min

7. MPN stands for
   (A) Most probable number   (B) Multi probable number
   (C) Maximum probable number   (D) Minimum probable number

8. The preservation technique using plasma processing is known as
   (A) Cold sterilization   (B) Dry sterilization
   (C) Heat sterilization   (D) Uperization

9. The undesirable change in food that makes it unsafe for human consumption is known as
   (A) Food decay   (B) Food spoilage
   (C) Food loss   (D) All the above

10. Aflatoxin is produced by
    (A) *Aspergillus* spp.   (B) Salmonella spp
    (C) *Fuserium* spp.   (D) *Streptococcus* spp.

11. Fresh meat can be stored using _____ priorly.
    (A) Vacuum Packaging   (B) Retort Packaging
    (C) CAP   (D) MAP

12. Moisture content of papaya is 85% wet basis. In dry basis the value will be
    (A) 333%   (B) 155%
    (C) 566.6%   (D) 444%

13. The ratio of total mass transferred to mass transferred due to molecular diffusion is called as
    (A) Grashof number
    (B) Schmidst number
    (C) Sherwood number
    (D) Reynolds number

14. The point where the constant drying period changes to falling rate period is called _____
    (A) Equilibrium moisture content
    (B) Critical moisture content
    (C) Critical humidity
    (D) Bound moisture content

15. Hard wheat contains
    (A) 4% protein
    (B) 10% protein
    (C) 40% protein
    (D) 12-14% protein

16. The saccharifying enzyme is
    (A) α-amylase
    (B) β- amylase
    (C) Pectinase
    (D) cellulose

17. Bulging of can due to
    (A) H_2 gas production
    (B) Expansion of food product
    (C) N_2 production
    (D) O2 gas production

18. The expansion of term HACCP and GRAS are
    (A) Hygienic Associated Critical Control Point; Grossly Recommended As Safe
    (B) Hazard Analysis and Critical Control Point; Generally Recognized As Safe
    (C) Hygienic and Aesthetic Concept of Critical Products; Generally Recognized As Safe
    (D) Hazard Analysis and Critical Control Point; Grossly Recommended As Safe

19. Micelle in solvent extraction of oil from oil seed flakes consists of
    (A) Oil and water
    (B) Oil, water and solvent
    (C) Water and solvent
    (D) Oil and solvent

20. Toxin gossypol is present in which oil bearing seeds
    (A) Coconut
    (B) Cotton seed
    (C) Sunflower
    (D) Caster seed

21. Which vitamin is found in parboiled rice but absent in milled raw rice?
    (A) Vit A
    (B) Vit D
    (C) Vit E
    (D) Thiamine

22. The glucose units in cellulose are linked together by
    (A) α-1-4 glycosidic linkage
    (B) β-1-4 glycosidic linkage
    (C) α-1-6 glycosidic linkage
    (D) β-1-6 glycosidic linkage

23. _____ enzyme is used for tenderization of meat
    (A) Pectinase
    (B) Bromelain
    (C) Papain
    (D) Both (B) and (C)

24. 100 kWh is equal to
    (A) 7.2×10^8 J   (B) 3.6×10^8 J
    (C) 8.3×10^8 J   (D) 6.5×10^8 J

25. Match the food items in Group I with the type of colloidal dispersion given in Group II.

Group I	Group II
P) Mayonnaise	1) Sol
Q) Tomato ketchup	2) Emulsion
R) Cake	3) Gel
S) Curd	4) Solid foam

    (A) P-4, Q-1, R-2, S-3   (B) P-3, Q-1, R-2, S-4
    (C) P-2, Q-3, R-4, S-1   (D) P-2, Q-1, R-4, S-3

26. A researcher is interested in studying the prospects of a particular political party in an urban area. So, what tool should he prefer for the study?
    (A) Rating Scale   (B) Interview
    (C) Questionnaire   (D) Schedule

27. How to judge the depth of any research?
    (A) By research title   (B) By research duration
    (C) By research objectives   (D) By total expenditure on research

28. Which of the following is not the method of Research?
    (A) Survey   (B) Historical
    (C) Observation   (D) Philosophical

29. Which one is called non-probability sampling?
    (A) Quota sampling   (B) Cluster sampling
    (C) Systematic sampling   (D) Stratified random sampling

30. Observation is a direct method of collecting
    (A) Primary data   (B) Secondary data
    (C) Both   (D) Published data

31. The scale measurement which has a natural zero
    (A) Ordinal scale   (B) Ratio scale
    (C) Nominal   (D) Interval

32. A subset of the population is called
    (A) Element   (B) Sampling unit
    (C) Sample   (D) Sampling frame

33. A Hypothesis must be _____
    (A) Diffuse   (B) Specific
    (C) Slow   (D) Speedy

34. Which of the following is an example of primary data?
    (A) Book   (B) Journal
    (C) News Paper   (D) Census Report

(3)

35. Sampling is advantageous as it
    (A) Saves time
    (B) Helps in capital saving
    (C) Increases accuracy
    (D) Both A & B

36. What is the major attribute of correlation analysis?
    (A) Association among variables
    (B) Difference among variables
    (C) Regression among variables
    (D) Variation among variables

37. Conceptual Framework in which research is carried out?
    (A) Research hypothesis
    (B) Synopsis
    (C) Research Paradigm
    (D) Research design

38. What are the conditions in which Type-I error occurs?
    (A) The null hypothesis gets accepted Even if it is false
    (B) The null hypothesis gets rejected even if it is true
    (C) Both null as well as alternative hypothesis are rejected
    (D) None of the above

39. A researcher is interested in studying the prospects of a particular class of student in a particular city. So, what tool should he prefer for the study?
    (A) Rating scale
    (B) Interview
    (C) Questionnaire
    (D) Schedule

40. Which technique is generally followed when the population is finite?
    (A) Systematic sampling technique
    (B) Purposive sampling technique
    (C) Area sampling technique
    (D) None of the above

41. The data of research is _____
    (A) Quantitative only
    (B) Qualitative only
    (C) Both (A) and (B)
    (D) Neither (A) and (B)

42. Longitudinal approach of research deals with _____.
    (A) Short-term researches
    (B) Long-term researches
    (C) Horizontal researches
    (D) None of the above

43. To test null hypothesis, a researcher uses
    (A) T test
    (B) Z test
    (C) ANOVA
    (D) Factorial analysis

44. Which one of the following is the most comprehensive source of population data?
    (A) Census
    (B) National Sample surveys
    (C) Demographic Health Surveys
    (D) National Family Health Surveys

45. Which one of the following is not a non-parametric test?
    (A) T- test
    (B) Run test
    (C) Sign test
    (D) Chi-square test

46. Sampling error decreases with the
    (A) Process of analysis   (B) Increase in sample size
    (C) Decrease in sample size   (D) Process of randomization

47. A thesis statement is
    (A) A fact   (B) A discussion
    (C) An assertion   (D) An observation

48. Primary data for the research process be collected through _____ .
    (A) Survey   (B) Experiment
    (C) Both (A) and (B)   (D) None of the above

49. _____ is not required for effective communication.
    (A) Speech modulation   (B) Charming personality
    (C) Appropriate gestures   (D) Good knowledge of the content

50. Longitudinal approach of research deals with _____ .
    (A) Short-term researches   (B) Long-term researches
    (C) Horizontal researches   (D) None of the above

x-x-x

(French)

1. Une source primaire :
   (A) Une encyclopédie
   (B) Une revue scientifique
   (C) Une lettre
   (D) Un manuel

2. Lequel des suivants n'est pas un outil de recueil de données couramment utilisé en recherche:
   (A) l'audit
   (B) l'entretien
   (C) le questionnaire
   (D) l'observation

3. Laquelle n'est pas une des techniques de traitement textuelles des données:
   (A) l'analysethématique
   (B) l'analyse conversationnelle
   (C) l'analyse de contenu
   (D) l'analyse statistique

4. L'énonciation de l'hypothèse se fait à
   (A) la phase du recueil de données
   (B) la phase de traitement et analyse des données
   (C) la phase de conception
   (D) toutes les phases

5. Quelle que soit la technique d'analyse des données textuelles choisie par lui, l'apprenti chercheur doit :
   (A) Conserver l'ensemble des unitéssémantiques qui ressortent des données textuelles recueillies
   (B) éliminer les unitéssémantiques qui ne se retrouvent pas dans le croisement des discours
   (C) conserver uniquement les unités de sens qui permettent de répondre à sa question de recherche
   (D) éliminer les unités de sens qui ne concordent pas avec l'objectif de la recherche

6. Avec la technique d'analyse quantitative, la fréquence se définit comme :

   (A) le rapport entre l'effectif d'un thème et le nombre de fois où est énoncé le thème
   (B) le rapport entre l'effectif d'une valeur et le nombre de fois où est énoncée cette valeur
   (C) le rapport entre l'effectif de sujets ayant participé à une recherche et le nombre de fois où est énoncée une valeur
   (D) Le rapport entre l'effectif d'une valeur et le nombre de sujets ayant participé à une recherche

7. Les résultatsprésentés dans une revue
   i) devraient êtreappliqués quel que soit le contexte

   ii) devraient êtreappliqués uniquement si les résultats proviennent d'une revue scientifique

   iii) devraient faire débat au sein d'une équipeconcernée par le thème.

   iv) devraient permettre de réactualiser les pratiques

   Cochez la réponse correcte :
   (A) i) et iii)
   (B) ii) et iii)
   (C) iii) et iv)
   (D) ii) et iv)

8. Un résumé :
    (A) a une structuration prédéfinie
    (B) accorde plus d'importance à la structure qu'au nombre de mots
    (C) accorde plus d'importance au nombre de mots qu'à la structure
    (D) est facultatif dans un article de recherche

9. Les qualités d'une affiche sont :
    (A) de comporter uniquement du texte
    (B) d'être attrayante, claire, riche et compréhensible
    (C) d'êtreréalisée en noir et blanc et de respecter la police d'écritureimposée
    (D) d'être toujours en couleurs

10. La réalisation d'une affiche demande :
    i)   descapacitésrédactionnelles
    ii)   descapacitésméthodologiques
    iii)   descapacités argumentatives
    iv)   descapacités de synthèse
    Cochez la bonne réponse :

    (A) i) et iv)
    (B) ii) iii) et iv)
    (C) ii) et iii)
    (D) toutes les quatre

11. Ce qui est important lors du débat avec les membres du jury (**une seule réponse**) :
    (A) il faut répondre par oui ou non
    (B) il est conseillé de noter les questions du jury
    (C) il importe de répondretrès rapidement afin de montrer que le sujet est bien maîtrisé
    (D) il ne faut pas reformuler une question car cela est perçusystématiquement comme
un point faible

12. La présentation d'un diaporama lors de la soutenance requiert des diapositives :
    (A) écrite en jaune car c'est lumineux
    (B) comprenant des phrases complètes afin d'être exhaustif
    (C) qui peuvent êtrevisionnées au rythme d'une diapositive toutes les trente secondes
    (D) dont la numérotation fait référence au nombre de diapositives totales

13. Dans un questionnaire, une question dichotomique :
    (A) est une question fermée indiquant les réponses oui, non et ne sait pas
    (B) est une question fermée offrant un choix entre 2 réponses possibles
    (C) est une question ouverte offrant un choix entre 2 réponses possibles
    (D) est une question ouverte permettant de développer deux réponsesdifférentes sur un
        sujet

14. Laquelle n'est pas une tâche à réaliser en amont du recueil des données sur
    le terrain à l'aide du ou des outils retenus ?
    (A) réaliser une observation et des entretiens préalables
    (B) identifier les sources d'information : personnes et lieux ressources
    (C) tester le ou les outil(s) auprès d'un public restreint
    (D) construire le ou les outil(s)

(2)

15. La recherche quantitative s'appuie sur
    (A) laméthode d'observation
    (B) d'entretien
    (C) deréférences
    (D) desméthodes statistiques

16. Un '*hapax*' c'est
    (A) Un mot dont on ne connaît pas l'étymologie
    (B) Un mot qui n'apparaît qu'une seule fois dans un texte
    (C) Un mot inventé pour le besoin d'un test
    (D) Une faute d'orthographe

17. Dans l'entretien non-directive
    (A) La personne interrogée doit répondre rapidement
    (B) Elle n'exprime pas son avis
    (C) Elle répond à une question à champ large
    (D) Elle a un choix limité

18. Par l'observation, une méthode de recherche, on ne peut pas
    (A) Collecter des informations sur un phénomène
    (B) Mener une étude qualitative
    (C) Mener une étude quantitative
    (D) Confirmer ou infirmer des hypothèses

19. Une revue de littérature se fait afin de savoir :
    (A) quels sont les chercheurs qui ont contribué au sujet de recherche
    (B) ce qui existe déjà comme étude sur le sujet
    (C) quels concepts et théories ont été appliqués au sujet
    (D) toutes les réponses données ci-dessus

20. L'analyse quantitative ne comprend pas :
    (A) les données objectives
    (B) l'analyse statistique
    (C) les données subjectives
    (D) un plan expérimental fixé à l'avance

21. Ce n'est pas une norme de citation bibliographique :
    (A) NLA
    (B) Chicago
    (C) APA
    (D) MLA

(3)

22. Cochez ce qui est vrai :
    (A) Ce n'est pas du plagiat si on a copié/collé un passage trouvé sur Internet, puis changé quelques mots par des synonymes et inversé une ou deux phrases
    (B) La traduction du mot à mot d'un texte anglais cité par le chercheur sans guillemets est du plagiat
    (C) Si la traduction est libre (comme dans le cas d'une paraphrase) et sans guillemets, c'est du plagiat
    (D) Dans tous les cas, la référence complète à la source est nécessaire puisqu'il s'agit d'un emprunt et, si l'emprunt est textuel, les guillemets (« ») ne sont pas requis

23. Cochez ce qui est faux :
    (A) Lorsqu'on réfère à des faits qui sont de notoriété publique (ex. : Apple est le fabricant du iPhone), il n'est pas nécessaire de citer la source
    (B) Une personne reconnue coupable de plagiat peut s'exposer à plus d'une mesure disciplinaire
    (C) L'information trouvée sur Internet (écrits, idées, images, vidéos, etc.) est publique et, par conséquent, elle appartient à tous. Il n'est donc pas nécessaire de citer la source
    (D) Dans une présentation qu'il a donnée dans un colloque international, C'est du plagiat si un doctorant a utilisé un graphique issu des travaux de recherche de Mlle X, membre du même groupe de recherche, sans mentionner qu'il s'agissait des travaux de celle-ci

24. On peut les soumettre à une analyse du contenu textuel :
    (A) Articles de journaux
    (B) Transcriptions des entretiens
    (C) Paroles des chansons
    (D) Tous les trois

25. Qu'est-ce qui est faux :
    (A) Pour être valable, une hypothèse doit être vérifiable
    (B) Une hypothèse doit mettre en œuvre des faits réels
    (C) Elle doit comporter des jugements de valeur (utiliser les termes tels : bon, mauvais, devraient etc.)
    (D) Une hypothèse doit se rattacher à une théorie existante et être en conformité avec le contenu actuel de la science

26. Chassez l'intrus
    (A) Jean-Luc Godard
    (B) Eric Rohmer
    (C) Jacques Tati
    (D) François Truffaut

27. Il est né en 1802 :
    (A) Alfred de Musset
    (B) Victor Hugo
    (C) Honoré de Balzac
    (D) Guy de Maupassant

(4)

28. *La chanson du mal aimé* est écrit par
    (A) Charles Baudelaire
    (B) Alphonse Lamartine
    (C) Guillaume Apollinaire
    (D) Alfred de Musset

29. Esméralda et Phébus sont des personnages de quelle œuvre ?
    (A) Le père Goriot

    (B) Notre Dame de Paris

    (C) Bel Ami

    (D) Les Misérables

30. Lequel est un peintre impressionniste :
    (A) David d'Angers

    (B) Auguste Renoir

    (C) Eugène Delacroix

    (D) Picasso

31. Les femmes françaises ont eu le droit de vote en
    (A) 1789

    (B) 1889

    (C) 1848

    (D) 1944

32. Lamartine est un poète
    (A) Symboliste

    (B) Surréaliste

    (C) Romantique

    (D) Classique

33. La traduction de *hardware* en anglais sera :
    (A) Matériel dur

    (B) Quincaillerie

    (C) Matières dures

    (D) Ferraillerie

34. L'auteur de *Lettres de mon moulin*, c'est
   (A) Montesquieu

   (B) Prosper Mérimée

   (C) George Sand

   (D) Alphonse Daudet

35. Sur quelle théorie d'apprentissage s'appuyait la méthode audio-orale :
   (A) Cognitivisme

   (B) Constructivisme

   (C) Behaviorisme

   (D) Connectivisme

36. Quel personnage historique français n'était pas guillotiné :
   (A) Marat

   (B) Marie Antoinette

   (C) Danton

   (D) Louis XVI

37. On le connaît aussi comme *Le Patriarche de Ferney* :
   (A) Victor Hugo

   (B) Jean-Jacques Rousseau

   (C) Voltaire

   (D) Molière

38. Emanuel Macron appartient à ce parti politique :
   (A) RPR

   (B) REM

   (C) UPR

   (D) RN

39. «He is on the committee» est traduit par:
    (A) *ll est sur le comité*

    (B) *Il est dedans le comité*

    (C) *Il est dans le comité*

    (D) *Il fait partie du comité*

40. En 1980, la première femme élue à l'Académie Française c'était :
    (A) Marguerite Duras

    (B) Marguerite Yourcenar

    (C) George Sand

    (D) Nathalie Sarraute

41. L'esclavage était définitivement aboli en France en
    (A) 1789
    (B) 1842
    (C) 1799
    (D) 1848

42. Les méthodes traditionnelles de l'enseignement des langues proposaient souvent des exercices
     de
    (A) Grammaire de base
    (B) Grammaire normative
    (C) Grammaire implicite
    (D) Grammaire générative

43. *La Môme* est le surnom donné à la chanteuse
    (A) Jane Birkin
    (B) Françoise Hardy
    (C) Edith Piaf
    (D) Barbara

44. Complétez : *Heureux comme un* _____
    (A) Bon chien
    (B) Poisson dansl'eau
    (C) Bébé
    (D) Papillon

45. Le mouvement *dadaïsme* prend son nom du mot *dada* qui veut dire dans le language enfantin
    (A) Dormir
    (B) Danse
    (C) Cheval
    (D) Chanson

46. « Seau », « Sceau », « Saut », « sot » sont des
    (A) Synonymes
    (B) Homographes
    (C) Antonymes
    (D) Homophones

47. Les expressions comme « silences éloquentes », « réalité virtuelle », douce violence » sont des
    (A) Litotes
    (B) Euphémismes
    (C) Oxymores
    (D) Métaphores

48. *Le Penseur* est une sculpture par
    (A) Michel Ange
    (B) Auguste Rodin
    (C) Leonard de Vinci
    (D) Bernard Palissy

49. Le ludique dans la pédagogie s'appuie sur
    (A) Le vocabulaire technique
    (B) La grammaire
    (C) Les jeux
    (D) La linguistique

50. _____ a mené le mouvement de la Résistance pendant la Seconde guerre mondiale :

(A) André Malraux

(B) Charles de Gaulle

(C) René Coty

(D) Giscard d'Estaing

x-x-x

Gandhian Studies(Ph.D. & M.Phil) (GPS)

1. The major attribute of Correlation Analysis are:
   (A) Association among variables

   (B) Difference among variables

   (C) Regression among variables

   (D) Variations among variables

2. Identify among the following which falls under the category of research development?
   (A) Descriptive Research

   (B) Philosophical Research

   (C) Action Research

   (D) All of the above

3. The Factorial Analysis is used for:
   (A) For setting the hypotheses

   (B) To understand the difference between two variables

   (C) To understand the relationship between two variables
   (D) To understand the difference between various variables

4. The _____ technique is generally followed when the population is finite
   (A) Systematic Sampling

   (B) Purposive Sampling

   (C) Area Sampling
   (D) None of the above

5. Research problem is selected from the standpoint of
   (A) Social relevance
   (B) Financial support
   (C) Researcher's interest
   (D) Availability of relevant literature

6. The F-test:
   (A) Is essentially a two-tailed test

   (B) Is essentially a one-tailed test

   (C) Can be one-tailed as well as two-tailed depending on the hypotheses
   (D) Can never be one tailed test

7. The process not needed in experimental research is
   (A) Controlling
   (B) Observation
   (C) Reference collection
   (D) Manipulation and replication

8. Identify from the following the conditions where a research problem is not viable

(A)   It is new and adds something to knowledge
(B)   It can be researched
(C)   It has utility and relevance
(D)   It contains dependent and independent variables

9. The research objective can be enhanced by:
(A)   Making it more valid
(B)   Making it more reliable

(C)   Making it more impartial

(D)   All of the above

10. Action-research can be understood as _____
(A)   A longitudinal research
(B)   An applied research
(C)   A kind of research being carried out to solve a specific problem
(D)   All of the above

11. Cyber bullying at work is a growing threat to employee job satisfaction. Researchers want to find out why people do this and how they feel about it. The primary purpose of the study is:
(A)   Description
(B)   Prediction
(C)   Exploration
(D)   Explanation

12. A theory:
(A)   Is an accumulated body of knowledge
(B)   Includes inconsequential ideas
(C)   Is independent of research methodology
(D)   Should be viewed uncritically

13. The research method is a bottom-up approach to research. Point out
(A)   Deductive method
(B)   Explanatory method
(C)   Inductive method
(D)   Exploratory method

14. A review of the literature prior to formulating research questions allows the researcher to:
(A)   Provide an up-to-date understanding of the subject, its significance, and structure
(B)   Guide the development of research questions
(C)   Present the kinds of research methodologies used in previous studies
(D)   All of the above

15. Sample value is called
(A)   Parameter

(B)   Statistics

(C)   Variable

(D)   Data

16. Judgemental sampling is also known as
    (A)   Purposive sampling

    (B)   Convivence sampling

    (C)   Extensive sampling

    (D)   Cluster sampling

17. Ex-Post-Facto research means
    (A)   The research carried out after the incident

    (B)   The research is carried out prior to the incident

    (C)   The research is carried out along with the happening of the incident

    (D)   The research is carried keeping in mind the possibilities of the incident

18. Which correlation is the strongest?
    (A)   −1.00
    (B)   +80
    (C)   −60
    (D)   +05

19. A nominal variable can be described as:
    (A)   Annual income
    (B)   Age
    (C)   Annual sales
    (D)   Geographical location of a firm

20. When conducting an interview, asking questions such as: "What else? or 'Could you expand on that?' are all forms of:
    (A)   Structured responses
    (B)   Category questions
    (C)   Protocols
    (D)   Probes

21. Which term measures the extent to which scores from a test can be used to infer or predict performance in some activity?
    (A)   Face validity
    (B)   Content reliability
    (C)   Criterion-related validity
    (D)   Construct validity

22. The 'reliability' of a measure refers to the researcher asking:
    (A)   Does it give consistent results?
    (B)   Does it measure what it is supposed to measure?
    (C)   Can the results be generalized?
    (D)   Does it have face reliability?

23. A disadvantage of using secondary data is that:
   (A) The data may have been collected with reference to research questions that are not
       those of the researcher
   (B) The researcher may bring more detachment in viewing the data than original
       researchers could muster
   (C) Data have often been collected by teams of experienced researchers
   (D) Secondary data sets are often available and accessible

24. To compare the performance of a group at time T1 and then at T2, we would use:
   (A) A chi-squared test
   (B) One-way analysis of variance
   (C) Analysis of variance
   (D) A paired t-test

25. In preparing for a viva or similar oral examination, it is best if you have:
   (A) Avoided citing the examiner in your thesis
   (B) Made exaggerated claims on the basis of your data
   (C) Published and referenced your own article(s)
   (D) Tried to memorize your work

26. What was Mahatma Gandhi's profession in South Africa?
   (A) Translator

   (B) Reporter

   (C) Teacher

   (D) Lawyer

27. Who in South Africa gave Gandhiji 'Unto This Last' to read which proved to be one of the most
   decisive books of his life?
   (A) John Holmes Haynes

   (B) H S Pollak

   (C) Hermann Kallenbach

   (D) Louis Fischer

28. Identify the Viceroy who wrote home these words after his first meeting with Gandhiji:
   "Mr Gandhi's religious and moral views are, I believe, admirable, but I confess that I
   find it difficult to understand the practice of them in politics."
   (A) Lord Wavell

   (B) Lord Irwin

   (C) Lord Reading

   (D) Lord Mountbatten

29. The theory of 'Cultural Nationalism' was expounded by
    (A)   Gandhi

    (B)   Vivekananda

    (C)   Savarkar

    (D)   Nehru

30. Quit India Movement is also known as _____.
    (A)   August movement
    (B)   May Movement
    (C)   July Revolution
    (D)   None of the above

31. In which year Gandhi's name first recommended for the Nobel Prize
    (A)   1947

    (B)   1948

    (C)   1937

    (D)   1938

32. Gandhi said, "For me there can be no politics without _____ "
    (A)   Service

    (B)   Religion

    (C)   Will

    (D)   None of these

33. Gandhi believed in the sovereignty of the people based on pure _____.
    (A)   Rational authority

    (B)   Political wisdom

    (C)   Moral authority

    (D)   Knowledge

34. By the term Panchyat Raj, Gandhi means:
    (A)   Federation of decentralised rural communities
    (B)   Federation of rural communities
    (C)   Federation of decentralised communities
    (D)   None of these

35. Daridranarayana means:
    (A)   Poor God

    (B)   God is poor

    (C)   Poor as God

    (D)   None of these

36. Tolstoy's "_____ " made much impression upon Gandhi.
    (A)   Unto This Last

    (B)   Enlightens

    (C)   The Kingdom of God within You

    (D)   None of these

37. The essential nature of God is described by Gandhi by the phrase:
    (A)   Sarveswaran

    (B)   Svarupan

    (C)   Satchidananda

    (D)   Iswara

38. Truth to Gandhi is not an epistemological presupposition but an :
    (A)   Psychological notion
    (B)   Ontological implication
    (C)   Epistemological notion
    (D)   None of these

39. Gandhi understood the facts of non-violence from the teachings of:
    (A)   Buddhism and Jainism

    (B)   Advaita

    (C)   Christianity

    (D)   Islam

40. _____ became the president of the Haripura Indian National Congress against the wishes of Gandhiji in 1938.
    (A)   Subhas Chandra Bose
    (B)   Qutubuddin Ahmad
    (C)   Shamsuddin Hussain
    (D)   Maulana Shaukat Ali

41. In the second Round Table Conference, _____ was appointed as the representative of the Congress, which was convened from 1st September to 1st December in the year1931.
    (A)   Gandhiji
    (B)   B.R. Ambedkar
    (C)   Annie Besant
    (D)   Maulana Azad

42. The programs of _____ involved the surrender of titles and offices and resignation from the nominated posts in the government body.
    (A)   Non-cooperation
    (B)   Khudai Khidmatgars
    (C)   Labour movement
    (D)   Womens' movement

43. At which place was Gandhiji arrested for the first time by the British Government for sedition?
   (A)   Bombay
   (B)   Pune
   (C)   Calcutta
   (D)   Ahmedabad

44. On being arrested for his "Quit India" programme, where was Gandhiji detained?
   (A)   Yeravda Jail
   (B)   Byculla Prison
   (C)   Aga Khan Palace Jail
   (D)   Ahmedabad Prison

45. In February 1933 Gandhiji started the publication of a weekly paper, Harijan, to promote the anti-untouchability campaign. Its first issue was out on February 11, 1933 from
   (A)   Bombay
   (B)   Ahmedabad
   (C)   Poona
   (D)   Nasik

46. When on August 15, 1947 the transfer of power took place, the Congress President issued a message to the nation and saluted Mahatma Gandhi as "the maker of freedom achieved in a unique way." He said "never before was so great an event consummated with such little bloodshed and violence." Who was the Congress President?
   (A)   J B Kripalani

   (B)   Vallabhbhai Patel

   (C)   Jawaharlal Nehru

   (D) Motilal Nehru

47. Who of the following desired to convert Gandhiji to Christianity in South Africa?
   (A)   A. W. Baker
   (B)   Mrs. MacDonald
   (C)   William Godfrey
   (D)   Spencer Walton

48. Who of the following satyagrahis succumbed to jail hardships during the satyagraha movement launched by Gandhiji in South Africa?
   (A)   Harbat Singh
   (B)   Villiamma
   (C)   Nagappan
   (D)   All of them

49. At which place was the first permit office opened on July 1, 1907 for the registration of Indians under the Registration Act?
   (A)   Pretoria
   (B)   Johhanesburg
   (C)   Petersburg
   (D)   Volksrust

50. In the course of resistance against which of the following in South Africa did Gandhiji first use his new political weapon which came to be known later on as 'Satyagraha'?
    (A)   Peace Preservation Ordinance
    (B)   Natal Indenture Law
    (C)   Asiatic Law Amendment Act
    (D)   Immigrants Regulation Act

x-x-x

(GEOLOGY)

1. What is rift valley:
   (A) It's a deep valley formed in between the mountains
   (B) It's a valley on the sides of which are huge mountain
   (C) It's a subsidized land leaving a long and narrow opening
   (D) Surrounded by lakes

2. The Tethys was located between:
   (A) North America and South America
   (B) North America and Eurasia
   (C) Eurasia and Africa
   (D) Antarctica and Australia

3. Kota Formation in Godavari valley overlies _____Formation and is underlained by _____Formation:
   (A) Gangpur, Dharmaram
   (B) Dharmaram, Gangpur
   (C) Maleri, Dharmaram
   (D) Dharmaram, Maleri

4. Ancestral of Horse first made their appearance in which of the epoch:
   (A) Miocene
   (B) Eocene
   (C) Oligocene
   (D) Pleistocene

5. The oldest rocks in the world are found in:
   (A) Australian craton
   (B) Indian craton
   (C) Antarctica
   (D) Greenland

6. A double plunging fold:
   (A) Is same as dome
   (B) Has quaquaversal dip
   (C) Has two axis at right angles to each other
   (D) Reverses its direction of plunge within limits of observation

7. In case of tear faults:
   (A) Dip slip is zero, the net slip is zero
   (B) Dip slip is zero, the net slip is equals to strike slip
   (C) Dip slip and strike slip are equal
   (D) Dip slip is equal to strike slip and net slip is of any value

8. Which of the following set of geophysical methods are most suitable for the recognition of folds:
   (A) Gravimetric, magnetic, electrical
   (B) Gravimetric, magnetic, astronomical, seismic
   (C) Electrical, magnetic, seismic
   (D) Electrical, magnetic, seismic, gravimetric

9. The width of gravity dam at its base is how many times to that of its height:
   (A)   0.2 to 0.4
   (B)   0.4 to 0.6
   (C)   0.6 to 0.8
   (D)   0.8 to 1.0

10. In irregular terrain, underground water basin is artificially charged by:
    (A)   Basin method
    (B)   Ditch or furrow method
    (C)   Flooding method
    (D)   Natural channel method

11. What is the name of rock consisting essentially of olivine and Anorthite?
    (A)   Eucrite
    (B)   Troctolite
    (C)   Allivalites
    (D)   Picrite

12. A feldspar free Lamprophyre is:
    (A)   Minette
    (B)   Adamellite
    (C)   Vogesite
    (D)   Alnoite

13. The presence of anhydrous minerals like chlorite, actinolite, epidote and albite are characteristic of:
    (A)   Greenschist facies
    (B)   Hornblende hornfels facies
    (C)   Sanidinite facies
    (D)   Blueschist facies

14. The synonym term for Flexible sandstone is:
    (A)   Litharenite
    (B)   Ferricrete
    (C)   Itacolumite
    (D)   Ignimbrites

15. Mica syenite is a heteromorph of:
    (A)   Leucite Basalt
    (B)   Olivine Basalt
    (C)   Meta Gabbro
    (D)   Mica Peridotite

16. The rock Luxullianite is a product of which of this process:
    (A)   Albitization
    (B)   Chloritization
    (C)   Tourmalinization
    (D)   Uralitization

17. The characteristic minerals of Amphibolite facies are:
    (A)   Glaucophane+Grossularite+Zadite+Quartz
    (B)   Hornblende+Galucophane+Almandine+Quartz
    (C)   Glaucophane+Plagioclase+Hornblende+Almandine
    (D)   Hornblene+Plagioclase+Almandine+Epidote

18. The plagioclase in eclogite facies breaks down and goes both in _____ molecules:
    (A)   Jadeite and Tschermak's
    (B)   Albite and Grossularite
    (C)   Jadeite and Grossularite
    (D)   Albite and Diopside

19. Walking beam, pittman, band wheel, drum are the tools associated with:
    (A)   Driffers
    (B)   Aerial rock drill
    (C)   Churn drill
    (D)   Wagon drill

20. Pegmatites are examples of:
    (A)   Late magmatic injection
    (B)   Early magmatic injection
    (C)   Not related with magmatic deposits
    (D)   Replacement deposits

21. Elements with completely full outermost shells are grouped under:
    (A)   Lithophiles
    (B)   Chalcophiles
    (C)   Siderophiles
    (D)   Atmophiles

22. Foraminifers having a small test and large proloculus are described as:
    (A)   Microspheric
    (B)   Megalospheric
    (C)   Flagellate
    (D)   Uninucleate

23. A fold which increases in size as it is traced upwards along the axial plane is termed:
    (A)   Growth fold
    (B)   Reclined fold
    (C)   Ptygmatic fold
    (D)   Generative fold

24. The Low Velocity Zone apart from reduced seismic velocities is also characterized by:
    (A)   Low heat flow
    (B)   Low heat flow and high electrical conductivity
    (C)   High heat flow and high electrical conductivity
    (D)   High heat flow and low electrical conductivity

25. The most characteristic rocks of the Island-Arc Systems are:
    (A)   Andesites
    (B)   Granodiorites
    (C)   Blue schists
    (D)   Basalts

26. The behaviour of perfectly elastic bodies is governed by:
    (A)   Hooke's law
    (B)   Hilt's law
    (C)   Lambert's law
    (D)   Bode's law

27. Schuppen structures are associated with:
    (A)   Normal faulting
    (B)   Reverse faulting
    (C)   Thrust faulting
    (D)   Recumbent folding

28. Diapric or piercement folding results from:
    (A)   Horizontal movements in an initially competent fold
    (B)   Vertical movements in an initially competent fold
    (C)   A combination of horizontal and vertical movements in an initially competent fold
    (D)   Joints

29. The Perrisodactyls consists of:
    (A)   Even-toed ungulates
    (B)   Uneven-toed ungulates
    (C)   Both even and uneven-toed ungulates
    (D)   Streamlined body

30. Which of the following can be regarded as "Connecting Link" between amphibians and reptiles?
    (A)   Archaeopterix
    (B)   Duck-billed Platypus
    (C)   *Seymouria*
    (D)   *Limnoscelis*

31. Which of the following rock successions show evidence of glacial erosion in its lower parts?
    (A)   Zewan Formation
    (B)   Muth Quartzite
    (C)   Haimanta Group
    (D)   Agglomerate slate series

32. The A-type granites are characterized by:
   (A)   High alkalis and low CaO contents
   (B)   High FeO/MgO
   (C)   Enrichment in halogens
   (D)   Depletion in HREE/LILE

33. Which of the following is an example of a non-feldspathoidal undersatutaed rock?
   (A)   Nepheline syenite
   (B)   Nepheline basalt
   (C)   Leucite basanite
   (D)   Olivine gabbro

34. Which of the following is an orbicular diorite:
   (A)   Corsite
   (B)   Andesite
   (C)   Malachite
   (D)   Plumasite

35. The rock 'mangerite' is a:
   (A)   Quartz syenite
   (B)   Pyroxene syenite
   (C)   Hypersthene granite
   (D)   Ferro-augite grano-diorite

36. Tongue-shaped ripples that resemble mudlows and point-up current are known as:
   (A)   Linguiod ripples
   (B)   Lunate ripples
   (C)   Rhomboid ripples
   (D)   Undulatory ripples

37. Laterally extensive sheets of coarse braided alluvium generally only a few feet thick and blanketing continental shields is described as:
   (A)   Molasse facies
   (B)   Flysch facies
   (C)   Nubian facies
   (D)   Alluvial facies

38. In terms of chemical composition the Eclogites are closely similar to:
   (A)   Continental tholeiites
   (B)   Oceanic tholeiites
   (C)   Spilites
   (D)   Granodiorites

39. The term 'Liquidation grade' is applied to:
   (A)   A grade of an ore which is infested with gangue impurities
   (B)   A grade of an ore whose price is forced
   (C)   A grade of an unworkable ore deposit
   (D)   A suspected reserve

(5)

40. 'Xanthates' and 'aerofloats' are the examples of:
    (A)   Collectors
    (B)   Frothers
    (C)   Modifiers
    (D)   Dispersants

41. Arrange the following in the order of their increasing specific yield:
    (A)   Sand-Gravel-Clay
    (B)   Silt-Gravel-Clay
    (C)   Clay-Sand-Gravel
    (D)   Gravel-Clay-Sand

42. Which of the following method is used for detailed exploration of oil and gas?
    (A)   Gravity method
    (B)   Seismic refraction
    (C)   Seismic reflection
    (D)   Magnetic method

43. An influent stream is one which:
    (A)   Flows into a parent stream
    (B)   Flows parallel to a consequent stream
    (C)   Recharges the ground water
    (D)   Receives discharges from the groundwater

44. The mercury content of wall rocks and soil acts as a common path finder in the geochemical prospecting for:
    (A)   Vein type gold ores
    (B)   Fissure type gold ores
    (C)   Pb-Zn-Ag ores
    (D)   Cu-Pb-Zn ores

45. Primary geochemical dispersion is characterized by:
    (A)   HP, HT and restricted circulation of fluids
    (B)   LP, HT and restricted circulation of fluids
    (C)   LP, HT and free circulation of fluids
    (D)   HP, HT and free circulation of fluids

46. Which one of the following types of deposits is formed by high-temperature fluids, in low pressure environment and a shallow depth?
    (A)   Telethermal
    (B)   Xenothermal
    (C)   Hypothermal
    (D)   Epitherrmal

47. The typical hypothermal ore deposit is that of:
    (A)   Gold
    (B)   Copper
    (C)   Mercury
    (D)   Manganese

48. The geomorphic feature that helps in groundwater recharge is:
   (A)   Cuesta
   (B)   Pediment
   (C)   Pedeplain
   (D)   River terrace

49. The strata which record the complete evolutionary history of a species is termed as:
   (A)   Biolith
   (B)   Biocoenose
   (C)   Thantocoenose
   (D)   Cladistics

50. In a geological map the double plunging folds are represented as:
   (A)   Hyperbolas
   (B)   Parabolas
   (C)   Concentric ellipses
   (D)   Concentric circles

x-x-x

History(Ph.D.) (HIS)

1. Which statement is not correct with reference to the Ratnin of the Vedic age?
   - (A)   They were government officers
   - (B)   They were incapable
   - (C)   They were elites in government service
   - (D)   They liked wearing gems

2. The Kasharpan coins were struck in _____
   - I.   Gold
   - II.   Silver
   - III.   Copper
   - IV.   Lead

   Which of the following is correct?

   - (A)   I, II
   - (B)   I, II, III
   - (C)   III, IV
   - (D)   I, IV

3. Who called the Shudras as Krishaks?
   - (A)   Fahien
   - (B)   Yuvan Chiang
   - (C)   Itsing
   - (D)   Justin

4. On what basis, it is assumed that on Kuntal region, Nand dynasty ruled?
   - (A)   Edicts of Asoka
   - (B)   Kharvel's Hathi Gumpha Inscription
   - (C)   Rock Edicts of mysore (12th century)
   - (D)   None of these

5. Where did Kharvel rule?
   - (A)   Malwa
   - (B)   Magdha
   - (C)   Kalinga
   - (D)   Gandhar

6. Jawabit' means _____
   - (A)   Royal orders
   - (B)   Tax on forest produce
   - (C)   Head of factories
   - (D)   Tax on plough

7. Which Sultan of Delhi propounded Niyabat-i-Kudai?
   - (A)   Iltutmish
   - (B)   Balban
   - (C)   Alauddin Khalji
   - (D)   Firoz Tughlaq

8. Who was the ruler when Persian Ambassador Abdur Rajjak came to Vijaynagar?
   - (A)   Devraya I
   - (B)   Vijay I
   - (C)   Devraya II
   - (D)   Krishnadeva Ray

9. The greatest painter of birds in Jahangir's court was _____
   (A)   Abdussmad
   (B)   Abul Hasan
   (C)   Basawan
   (D)   Mansur

10. Who arranged the translation of Upnishads in Persian?
   (A)   Abul Fazal
   (B)   Faizi
   (C)   Dara Shukuh
   (D)   Murad baksh

11. Who build the precious (Kirti stambh) pillar of Chittor?
   (A)   Rana Kumbha
   (B)   Rana Sanga
   (C)   Rana Maldev
   (D)   None of these

12. Who was the king to organize Asht Pradhan?
   (A)   Akbar
   (B)   Shivaji
   (C)   Krishnadeva Ray
   (D)   Tipu Sultan

13. Which of the following temples is not situated at Khajuraho?
   (A)   Parshva Nath
   (B)   Vishwa Nath
   (C)   Kandaria Mahadev
   (D)   Lingraj

14. The Rishi Andolan in medieval India was centered at _____
   (A)   Mewar
   (B)   Vijay Nagar
   (C)   Bengal
   (D)   Kashmir

15. In what commodity the English first conducted trade from India?
   (A)   Indigo
   (B)   Tea
   (C)   Salt
   (D)   Cotton

16. Which was the charter act to close the trade of east India company with China?
   (A)   1793
   (B)   1813
   (C)   1833
   (D)   1853

17. Assam was made an independent province when _____
   (A)   When in 1905 Curzon divided Bengal
   (B)   Minto declared new reform resolutions in 1906
   (C)   When in 1911, the partition of Bengal was cancelled
   (D)   In 1919 when Montague Chelmsford reforms were introduced

18. Who granted freedom to India?
    (A)   League of Nations
    (B)   Lord Mount Batten
    (C)   British Parliament
    (D)   None of These

19. When was the treaty of Amritsar signed?
    (A)   1825
    (B)   1809
    (C)   1848
    (D)   1846

20. With which the wood's Dispatch of 1854 connected?
    (A)   Administrative Reform
    (B)   Health Services
    (C)   Education
    (D)   Police

21. When did Curzon passed the Indian University Act?
    (A)   1901
    (B)   1902
    (C)   1903
    (D)   1904

22. Who was the revolutionary leader to kill General O Dyar responsible for Jallianwala Bagh Tragedy?
    (A)   Madan Lal Dhingra
    (B)   Ras Bihari Bose
    (C)   Bhagat Singh
    (D)   Udham Singh

23. Who said, "the congress people are hungry for posts"?
    (A)   Gopal Krishna Gokhale
    (B)   Bal Gangadhar Tilak
    (C)   Bipin Chandra Pal
    (D)   Lala Lajpat Ray

24. Which historian brought out the interdisciplinary method to study ancient Indian history?
    (A)   R.C. Majumdar
    (B)   D.D. Kosambi
    (C)   R.S. Sharma
    (D)   D.N. Jha

25. According to D.D. Kosambi, interpretation of myths is , in order to study early cultures.
    (A)   Unnecessary
    (B)   Irrelevant
    (C)   Necessary
    (D)   A burden

26. Who wrote Urban Decay in India?
    (A)   R.S. Sharma
    (B)   Ranajith Guha
    (C)   D.N. Jha
    (D)   Romila Thapar

27. Who is the author of Asoka and the Decline of Mauryas?
    (A)   Bipan Chandra
    (B)   R. C. Majumdar
    (C)   Romila Thapar
    (D)   Satish Chandra

28. Who called Herodotus the father of history?
    (A)   Plato
    (B)   Thucydides
    (C)   Aristotle
    (D)   Cicero

29. "Abundance of source material and absence of histories" is told about
    (A)   Ancient Indian history
    (B)   Greek history
    (C)   Chinese history
    (D)   Roman history

30. Who Coined the term Hydraulic Society
    (A)   Prof Max Muller
    (B)   Karl August Wittfogel
    (C)   James Mill
    (D)   Karl Marx

31. Who among the following Scholar declared that "Sapt Sindhava" region was the home land of Aryans
    (A)   Dr. A. C. Das
    (B)   Prof. Maxmuller
    (C)   Prof. Penka
    (D)   Dr. K. K. Sharma

32. The Concepts, thesis, anti -thesis and synthesis is introduced by _____
    (A)   Ranke
    (B)   Hegel
    (C)   Spengler
    (D)   Marx

33. The Archaeology of Knowledge, is book written by
    (A)   Antonio Gramsci
    (B)   Michel Foucault
    (C)   Collingwood
    (D)   Marwick

34. Which among the following is not a work of Romila Thaper?
    (A)   Past and Prejudice
    (B)   Lineage to State
    (C)   Knowing India
    (D)   Indian Numismatics

35. Oral history can be based on _____
    (A)   Interviews with people
    (B)   Stories and tales
    (C)   Songs
    (D)   All of the above

36. Who is considered the father of Objectivity
    (A)   Toynbee
    (B)   Rousseau
    (C)   Voltaire
    (D)   Ranke

37. Who propounded the concept The Philosophy of History?
    (A)   Rousseau
    (B)   Voltaire
    (C)   Montesquieu
    (D)   Gibbon

38. Epigraphy is the study of _____
    (A)   Coins
    (B)   Monuments
    (C)   Inscriptions
    (D)   Palaces

39. Folk lore' the term coined by
    (A)   William James
    (B)   William Thomas
    (C)   Federic William
    (D)   Maxmullar

40. Who defined history as 'History is a science no less and no more"
    (A)   Napoleon
    (B)   Churchill
    (C)   J B Bury
    (D)   Edward Gibbon

41. The term subaltern was firstly used
    (A)   Guha
    (B)   Gramsci
    (C)   Mussolini
    (D)   Pirrenne

42. Which animal is declared '*Aghanya'* in Rigveda?
    (A)   Horse
    (B)   Goat
    (C)   Cow
    (D)   Sheep

43. How many Sangam took place?
    (A)   One
    (B)   Two
    (C)   Three
    (D)   Five

44. Which of the following group belonged to Hina jatis mentioned in early Buddhist literature?
    (A)   Nishad, Chandal, Snake Charmer, Hunter, Barbar
    (B)   Nishad, Chandal,Vena, Pukkusa, Rathakar
    (C)   Nishad, Chandal, Vena, Hunter, Cobbler
    (D)   Barber, Cobbler, Hunter, Snake Charmer, Rathakar

45. The Allahabad Pillar Inscription is associated with which one of the following-
    (A)   Mahapadama Nanda
    (B)   Chabdra Gupta Maurya
    (C)   Ashoka
    (D)   Samudra Gupta

46. Which style of architecture was developed by the Chalukyas
    (A)   Dravida
    (B)   Vesara
    (C)   Nagara
    (D)   Gopuram

47. A Dhadi is _____
    (A)   A Musician who sings in praise of Sikh Guru and their heroic deeds
    (B)   The Khalasa solider
    (C)   Literary, a horse rider
    (D)   A person well versed in the Sikh scriptures

48. PEPSU IS:
    (A)   Punjab and East Panjab union
    (B)   Patiala and East Punjab States Union
    (C)   Punjab and East Princely States Union
    (D)   Punjab and North Punjab States Union

49. Guru Arjun Dev founded Kartarpur in _____
    (A)   Chaj Doab
    (B)   Bari Doab
    (C)   Bist-Jalandhar Doab
    (D)   Rachna Doab

50. The Namdhari movement in Punjab was started by _____
    (A)   Hira Singh Dard
    (B)   Baba Dyal
    (C)   Baba Balak Singh
    (D)   Tej Singh

x-x-x

Human Genomics (Ph.D.) (HG)

1. Which of the following is correct about International Standard Serial Number (ISSN)?
   (A)   ISSN guarantees the quality or validity of the contents
   (B)   ISSN includes information about the origins or contents of publication
   (C)   The role of ISSN is to identify a publication
   (D)   All the above are correct

2. Which section of a journal article is provided in most online electronic databases?
   (A)   Abstract
   (B)   Introduction
   (C)   Conclusion
   (D)   Results

3. India's indigenous COVID-19 vaccine (Covaxin) is developed and manufactured in:
   (A)   BSL-1 facility
   (B)   BSL-2 facility
   (C)   BSL-3 facility
   (D)   BSL-4 facility

4. _____ is a statistical index which describes the degree and direction of the relationship between two characteristics or variables.
   (A)   t-test
   (B)   Mean
   (C)   Probability
   (D)   Correlation

5. If the number of measurements are increased in an experiment, which of these is expected to decrease:
   (A)   Mean
   (B)   Correlation
   (C)   Standard error of mean
   (D)   Both A and B

6. The Students' t-test is:
   (A)   A parametric test
   (B)   A non-parametric test
   (C)   A test for comparing averages
   (D)   A test for comparing variances

7. A large collection of data may be condensed by constructing
   (A)   A frequency distribution
   (B)   A frequency polygon
   (C)   Class limits
   (D)   Classes

8. Which of the following is not a measure of central tendency?
   (A)   Mode
   (B)   Median
   (C)   Variability
   (D)   Mean

9. In regression analysis, the variable that is being predicted is the
   (A)   Independent variable
   (B)   Response, or dependent variable
   (C)   Intervening variable
   (D)   Is usually x

10. Standard deviation
    (A)   Is the square root of variance?
    (B)   Is measured using the unit of the variable?
    (C)   Is measured using the squared unit of the variable?
    (D)   Has values generally comparable with the average value?

11. What is the first stage of a systematic review?
    (A)   Assess the relevance of each study to research question(s)
    (B)   Define the purpose and scope of the review
    (C)   Appraise the quality of studies from the previous step
    (D)   Survey all the literature contained within a single library

12. Two types of errors associated with hypothesis testing are Type I and Type II. Type II error is committed when
    (A)   The null hypothesis is rejected whilst the alternative hypothesis is true
    (B)   The null hypothesis is rejected when it is true
    (C)   The null hypothesis is accepted when it is not true
    (D)   Both B and C

13. The advantage of difference in gel electrophoresis (DiGE) over gel free approaches for proteomics is:
    (A)   Higher sensitivity
    (B)   Detection of changes in protein modification due to intact proteins
    (C)   Analysis of a greater range of proteins
    (D)   None of the above

14. At a pH below its pI, a protein would have:
    (A)   Net positive charge
    (B)   Net negative charge
    (C)   No charge
    (D)   No net charge

(2)

15. Which of the following *E. coli* strains would be preferred for recombinant expression of a toxic protein?
    (A)   BL21(DE3) Origami
    (B)   BL21(DE3)
    (C)   BL21(DE3) Rosetta
    (D)   BL21(DE3) pLysS

16. Where in the genome are loxP sites located in a Cre/Lox model?
    (A)   Adjacent to the Cre locus expressed in a desired cell type
    (B)   On either side of the gene that is to be knocked out
    (C)   Random sites throughout the genome
    (D)   All of the above

17. A suspension containing 2.5 X 10^6 cells/ml is diluted 1:25 and then 100 µl is seeded per well into a 96 well plate. What is the final cell density in each well?
    (A)   1 X 10^5
    (B)   2.5 X 10^4
    (C)   2.5 X 10^5
    (D)   1 X 10^4

18. The h-index, or Hirsch index, measures the impact of
    (A)   A researcher
    (B)   An indexed journal
    (C)   A book
    (D)   An abstracting and indexing service

19. Which of the following statements is correct?
    (A)   In an experiment, biological replicates are defined as measurements of biologically distinct samples, whereas technical replicates are repeated measurements of the same sample
    (B)   In an experiment, biological replicates are repeated measurements of the same sample whereas technical replicates are defined as measurements of biologically distinct samples that show biological variation
    (C)   Biological replicates represent independent measures of the random noise associated with protocols or equipment whereas technical replicates capture random biological variation
    (D)   There is no need of biological and technical replicates in analysis of genomics data

(3)

20. Which of the following is incorrect about the Journal Impact Factor (IF):
    (A)   IF is a measure of the frequency with which the average article in a journal has been cited in a particular year
    (B)   IF is used to measure the importance or rank of a journal by calculating the times its articles are cited
    (C)   The calculation of IF is based on a two-year period and involves dividing the number of times articles were cited by the numbers of articles that are citable
    (D)   The calculation of IF is based on a five-year period and involves dividing the number of times articles were cited by the numbers of articles that are citable

21. Select the right combination of the isotopes, their half life and the particles emitted by them

	Isotope	Half life	emission
I)	^{32}P	a) 60 days	i) γ
II)	^{33}P	b) 14.3 days	ii) β
III)	^{125}I	c) 25.3 days	

    (A)   (I)-(a)-(i), (II)-(b)-(ii), (III)-(c)-(ii)
    (B)   (I)-(b)-(ii), (II)-(c)-(ii), (III)-(a)-(i)
    (C)   (I)-(c)-(i), (II)-(a)-(i), (III)-(b)-(ii)
    (D)   (I)-(b)-(i), (II)-(c)-(i), (III)-(a)-(ii)

22. What is the concentration of H^+ in a solution of 0.1 M NaOH?
    (A) 10^{-11} M
    (B) 10^{-1} M
    (C)   1.0 M
    (D) 10^{-13}M

23. A researcher is using siRNA to study the effect of silencing the gene in cancer cells. The data thus collected is :
    (A)   Primary Data
    (B)   Secondary Data
    (C)   Tertiary Data
    (D)   Direct Data

24. Which of the following is not a Graphic representation?
    (A)   Pie Chart
    (B)   Table
    (C)   Bar Graph
    (D)   Histogram

25. GenBank and Protein Data Bank are the examples of:
   (A)   Hybrid Databases
   (B)   Secondary Databases
   (C)   Primary databases
   (D)   Tertiary Databases

26. Which of the following describes an advantage of the yeast two-hybrid assay for analysis of protein interactions?
   (A)   The assay works well for membrane bound proteins
   (B)   The assay can screen for interaction partners of a protein without the need for protein purification
   (C)   The assay only detects direct interaction between 2 proteins
   (D)   The assay involves secretion of proteins from the cells making it suitable only for human proteins

27. Which one of the following is incorrect about Drosha?
   (A)   Drosha is involved in microRNA biogenesis
   (B)   Drosha is an RNase III double stranded RNA-specific endonuclease
   (C)   Drosha recognizes and cuts at specific sequence in the precursors
   (D)   Drosha localizes predominantly in the nucleus

28. In drug design, QSAR refers to
   (A)   Quantitative structure-activity relationship
   (B)   Quantitative structure-advanced relationship
   (C)   Quantitative structural-autonomous relationship
   (D)   Quantitative structural-aided relationship

29. Which of the following is not a chromosome instability syndrome?
   (A)   Klinefelter syndrome
   (B)   Ataxia telangiectasia
   (C)   Fanconi anaemia
   (D)   Bloom syndrome

30. Which of the following is a disorder of peroxisome?
   (A)   Acute intermittent porphyria
   (B)   Maple syrup urine disease
   (C)   Medium chain acyl-CoA dehydrogenase deficiency
   (D)   Zellweger syndrome

31. Mutations that cause achondroplasia exert an effect which can be classified as:
   (A)   Dominant negative
   (B)   Gain-of function
   (C)   Haploinsufficiency
   (D)   Loss of function

(5)

32. An individual is most likely to share a common HLA haplotype with which of the following relatives?
    (A)   Father
    (B)   Mother
    (C)   Sister
    (D)   Son

33. Which of the following occurs at a lac operon when the lactose level is high and glucose level is low?
    (A)   cAMP levels decrease, triggering binding of CAP to RNA polymerase
    (B)   cAMP activates CAP, which binds to the lac promoter
    (C)   cAMP activates CAP, which binds to the Lac repressor
    (D)   CAP binds to the ribosome to prevent translation

34. All of the following statements are true regarding 'codon optimization' except:
    (A)   It causes change in mRNA sequence
    (B)   It is carried out to improve protein expression in heterologous host
    (C)   It doesn't cause change in protein sequence
    (D)   It often helps to fold proteins in heterologous host

35. At which stage would the regulation of gene expression by histone acetylation occur?
    (A)   Pre-transcription
    (B)   Post-transcription
    (C)   Pre-translation
    (D)   Post-translation

36. How are the two subunits of a leucine zipper DNA binding protein held together?
    (A)   Hydrogen bonding with the major groove of DNA
    (B)   Hydrogen bonding with the minor groove of DNA
    (C)   Hydrobhobic interactions between the leucine amino acids
    (D)   Hydrogen bonding between cysteine and histidine amino acids

37. Methylation of DNA can be determined by bisulfite sequencing in which:
    (A)   Bisulphite converts methylated cytosine to uracil
    (B)   Bisulphite converts unmethylated cytosine to uracil
    (C)   Bisulphite converts methylated guanine to uracil
    (D)   Bisulphite converts unmethylated guanine to uracil

38. Which of the following is not an epigenetic modification:
    (A)   Methylation of histone
    (B)   Methylation of DNA
    (C)   Propionylation of histone
    (D)   Crotonylation of DNA

39. Which of the following is NOT true for transcriptome profiling by RNA seq:
    (A)   It is limited to detecting transcripts that correspond to existing genomic sequence
    (B)   It provides precise measurement of levels of transcripts and their isoforms
    (C)   It can be used for non model organisms also
    (D)   It has >5000 fold dynamic range to quantify gene expression level

40. Whole-genome multiple displacement amplification from single cells can be carried out by:
    (A)   Taq DNA polymerase
    (B)   Pfu DNA polymerase
    (C)   Vent DNA polymerase
    (D)   Phi 29 polymerase

41. Which of the following components would be required to carry out DNA sequencing by Sanger method?
    (A)   deoxyribonucleotides (dNTPs), labeled dideoxyribonucleotides (ddNTPs), DNA template, primase, DNA polymerase [N= A, G, T, C]
    (B)   Labeled ddNTPs, primer, DNA template, DNA polymerase
    (C)   dNTPs, labeled ddNTPs, DNA template, primase, primer, DNA polymerase
    (D)   dNTPs, labeled ddNTPs, primer, DNA template, DNA polymerase

42. Which of the following chromosomal changes can be detected by Spectral Karyotyping (SKY)?
    (A)   Intrachromosomal inversions
    (B)   Interchromosome translocations
    (C)   Small deletions
    (D)   Duplications

43. Which of the following does not describe retrotransposons?
    (A)   A reverse transcriptase copies a RNA transcript into double stranded DNA
    (B)   The enzyme transposase inserts the RNA transcript into a cell's genome
    (C)   They have terminal inverted repeats
    (D)   They are similar to the genomes of retroviruses

44. In which of the following situations would the Next Generation Sequencing be best suited?
    (A)   To determine if a tumor sample contains a common missense mutation
    (B)   To determine the transcriptome of a tumor sample
    (C)   To obtain genotype of ten genomic DNA samples for a known SNP
    (D)   To detect the gene for resistance to rifamycin in *Mycobacterium tuberculosis*

45. Bromodomain containing proteins recognize
    (A)   Methylated lysine residues in histones
    (B)   Phosphorylated lysine residues in histones
    (C)   Acetylated lysine residues in histones
    (D)   Ubiquitinated lysine residues in histones

46. What is Cas9 and what does it do?
    (A)   An RNA molecule that binds to target DNA via complementary base pairing
    (B)   A DNA sequence that binds the Cas9 protein specified by guide RNA
    (C)   A viral protein that binds to bacterial membranes
    (D)   A protein that cleaves both strands of DNA at sites specified by guide RNA

47. Which is currently the most reliable method to determine positive COVID-19 cases?
    (A)   RT-qPCR on SARS-CoV-2 RNA extracted from respiratory samples
    (B)   RT-PCR on SARS-CoV-2 DNA extracted from respiratory samples
    (C)   Digital PCR on SARS-CoV-2 RNA extracted from respiratory samples
    (D)   RT-qPCR on SARS-CoV-2 DNA extracted from respiratory samples

48. Endoplasmic Reticulum-resident proteins in mammals have
    (A)   C-terminal sequence KDEL
    (B)   N-terminal sequence KDEL
    (C)   Internal KAAA sequence
    (D)   C–terminal sequence KAAA

49. What is the role of tmRNA in the process of translation in *E. coli*?
    (A)   tmRNA binds to ribosome when class I release factors decode the stop codon
    (B)   tmRNA binds to ribosome when the ribosome stalls at the end of the mRNA which lacks stop codon
    (C)   tmRNA binds to ribosome when ribosome reaches the termination codon on mRNA
    (D)   tmRNA binds to the ribosome after the ribosome recycling factor has bound to the translation machinery

50. Which of the following statements is NOT correct?
    (A)   Gain of function mutation in proto-oncogenes results in development of cancer
    (B)   Loss of function mutation in tumor suppressor results in development of cancer
    (C)   Loss of function mutation in proto-oncogene results in development of cancer
    (D)   Mutation in one of the two alleles in protooncogene is sufficient for induction of cancer

x-x-x

Industrial Chemistry

1. Hot wire anemometer is used for the measurement of
   (A) Composition
   (B) Flow
   (C) Pressure
   (D) Temperature

2. Which one of the following is not correct?
   (A) Nylon-6,6 is produced by condensation polymerization
   (B) Phenol formaldehyde resin is a thermosetting polymer
   (C) High density polyethylene (HDPE) is produced by condensation polymerization
   (D) Poly(ethylene terephthalate) (PET) is a polymer

3. The operating temperature range for the Haber process is 350-500 ^{O}C. It is used for the production of ammonia at
   (A) 20 MPa using Fe catalyst in an exothermic reaction
   (B) 0.1 MPa using Fe catalyst in an exothermic reaction
   (C) 20 MPa using Fe catalyst in an endothermic reaction
   (D) 20 MPa using Zeolite catalyst in an endothermic reaction

4. Ratio of momentum diffusivity to thermal diffusivity is
   (A) Reynolds number
   (B) Prandtl number
   (C) Nusselt number
   (D) Peclet number

5. Leidenfrost phenomena refers to
   (A) The condensation of vapour on a cold surface
   (B) The exchange of heat between two solids
   (C) The melting of frost
   (D) Film boiling and evaporation of liquid droplets falling on a very hot surface

6. Prandtl number signifies the ratio of
   (A) Momentum Diffusivity/Thermal Diffusivity
   (B) Mass diffusivity/Thermal Diffusivity
   (C) Thermal Diffusivity/Momentum Diffusivity
   (D) Thermal Diffusivity/ Mass diffusivity

7. Thermocouple senses temperature based on the
   (A) Nernst Effect
   (B) Maxwel Effect
   (C) Seeback Effect
   (D) Peltier Effect

8. In the drying of non-dissolving solids at constant drying conditions, the internal movement of moisture in the solid has a dominant effect on the drying rate during
   (A) The initial adjustment period only
   (B) The constant rate period only
   (C) The falling rate period only
   (D) Both the initial adjustment and constant rate periods

9. Producer gas is obtained by
   (A) Passing air through red hot coke
   (B) Thermal cracking of naphtha
   (C) Passing steam through red hot coke
   (D) Passing air and steam through red hot coke

10. The Most common catalyst used for oxidation of o-xylene to phthalic anhydride is
    (A) V_2O_5
    (B) Pd
    (C) Pt
    (D) Ag

11. In petroleum refining operations, the process used for converting paraffins and napthenes to aromatic is
    (A) Alkylation
    (B) Catalytic reforming
    (C) Hydrocracking
    (D) Isomerization

12. The terminal velocity of a spherical particle in gravitational settling under Stokes' regime varies
    (A) Linearly with the particle diameter
    (B) Linearly with the viscosity of the liquid
    (C) Directly with the square of particle diameter
    (D) Inversely with the density of particle

13. In connection with petroleum refining, identify the incorrect statement among the following options.
    (A) Desalting of crude oil is done before processing it in atmospheric distillation unit
    (B) A stream of hydrogen is produced in catalytic reforming of naphtha
    (C) Asphalt used for paving is a petroleum product
    (D) Cetane number indicates the quality of petrol / motor spirit

14. The molecular formula of the predominant chemical compound in commercial sugar is
    (A) $C_{12}H_{22}O_{11}$
    (B) $C_{12}H_{24}O_{12}$
    (C) $C_6H_{10}O_5$
    (D) $C_6H_{12}O_6$

15. Choose the correct statement; In viscose rayon manufacturing process,
    (A) Carbon disulphide used as reactant for xanthate formation is regenerated in a later step
    (B) Caustic soda used as reactant for steeping of cellulose is regenerated in a later step
    (C) Sulphuric acid is used in steeping process of cellulose
    (D) The spun viscose rayon is hardened in an alkali bath

16. According to the surface renewal theory, the unit of fractional rate of surface renewal is
    (A) $m^2 \, s^{-2}$
    (B) $m^2 \, s^{-1}$

(C) m s^{-1}
(D) s^{-1}

17. Pitot tube is used to measure
    (A) Liquid level in a tank
    (B) Flow velocity at a point
    (C) Angular deformation
    (D) Vorticity

18. Highest pH will be recorded for which of the following solutions if they are equimolar
    (A) $AlCl_3$
    (B) $BaCl_2$
    (C) $BeCl_2$
    (D) LiCl

19. On increasing the concentration of reactants in a reversible reaction, then equilibrium constant will
    (A) Depend on the concentration
    (B) Increase
    (C) Unchanged
    (D) Decrease

20. What are the conditions for gas like Carbon monoxide to obey the ideal gas laws?
    (A) Low temperature and low pressure
    (B) Low temperature and high pressure
    (C) High temperature and low pressure
    (D) High temperature and high pressure

21. Photochemical smog normally does not contain
    (A) Chlorofluorocarbons
    (B) Peroxyacetyl nitrate
    (C) Ozone
    (D) Acrolein

22. Alum's capacity to purify water is due to
    (A) Softens hard water
    (B) Pathogenic bacteria get destroyed
    (C) Impurities' coagulation
    (D) It improves taste

23. The compound essential for the process of photosynthesis has this element
    (A) Ca
    (B) Ba
    (C) Fe
    (D) Mg

24. The reaction responsible for the radiant energy of the Sun is
    (A) Nuclear fission
    (B) Nuclear fusion
    (C) Chemical reaction
    (D) Combustion

25. Find the incorrect statement
    (A) BOD value of clean water is less than 5 ppm
    (B) Drinking water pH should be between 5.5-9.5
    (C) Carbon, sulphur and nitrogen oxides are the most widespread air pollutants
    (D) Dissolved oxygen concentration below 5 ppm is ideal for the growth of fish

26. What is the major attribute of Correlation Analysis?
    (A) Association among variables
    (B) Difference among variables
    (C) Regression among variables
    (D) Variations among variables

27. What is the name of the conceptual framework in which the research is carried out?
    (A) Research hypothesis
    (B) Synopsis of Research
    (C) Research paradigm
    (D) Research design

28. Which of the following features are considered as critical in qualitative research?
    (A) Collecting data with the help of standardized research tools.
    (B) Design sampling with probability sample techniques.
    (C) Collecting data with bottom-up empirical evidence.
    (D) Gathering data with top-down schematic evidence.

29. A research intends to explore the result of possible factors for the organization of effective mid-day meal interventions. Which research method will be most appropriate for this study?
    (A) Descriptive survey method
    (B) Historical method
    (C) Ex-post facto method
    (D) Experimental method

30. In order to pursue the research, which of the following is priorly required?
    (A) Developing a research design
    (B) Formulating a research question
    (C) Deciding about the data analysis procedure
    (D) Formulating a research hypothesis

31. The format of thesis writing is the same as in
    (A) Writing of Seminar representation
    (B) Preparation of research paper/article
    (C) A research dissertation
    (D) Presenting a workshop/conference paper

32. Which one among the following statements is false in the context of participatory research?
    (A) It recognizes knowledge as power
    (B) It is a collective process of inquiry
    (C) It emphasizes people as experts
    (D) Its sole purpose is the production of knowledge

33. Which one among the following statement is true in the context of the testing of hypotheses?
    (A) It is only the alternative hypotheses that can be tested.
    (B) It is only the null hypotheses that can be tested.
    (C) Both the alternative and the null hypotheses can be tested.
    (D) Both the alternative and the null hypotheses cannot be tested.

34. What are the conditions in which Type-I error occurs?
    (A) The null hypotheses get accepted even if it is false
    (B) The null hypotheses get rejected even if it is true
    (C) Both the null hypotheses as well as alternative hypotheses are rejected
    (D) None of the above

35. What does the longitudinal research approach actually deal with?
    (A) Long-term research
    (B) Short-term research
    (C) Horizontal research
    (D) None of the above

36. Evaluation Research is concerned with _____
    (A) How well are we doing?
    (B) Why are we doing?
    (C) What are we doing?
    (D) None of the above

37. Which of the following does not correspond to characteristics of research?
    (A) Research is not passive
    (B) Research is systematic
    (C) Research is not a problem-oriented
    (D) Research is not a process

38. What is the main aim of interdisciplinary research?
    (A) To over simplify the problem of research
    (B) To bring out the holistic approach to research
    (C) To create a new trend in research methodology
    (D) To reduce the emphasis on a single subject in the research domain

39. The main aim of the scientific method in the research field is to _____
    (A) Improve data interpretation
    (B) Confirm triangulation
    (C) Introduce new variables
    (D) Eliminate spurious relations

40. A researcher is interested in studying the prospects of a particular political party in an urban area. So, what tool should he prefer for the study?
    (A) Rating Scale
    (B) Interview
    (C) Questionnaire
    (D) Schedule

41. The conclusions/findings of which type of research cannot be generalized to other situations?
    (A) Casual Comparative Research
    (B) Historical Research
    (C) Descriptive Research
    (D) Experimental Research

42. Which of the following is not the method of Research?
    (A) Survey
    (B) Historical
    (C) Observation
    (D) Philosophical

43. Which one is called non-probability sampling?
    (A) Quota sampling
    (B) Cluster sampling
    (C) Systematic sampling
    (D) Stratified random sampling

44. "Sampling Cases" can be defined as
    (A) Sampling using a sampling frame
    (B) Identifying people who are suitable for research
    (C) Literally the researcher's brief case
    (D) A sampling of people, newspapers, television programs etc.

45. Which technique is generally followed when the population is finite?
    (A) Systematic Sampling Technique
    (B) Purposive Sampling Technique
    (C) Area Sampling Technique
    (D) None of the above

46. Research problem is selected from the standpoint of
    (A) Social relevance
    (B) Financial support
    (C) Researcher's interest
    (D) Availability of relevant literature

47. The F-test:
    (A) Is essentially a two-tailed test.
    (B) Is essentially a one-tailed test.
    (C) Can be one-tailed as well as two-tailed depending on the hypotheses.
    (D) Can never be one tailed test.

48. The process not needed in experimental research is
    (A) Controlling
    (B) Observation
    (C) Reference collection
    (D) Manipulation and replication

49. A reasoning where we start with certain particular statements and conclude with a universal statement is called
(A) Deductive Reasoning
(B) Inductive Reasoning
(C) Abnormal Reasoning
(D) Transcendental Reasoning

50. In the process of conducting research 'Formulation of Hypothesis" is followed by
(A) Statement of Objectives
(B) Analysis of Data
(C) Selection of Research Tools
(D) Collection of Data

x-x-x

Information Technology Engineering(Ph.D.) (ITE)

1. A Computer uses a memory unit with 256K word of 32 bits each. A binary instruction code is stored in one word of memory. The instruction has four parts: an indirect bit, an operation code and a register code part to specify one of 64 registers and an address part. How many bits are there in operation code, the register code part and the address part ?
   A) 7, 7, 18
   B) 18, 7, 7
   C) 7, 6, 18
   D) 7, 18, 7

2. What is the size of an IPv6 address?
   A) 32 bits
   B) 64 bits
   C) 128 bits
   D) 256 bits

3. Which of the following statement/s is/are true ?
   (i) Firewall can screen traffic going into or out of an organization.
   (ii) Virtual private networks can simulate an old leased network to provide certain desirable properties.
   Choose the correct answer from the code given below:
   A) (i) only
   B) Neither (i) or (ii)
   C) (ii) only
   D) Both (i) and (ii)

4. Assuming main memory to be 4 KB and page size 1KB, using Least Frequently Used algorithm for page replacement, what pages should reside in main memory at the end for following sequence of page references: 4, 8, 2, 3, 2, 8, 3, 1, 2, 6, 7
   A) 2, 4, 7, 8
   B) 7, 8, 2, 3
   C) 1, 2, 6, 7
   D) 1, 2, 3, 8

5. The subnet mask for a particular network is 255.255.31.0. Which of the following pairs of IP addresses could belong to this network?
   A) 172.57.88.62 and 172.56.87.233
   B) 10.35.28.2 and 10.35.29.4
   C) 191.203.31.87 and 191.234.31.88
   D) 128.8.129.43 and 128.8.161.55

6. Which one of the following is the overflow condition if linear queue is implemented using an array with a size MAX_SIZE?

    A) rear = front

    B) rear = front+1

    C) rear=MAX_SIZE -1

    D) rear = MAX_SIZE

7. Consider a system with 3 processes and 4 shared resource instances. Each process can request a maximum of k number of instances. Resource instances are requested and released one at a time. The largest value of k that will always avoid a deadlock is:

    A) 4

    B) 2

    C) 3

    D) 1

8. A language is regular if and only if

    A) accepted by DFA

    B) accepted by PDA

    C) accepted by LBA

    D) accepted by Turing machine

9. The given array is arr = {1, 2, 4, 3}. Bubble sort is used to sort the array elements. How many iterations will be done to sort the array?

    A) 4

    B) 2

    C) 1

    D) 3

10. What is the output of the given program?

```
#include < stdio.h >
using namespace std;
int main()
{
        int array[] = {10, 20, 30};
        cout << -2[array];
        return 0;
}
```

    A) -15

    B) -30

    C) Compiler error

    D) Garbage value

(2)

11. An Internet specific protocol that specifies how low-power compute-constrained devices can operate in the Internet of Things (IoT) and that is gaining importance in utility field area networks is:
    A) CoAP
    B) MTTQ
    C) UDP
    D) SSDP

12. Which one out of the following is not an agile software methodology
    A) Spiral model
    B) Extreme Programming
    C) Scrum
    D) Lean Software Development

13. In a microprocessor, the address of the next instruction to be executed is stored in the
    A) Stack Pointer
    B) Program counter
    C) Address Latch
    D) General purpose register

14. The following postfix expression with single digit operands is evaluated using a stack
$$8\ 2\ 3\ \hat{}\ /\ 2\ 3\ *\ +\ 5\ 1\ *\ -$$
    The top two elements of the stack after the first * is evaluated are:
    A) 6,1
    B) 5,7
    C) 3,2
    D) 1,5

15. Suppose a cloud contains software stack such as Operating system, Application software, etc. This model is referred as _____ model.
    A) SaaS
    B) Paas
    C) Iaas
    D) MaaS

16. A computer has a word length of 8 bits (including sign). It is required to determine the range of integers that can be stored in the computer. If 1's complement is used to represent the numbers, then the range will be
    A) -256 to 256
    B) -256 to 255
    C) -127 to 127
    D) -128 to 127

17. The gray code for binary 101011 will be
    A) 101011
    B) 110101
    C) 011111
    D) 111110

18. In asymmetric key cryptography, the private key is kept by
    A) Sender
    B) Receiver
    C) Sender and Receiver
    D) All the connected devices to the network

19. Which of the following transport layer protocols is used to support electronic mail?
    A) SMTP
    B) IP
    C) TCP
    D) UDP

20. Which data structures are typically used to represent matrices:
    A) Linked List
    B) Arrays
    C) String
    D) Pointers

21. What is the name of the process that moves a filter mask over the image, followed by calculating the sum of products?
    A) Correlation
    B) Convolution
    C) Linear spatial filtering
    D) Non-linear spatial filtering

22. The values GET, POST, HEAD etc are specified in _____ of HTTP message
    A) Request line
    B) Header Line
    C) Status Line
    D) Entity body

23. What would be the Prefix notation for (a + (b / c) * (d ^ e) -f)?
    A) -+a*/^bcdef
    B) -+a*/bc^def
    C) -+a*b/c^def
    D) -a+*/bc^def

(4)

24. Consider a direct mapped cache of size 32 KB with block size 32 bytes. The CPU generates 32 bit addresses. The number of bits needed for cache indexing and the number of tag bits are respectively:
    A) 10, 17
    B) 10, 22
    C) 15, 17
    D) 5, 17

25. Which of the following can be considered as the correct syntax for declaring an array of pointers of integers that has a size of 10 in C++?
    A) int arr = new int[10];
    B) int *arr = new int*[10]
    C) int **arr = new int*[10];
    D) int *arr = new int[10];

26. What is the major attribute of Correlation Analysis?
    A) Association among variables
    B) Difference among variables
    C) Regression among variables
    D) Variations among variables

27. A research intends to explore the result of possible factors for the organization of effective mid-day meal interventions. Which research method will be most appropriate for this study?
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28. Which one among the following statement is true in the context of the testing of hypotheses?
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    B) It is only the null hypotheses that can be tested.
    C) Both the alternative and the null hypotheses can be tested.
    D) Both the alternative and the null hypotheses cannot be tested.

29. Which one is called non-probability sampling?

   A) Cluster sampling

   B) Systematic sampling

   C) Stratified random sampling

   D) Quota sampling

30. Which of the following average cannot be calculated for the observations
   2, 2, 4, 4, 6, 6, 8, 8, 10, 10?
   A) Mean
   B) Median
   C) Mode
   D) All of above

31. What is the mean of a Chi Square distribution with 6 degrees of freedom?
   A) 12
   B) 6
   C) 8
   D) 4

32. RSS feed is a tool of
   A) Graphic design
   B) Web 1.0
   C) Web 2.0
   D) Architecture

33. Which scientific method focuses on testing hypotheses developed from theories?
   A) Deductive method
   B) Inductive method
   C) Hypothesis Method
   D) Pattern Method

34. A statistical test used to determine whether a correlation coefficient is statistically
   significant is called
   A) One-way analysis of variance
   B) t-test for independent samples
   C) Chi-square test for contingency tables
   D) t-test for correlation coefficients

35. What do we call data on a continuous scale with a neutral zero?
   A) Categorical Data
   B) Interval Data
   C) Nominal Data
   D) Ratio data

36. In hypothesis testing, a Type I error is said to occur when
   A) A false null hypothesis is not rejected by researcher
   B) A true null hypothesis gets rejected by researcher
   C) Researcher fails to make a decision about null hypothesis
   D) Chosen level of significance is too low

37. The difference between the mean of a researcher's sample and the mean of the population of the sample is known as the:
   A) Confidence interval
   B) Sampling error
   C) Significance level
   D) Standard deviation

38. The sum of squares of factor loadings corresponding to a given factor is called
   A) Eigen value
   B) Communality
   C) Factor score coefficient
   D) KMO Statistic

39. The process of giving a numeral value to the responses given by the respondent is called
   A) Coding
   B) Tabulating
   C) Data analysis
   D) None of the above

40. Selecting every fifth female entering the mall is example of
   A) Quota sampling
   B) Cluster sampling
   C) Systematic sampling
   D) Simple random sampling

41. We want a sample of size $n = 30$ to be drawn from a population of size $N = 8000$ which is divided into three strata of size $N1 = 4000$, $N2 = 2400$ and $N3 = 1600$. Adopting proportional allocation, the sample sizes for the different strata will be:
   A) n1=15, n2=9, n3=6
   B) n1=10, n2=19, n3=6
   C) n1=6, n2=9, n3=6
   D) n1=9, n2=6, n3=15

42. To represent the rank, which of the following scale is used?
    A) Nominal Scale
    B) Ordinal Scale
    C) Interval Scale
    D) Ratio Scale

43. Which relation holds to represent the positive skewness curve
    A) Mode<Median<Mean
    B) Mode=Median=Mean
    C) Mode>Median>Mean
    D) None of the above

44. ……….are used to described the characteristics of sample.
    A) Parameters
    B) Statistics
    C) Hypothesis
    D) All of the above

45. If the confidence level is 95%, then the significance level will be
    A) 95%
    B) 100%
    C) 5%
    D) Cannot say

46. In a random selection of 64 of the 2400 intersections in a small city, the mean number of scooter accidents per year was 3.2 and the sample standard deviation was 0.8. The standard error of mean for this finite population will be
    A) 0.097
    B) 0.97
    C) 0.009
    D) 9.7

47. Genetic theory states that children having one parent of blood type A and the other of blood type B will always be of one of three types, A, AB, B and that the proportion of three types will on an average be as 1 : 2 : 1. A report states that out of 300 children having one A parent and B parent, 30 per cent were found to be types A, 45 per cent per cent type AB and remainder type B. Calculated value of chi-square will be
    A) 4.5
    B) 5.9
    C) 3.0
    D) 2.7

(8)

48. Ex-post facto research is a type of
   A) Quantitative research
   B) Applied research
   C) Qualitative research
   D) Descriptive research

49. Research periodicals are which category of sources?
   A) Primary
   B) Secondary
   C) Tertiary
   D) Non documentary

50. Suppose the population is quite comprehensive and distributed in larger geographical area. In such a situation, what kind of sampling procedure would you like to prefer?
   A) Quota sampling
   B) Multilevel sampling
   C) Random sampling
   D) Cluster sampling

x-x-x

Laws

1. Which of the following is not a type of non-probability sampling?
   - (A) Snow ball sampling
   - (B) Stratified random sampling
   - (C) Quota sampling
   - (D) Purposive sampling

2. Secondary data may include
   - (A) Official Document
   - (B) Personal Document
   - (C) Archived research Data
   - (D) All of the above

3. Tools for data collection and analysis
   - (A) Interview
   - (B) Observation
   - (C) Surveys
   - (D) All the above

4. Which of the following is not a type of Purposive Sampling?
   - (A) Expert Sampling
   - (B) Deviant Case Sampling
   - (C) Heterogenous Sampling
   - (D) Snowball Sampling

5. Attributes of object, event or things which can be measured are called
   - (A) Qualitative measure
   - (B) Data
   - (C) Variables
   - (D) None of the above

6. _____ is compared to Mariner's Compass in sea voyage
   - (A) Research Problem
   - (B) Data Collection
   - (C) Sampling
   - (D) Research Design

7. _____ prevents a research from blind search and intellectual wandering.
   - (A) Data
   - (B) Sampling
   - (C) Research Tool
   - (D) Research Design

8. Which of the following is a form of non-random Sampling?
   - (A) Snowball Sampling
   - (B) Convenience Sampling
   - (C) Quota Sampling
   - (D) All the above

9.   What effect does increasing the sample size have upon a Sampling error?
     (A)   It reduces the Sampling error
     (B)   It increases the Sampling error
     (C)   It has no effect on Sampling error
     (D)   None of the above

10.   _____ is a subset of a statistical population in which each member of the subset has an equal probability of being chosen.
     (A)   Systematic Sampling
     (B)   Simple Random Sampling
     (C)   Cluster Sampling
     (D)   All the above

11.   A good hypothesis should be
     (A)   Precise, specific and consistent with most of the facts
     (B)   Formulated in such a way that it can be tested by data
     (C)   Both (A) and (B)
     (D)   None of the above

12.   The depth of any research can be judge by
     (A)   Title of the research
     (B)   Duration of the research
     (C)   Objectives of the research
     (D)   Total expenditure incurred

13.   Random Sampling is helpful as its _____
     (A)   Reasonably accurate
     (B)   Free from personal bias
     (C)   An economical method of data collection
     (D)   All of the above

14.   Significance of review of literature in any research is _____.
     (A)   To make sure you have long list of references
     (B)   To reach the required word count
     (C)   To find out what is already researched or known about your area of interest
     (D)   None of the above

15.   A research intends to explore the effect of possible factors for the organization of effective mid-day meal interventions. Which research method will be most appropriate for this study?
     (A)   Historical method
     (B)   Descriptive survey method
     (C)   Ex-post facto method
     (D)   None of the above

16.   Which of the following provides more latitude to research for creative expression ?
     (A)   Thesis writing
     (B)   Writing of a research articles
     (C)   Presentation of a conference paper
     (D)   Preparing a research synopsis

17. In qualitative research paradigm, which of the following features may be considered critical?
    (A) Data collection with standardized research tools
    (B) Sampling design with probability sample techniques
    (C) Data collection with bottom-up empirical evidences
    (D) Data gathering to take with top-down systematic evidences

18. Which of the following is not a type of qualitative interview?
    (A) Unstructured interview
    (B) Oral history interview
    (C) Structured interview
    (D) Focus group interview

19. What is a 'probing question'?
    (A) One that inquires about a sensitive or deeply personal issue
    (B) One that encourages the interviewee to say more about a topic
    (C) One that asks indirectly about people/s opinions
    (D) One that moves the conversation on to another topic

20. Action research means
    (A) A longitudinal research
    (B) An applied research
    (C) A research initiated to solve an immediate problem
    (D) A research with socioeconomic objective

21. In the process of conducting research 'Formulation of Hypothesis' is followed by
    (A) Statement of Objectives
    (B) Analysis of Data
    (C) Selection of Research Tools
    (D) Collection of Data

22. A deductive theory is one that
    (A) Allows theory to emerge out of the data
    (B) Involves testing an explicitly defined hypothesis
    (C) Allows for findings to feed back into the stock of knowledge
    (D) Uses qualitative methods whenever possible

23. Which of the following is not a data-collection method?
    (A) Research questions
    (B) Unstructured interviewing
    (C) Postal survey questionnaires
    (D) Participant observation

24. In an experimental design, the dependent variable is
    (A) The one that is not manipulated and in which any changes are observed
    (B) The one that is manipulated in order to observe any effects on the other
    (C) A measure of the extent to which personal values effect research
    (D) An ambiguous concept whose meaning depends on how it is defined

25. An inductive theory is one that:
    (A)   Involves testing an explicitly defined hypothesis
    (B)   Does not allow for findings to feed back into the stock of knowledge
    (C)   Uses quantitative methods whenever possible
    (D)   Allows theory to emerge out of the data

26. Voluntarily throwing or attempting to throw acid is an offence punishable under IPC, 1860 under
    (A)   Section 326 A
    (B)   Section 326 B
    (C)   Section 228 A
    (D)   Section 228

27. Unsoundness of mind of a person at (who has committed an offence) the time of commission of an offence under IPC is
    (A)   A complete defence to a criminal charge
    (B)   A partial defence only
    (C)   Does not make any difference
    (D)   None of the above

28. Match the following correctly:
    Culpable homicide is not a murder if caused by

    a) Grave and sudden provocation   i) Exception 2 to section 300 IPC
    b) Death caused without pre meditation in a   ii) Exception 5 to section 300 IPC
       sudden fight
    c) Death caused with the consent of person   iii) Exception 1 to section 300 IPC
    of 18 years of age or above
    d) Exceeding right of Private defence   iv) Exception 4 to section 300 IPC

	a	b	c	d
(A)	iii,	ii,	iv,	i
(B)	iii,	iv,	ii,	i
(C)	iii,	i,	ii,	iv
(D)	iii,	ii,	iv,	i

29. Which of the following pair is not correctly matched ?
    (A)   Mens rea   -   R v Prince
    (B)   Necessity   -   Bas dev v State of PEPSU
    (C)   Insanity   -   M'Naughten rule
    (D)   Intoxication   -   Bas dev v State of PEPSU

30. The right to private defence is available with respect to
    (A)   Harm to body
    (B)   Harm to movable property
    (C)   Harm to immovable property
    (D)   All of the above

31. Match the following correctly
    a) Will theory   i) Corporate Personality
    b) Concession theory   ii) Analytical school
    c) Declaratory theory   iii) Legal right
    d) Command theory   iv) Judicial Precedent

            a   b   c   d
    (A)   i,   iii,   iv,   ii
    (B)   iii,   i,   iv,   ii
    (C)   iv,   iii,   i,   ii
    (D)   iii, iv,   i,   ii

32. The jural opposite of duty is
    (A)   Liberty or Privilege
    (B)   Liability
    (C)   No right
    (D)   Disability

33. Rousseau, a great champion of individual freedoms and rights make individual subject only to
    (A)   Will of majority
    (B)   General Will
    (C)   Sovereign Will
    (D)   Community Will

34. Who termed analytical Jurisprudence as imperative Jurisprudence?
    (A)   C. K. Allen
    (B)   Salmond
    (C)   Austin
    (D)   Bentham

35. "Society is like an organism and it can progress when it is guided by scientific principles" who said this
    (A)   Duguit
    (B)   Spencer
    (C)   August Comte
    (D)   Ihering

36. Preamble is not a part of the Constitution was held by Supreme Court in
    (A)   The Berubari Union Case
    (B)   Keshvananda Bharti Case
    (C)   Both A and B
    (D)   None of the above

(5)

37. The President cannot _____ Lok Sabha.
    (A) Dissolve
    (B) Adjourn
    (C) Prorogue
    (D) Summon

38. Executive power of the state is vested with
    (A) People of the State
    (B) Chief Minister of the State
    (C) Governor of the State
    (D) State Legislature

39. Which of the following is not correctly matched?
    (A) Part I   Union and its territories
    (B) Part II   Citizenship
    (C) Part III Fundamental rights
    (D) Part VI   Directive Principle of State Policy

40. Right to Life under Article 21 of the Constitution does not include 'Right to die' was observed by the Supreme Court in
    (A) P. Rathinam vs. Union of India
    (B) Gian Kaur vs. State of Punjab
    (C) Kirti Kaur vs. State of Punjab
    (D) None of the above

41. A contract by which one party promises to save other from loss caused to him by the conduct of promisor himself or any other person is called.
    (A) Contract of Guarantee
    (B) Contract of Indemnity
    (C) Contract of Bailment
    (D) Contract of Pledge

42. Harvey vs. Facey is leading case on
    (A) Conditional acceptance
    (B) Cross proposal
    (C) Continuing offer
    (D) Invitation to offer

43. Which is not correctly matched?
    (A) Balfour vs. Balfour   i)   Intention to create legal obligation
    (B) Carill vs. Carbillic Smoke Bull   ii) Calculation of Damages
    (C) Mohori Bibee vs. Dharmodas Ghose iii) Contract with minor Void-ab-initio
    (D) Harvey vs Facey   iv) Invitation to offer

44. A supplies the wife and children of 'B', lunatic with necessaries suitable to their condition in life:
    (A) A is entitled to be reimbursed from B's property
    (B) A is not entitled to be reimbursed from B's property
    (C) Both a and b are correct
    (D) None of the above

(6)

45. 'Acceptance is to be an offer what a lighted match is to a train of gun-powder'. This principle was propounded by
    (A)   Sir William Anson
    (B)   Friedman
    (C)   Chesire and fifoot
    (D)   Pollack and Mulla

46. Section 7 of Hindu Marriage Act, 1955 provides for
    (A)   Registration of marriage
    (B)   Ceremonies for a Hindu Marriage
    (C)   Adoption of Child
    (D)   All of the above

47. Degree of Prohibited relationship under Hindu Marriage Act, 1955 is applicable between two persons if they are related by
    (A)   Full blood
    (B)   Half or uterine blood
    (C)   Adoption
    (D)   All of the above

48. Section 20 of Hindu Adoption and Maintenance Act provides for maintenance to
    (A)   Only legitimate children
    (B)   Only illegitimate children
    (C)   Both legitimate and illegitimate minor children
    (D)   Both legitimate and illegitimate minor & major children

49. Marriage in Hindu Law would be _____ if either party has a spouse living at the time of marriage
    (A)   Void
    (B)   Valid
    (C)   Voidable
    (D)   Depends upon the discretion of Judge

50. A testamentary guardian is
    (A)   A guardian appointed under will
    (B)   A sole guardian
    (C)   A guardian appointed by contract
    (D)   None of the above

x-x-x

Mechanical Engineering(Ph.D.) (MEC)

1   A mass m1 of 100 kg travelling with a uniform velocity of 5 m/s along a line collides with a stationary mass of 1000 kg. After the collision, both the masses travel together with same velocity. The coefficient of restitution is

(A) 0.6   (B) 0.1

(C) 0.01   (D) 0

2   Increase in mass of a single-degree-of-freedom system will result in

(A) Increase in natural frequency   (B) Increase in damping ratio

(C) Decrease in natural frequency   (D) Decrease in damping ratio

3   The shape of the bending moment diagram for a uniform cantilever beam carrying a uniformly distributed load over its length is

(A) A straight line   (B) A hyperbola

(C) An ellipse   (D) A parabola

4   An ideal cycle on which a steam engine works is

(A) Carnot cycle   (B) Otto cycle

(C) Rankine cycle   (D) Joule cycle

5   Steam table can be used for

(A) Producing steam   (B) Collecting steam

(C) Calculating the volume of steam (D) Calculating dryness fraction

6   When the depth of cut is increased, the specific cutting energy

(A) Increases   (B) Decreases

(C) Remains same   (D) Reaches an optimum value

7   Which of the following compounds is very soft and ductile?

(A) Ferrite   (B) Cementite

(C) Austenite   (D) Pearlite

8   When a rigid body is suspended vertically and it oscillates with a small amplitude under the action of the force of gravity, the body is known as

(A) Simple pendulum   (B) Torsional pendulum

(C) Compound pendulum   (D) Second's pendulum

9   The material commonly used for machine tool bodies is

(A) Cast iron   (B) Mild steel

(C) Stainless steel   (D) Aluminium

10   Beams are designed mainly for taking up

(A) Direct tensile stresses   (B) Direct compressive stresses

(C) Bending stresses   (D) Torsional shear stresses

11   Point of contraflexture is a point where

(A) Bending moment is zero   (B) Shear force is zero

(C) Shear force is maximum   (D) Bending moment is maximum

12   In which cycle, compression ratio is the highest

(A) Diesel cycle   (B) Brayton cycle

(C) Rankine cycle   (D) Otto cycle

13   Sensible heat is the heat required to

(A) Change vapour into liquid   (B) Increase the temperature of a liquid or
                                           vapour

(C) Change liquid into vapour   (D) Convert water into steam

14   A turbo machine becomes prone to cavitation, if

(A) Temperature exceeds critical value (B) Temperature falls below a critical value

(C) Pressure falls below vapour   (D) Velocity exceeds a critical value

pressure

15   An ideal fluid has

(A) Zero density   (B) Zero surface tension

(C) Zero specific gravity   (D) Zero viscosity

16   Which material is used in making disposable patterns?

(A) Wood   (B) Rubber

(C) Metal   (D) Polystyrene

(2)

17 Which of the following materials require minimum compaction pressure?

(A) Brass
(B) Iron

(C) Bronze
(D) Aluminium

18 Heat transfer in liquids and gases takes place by

(A) Conduction
(B) Convection

(C) Radiation
(D) Conduction and radiation

19 Consider steady laminar incompressible axisymmetric fully developed viscous flow through a straight circular pipe of constant cross-sectional area at a Reynolds number of 5. The ratio of inertia force to viscous force on a fluid particle is

(A) 5
(B) 0.2

(C) 0
(D) 25

20 A streamline and an equipotential line in a flow field

(A) Are parallel to each other
(B) Are identical

(C) Are perpendicular to each other
(D) Intersect at an acute angle

21 Which of the following statements is true to two-dimensional flow of ideal fluids?

(A) Potential function exists if stream function exists
(B) Stream function may or may not exist

(C) Stream function will exist but potential function may or may not exist
(D) Both stream function and potential function must exist

22 A measure of Rockwell hardness is the

(A) Depth of penetration of indenter
(B) Projected area of indentation

(C) Surface area of indentation
(D) Height of rebound

23 An expandable pattern is used in

(A) Slush casting
(B) Squeeze casting

(C) Centrifugal casting
(D) Investment casting

24 The operation in which oil is permeated into the pores of a powder metallurgy product is known as

(A) Mixing
(B) Sintering

(C) Impregnation
(D) Infiltration

25 Which of the following is a solid-state joining process?

(A) GTAW

(B) Resistance spot welding

(C) Friction welding

(D) SMAW

26 Which of the following is performed first during a research process?

(A) Submission of synopsis

(B) Comparing the possible solutions

(C) Identification of problem

(D) Finding the best possible solution

27 Which of the following is not a reference manager software?

(A) Endnote

(B) Mendeley

(C) Zotero

(D) Anydesk

28 Conference proceedings are considered as _____ documents.

(A) Conventional

(B) Primary

(C) Secondary

(D) Tertiary

29 Questionnaire is a

(A) Research method

(B) Measurement technique

(C) Tool for data collection

(D) Data analysis technique

30 "Controlled Group" is a term used in

(A) Survey research

(B) Historical research

(C) Experimental research

(D) Descriptive research

31 The research that is especially carried out to test and validate the study hypotheses is termed

(A) Fundamental research

(B) Applied research

(C) Conclusive research

(D) Exploratory research

32 The range of a partial correlation coefficient is:

(A) 0 to 1

(B) -1 to 0

(C) -1 to 1

(D) 0 to infinity

33 Regression coefficient is independent of

(A) Origin   (B) Scale

(C) Both origin and scale   (D) Neither origin nor scale

34 Which of the following is not covered under Intellectual Property Rights?

(A) Copyrights   (B) Patents

(C) Trade Marks   (D) Thesaurus

35 An investigator reports that the arithmetic mean of two regression coefficients of a regression line is 0.7 and the correlation coefficient is 0.75. The results are

(A) Valid theoretically as well as practically
(B) Valid theoretically but invalid practically

(C) Invalid theoretically as well as practically
(D) Inconclusive

36 When the regression line passes through the origin then

(A) The regression coefficient is zero   (B) Correlation is zero

(C) Intercept is zero   (D) Association is zero

37 Two regression lines are parallel to each other if their slope is

(A) Different   (B) Same

(C) Positive   (D) Negative

38 A perfect negative correlation is represented by the value

(A) 0   (B) 1

(C) -1   (D) 0.5

39 The difference between the actual Y value and the predicted Y value found using a regression equation is called the

(A) Slope   (B) Outlier

(C) Residual   (D) Scatter plot

40 Which of the following software is not used in statistical analysis?

(A) Minitab   (B) MS Excel

(C) SPSS   (D) Ansys

41 "Track changes" option in MS Word is used in

(A) Reviewing work   (B) Tracking the change in size of document

(C) Tracking the change in settings of   (D) Sending and tracking emails
    MS Word software

42 Size of the sample is

(A) Always equal to the size of the   (B) Always smaller than the size of the
    population   population

(C) Always greater than the size of the   (D) Always either greater than or equal to the
    population   size of the population

43 Which of the following is not a type of sampling used preferentially in statistics?

(A) Simple random sampling   (B) Cluster sampling

(C) Stratified random sampling   (D) Unified sampling

44 Which of the following is not a measure of central tendency?

(A) Mean   (B) Range

(C) Mode   (D) Median

45 Which of the following parameter is not useful during Analysis of Variance?

(A) Standard deviation   (B) p-value

(C) F-value   (D) median

46 Which of the following variable will not require a nominal scale?

(A) Gender   (B) Political preferences

(C) Place of residence   (D) Grades

(6)

47 In which of the following scale, sequence of variables will not be established?

(A) Nominal   (B) Ordinal

(C) Interval   (D) Ratio

48 What is the purpose of a Research Data Repository?

(A) To publish and share research data   (B) To validate the research data

(C) To publish research papers related   (D) To publish research papers related to
to   statistics
    data science

49 A researcher asked 933 people what their favourite type of TV programme was: news, documentary, soap or sports. They could only choose one answer. As such, the researcher had the number of people who chose each category of programme. How should she analyze these data?

(A) t-test   (B) One-way analysis of variance

(C) Chi-square test   (D) Regression

50 A t-test is a significance test that assesses

(A) The means of two independent   (B) The medians of two dependent groups
    groups

(C) The modes of two independent   (D) The standard deviation of three
    variables   independent variables

x-x-x

Space for Rough Work

Medical Physics(Ph.D.)

1. A pictorial diagram of frequency distribution is

    (A) Pictogram

    (B) Bar diagram

    (C) Histogram

    (D) Pie diagram

2. Average dental caries prevalence among different school children is described by

    (A) Mode

    (B) Mean

    (C) Median

    (D) Geometric Mean

3. Which of the following is not true for the coefficient of non-determination?

    (A) r^2

    (B) $1-r^2$

    (C) $100-r^2$

    (D) $1-\rho^2$

4. Standard Error is due to

    (A) Observer error

    (B) Instrumental error

    (C) Sampling error

    (D) Conceptual error

5. Total number of cases at a given point of time in a given population is

    (A) Prevalence rate

    (B) Attack rate

    (C) Epidemic

    (D) Incidence rate

6   If in a set of discrete values of observations, 50 percent values are greater than 25, then Q_2 is

(A)   20

(B)   25

(C)   50

(D)   75

7   In a binomial distribution consisting of 5 independent trials, the probability of 1 and 2 successes are 0.4096 and 0.2048, respectively. The parameter p of the distribution is

(A)   1/4

(B)   1/2

(C)   1/3

(D)   1/5

8.   To be assumed that a hypothesis test is working correctly, it is desired that the value of 1-β should be close to

(A)   0.25

(B)   0.050

(C)   0.075

(D)   1.0

9.   Critical region is a region of

(A)   Acceptance

(B)   Rejection

(C)   Indecision

(D)   None of these

10. The probability of Type II error is

(A) α

(B) β

(C)   1-α

(D)   1-β

11.   The number of parts in which total variance in a two way analysis of variance partitioned is

(A)   5

(B)   4

(C)   3

(D)   2

12.   How many pairs of observation must be included in a sample so that an observed correlation coefficient of value 0.42 shall have a calculated value of t greater than 2.72?

(A)   34

(B)   37

(C)   42

(D)   72

13.   Which of the following statement is false?

(A)   In a perfect positive correlation, each individual obtains the same z value on each variable

(B)   A correlation of $r = 0.85$ implies a stronger association than $r = -0.70$

(C)   The range of the correlation coefficient is from -1 to +1

(D)   Sperman's correlation coefficient is used when one of both variables are at least of interval scaling

14.   The highest strength of association is reflected by which of the following correlation coefficients

(A)   -1.0

(B)   -0.95

(C)   0.1

(D)   0.85

15.   If two regression lines are: $y = 4 + kx$ and $x = 5 + 4y$ then the range of k is

(A) $k \leq 0$

(B) $k \geq 0$

(C) $0 \leq k \leq 1$

(D) $0 \leq 4k \leq 1$

16. Host factor strongly related to disease is

(A) Sex

(B) Marital status

(C) Age

(D) Occupation

17. Mean of 400 observations is 100 and standard deviation is 8. What will be standard error of deviation?

(A) 0.4

(B) 1.0

(C) 1.0

(D) 4.0

18. One way ANOVA is applicable when there are

(A) Any number of matched subgroups

(B) Any number of independent subgroups

(C) No more than five independent subgroups

(D) No more than five matched subgroups

19. In the sign test, if the null hypothesis is true, then p

(A) Equals 0.50

(B) Is greater than 0.50

(C) Is less than 0.50

(D) Differs depending an alternative hypothesis

20. For a group of n = 120 subjects, 40th percentile will be

(A) 30th value

(B) 40th value

(C) 48th value

(D) 38th value

21. In microbiology, the average dilution titers is computed by

   (A) Arithmetic mean

   (B) Geometric mean

   (C) Harmonic mean

   (D) Median

22. The mean, median and the coefficient of variation of 100 observations are found to be 90, 84, and 80, respectively. The coefficient of skewness of the above system of 100 observations is

   (A) 0.25

   (B) 0.50

   (C) 0.75

   (D) 1.0

23. The semi-interquartile range is most closely related to the

   (A) Mean

   (B) Median

   (C) Mode

   (D) Range

24. Root mean square of 1,3,5, 7 is

   (A) 84

   (B) 21

   (C) 4.6

(D) 2.3

25. Which of the following is not types of kurtosis

(A) Lepto

(B) Hecto

(C) Meso

(D) Platy

26. The heel effect is more pronounced

(A) At larger distances from the focal spot

(B) With a larger target (anode) angle

(C) With a smaller anode angle

(D) At the cathode edge of the x-ray field

27. Stray radiation is the sum of

(A) Primary and transmitted

(B) Primary and scatter

(C) Scatter and leakage

(D) Primary and leakage

28. Which interaction dominates for 45 keV photons in water?

(A) PE effect

(B) Compton scatter

(C) Coherent scatter

(D) Photodisintegration

29. Sensitivity is given by the

(A) True negative fraction

(B) False negative fraction

(C) False positive fraction

(D) True positive fraction

30. The DICOM standard does not specify the image's

    (A) Matrix size

    (B) Reimbursement rate

    (C) Display settings

    (D) Bit depth

31. Which radionuclide does PET breast imaging

    (A) ^{99m}Tc

    (B) ^{131}I

    (C) ^{123}I

    (D) ^{18}F

32. Following administration of ^{131}I to a patient, the dose rate near the patient does not depend on

    (A) Administered activity

    (B) Effective half-life

    (C) Distance to patient

    (D) Patient age

33. The cell division stage most sensitive to radiation is

    (A) Prophase

    (B) Metaphase

    (C) Anaphase

    (D) Telophase

34. One meter away from a CT scanner, the total exposure during a patient examination might be

    (A) 300 μGy (30 mR)

    (B) 30 μGy (3 mR)

    (C) 3 mGy (300 mR)

    (D) 30 mGy (3 R)

35. A lead apron attenuates 95%; transmission through two lead aprons would be approximately

    (A) 0.25%

    (B) 0.5%

    (C) 1.0%

(D) 1.25%

36. Which imaging modality results in the highest collective medical dose?

(A) Mammography

(B) Chest x-rays

(C) Fluoroscopy

(D) CT

37. Clinical ultrasound beams normally have an intensity of

(A) 0.5 mW/cm^2

(B) 0.5 W/cm^2

(C) 5 mW/cm^2

(D) 5 W/cm^2

38. The largest ultrasound reflections occur between

(A) Kidney and water

(B) Blood and brain

(C) Fat and kidney

(D) Water and muscle

39. If the half-value layer (HVL) is 2 cm, the linear attenuation coefficient is

(A) 0.50 cm^{-1}

(B) 0.35 cm^{-1}

(C) 2.9 cm^{-1}

(D) 0.35 cm

40. The chronic x-ray threshold dose for radiation-induced cataracts is about

(A) 0.1 Gy (10 rad)

(B) 50 mGy (5 rad)

(C) 5 Gy (500 rad)

(D) 1 Gy (100 rad)

41. Filters remove mainly what type of radiation from an x-ray beam?

(A) Scatter

(B) High-energy

(C)   Leakage

(D)   Low-energy

42.   An x-ray beam intensity attenuated by three HVLs, is reduced by a factor of

(A)   2

(B)   4

(C)   8

(D)   16

43.   To get high resolving power and low noise background, the semi-conductor detector should be kept at

(A)   High temperature

(B)   Low temperature

(C)   Any temperature

(D)   Very high temperature

44.   The half life of a radioactive element is one hour. It will take time for 60% of a substance to decay in

(A)   1326 hours

(B)   526 hours

(C)   2652 hours

(D)   652 hours

45.   Geiger counters

(A)   Are used to measure the output of x-ray tubes

(B)   Emit light after absorption of radiation

(C)   Use filters to estimate photon energy

(D)   Can detect individual photons

46.   Equivalent dose is greater than absorbed dose for

(A)   Gamma rays

(B)   Neutrons

(C)   Positrons

(D)   Electrons

47. Which would be most effective at reducing the dose level outside an x-ray room?

(A) Halving the occupancy factor

(B) Adding a HVL of lead

(C) Halving the use factor

(D) Doubling the distance to the x-ray source

48. The energy of the scattered photon in Compton processes depends primarily on the

(A) Electron density

(B) Scattering angle

(C) Density

(D) Atomic number

49. A Geiger-Muller detector would be best employed to

(A) Measure the output of an x-ray tube

(B) Detect low-level ^{99m}Tc contamination

(C) Monitor patient exposures

(D) Estimate a skin dose

50. Higher-frequency transducers have increased

(A) Velocity

(B) Wavelength

(C) Attenuation

(D) Intensity

x-x-x

Microbial Biotechnology(Ph.D.)   (MBT)

1. What are the variables whose calculation is done according to the weight, height, and length known as?
    (A)   Flowchart variables
    (B)   Discrete variables
    (C)   Continuous variables
    (D)   Measuring variables

2. One of the following is not an open source software:
    (A)   DSpace
    (B)   Windows
    (C)   Green-stone
    (D)   Linux

3. What are the conditions in which Type-I error occurs?
    (A)   The null hypotheses get accepted even if it is false
    (B)   The null hypotheses get rejected even if it is true
    (C)   Both the null hypotheses as well as alternative hypotheses are rejected
    (D)   Alternative hypotheses are rejected

4. What are the core elements of a dissertation?
    (A)   Introduction; Data Collection; Data Analysis; Conclusions and Recommendations
    (B)   Executive Summary; Literature Review; Data Gathered; Conclusions; Bibliography
    (C)   Research Plan; Research Data; Analysis; References
    (D)   Introduction; Literature Review; Research Methodology; Results; Discussions and Conclusions

5. Microchip was invented by
    (A)   Microsoft
    (B)   IBM
    (C)   DELL
    (D)   Intel

6. Questionnaire is a:
    (A)   Research method
    (B)   Measurement technique
    (C)   Tool for data collection
    (D)   Data analysis technique

7. Research participants are described in detail in which section of the research plan?
    (A)   Introduction
    (B)   Method
    (C)   Data analysis
    (D)   Discussion

8. High Level Language is

(A)   Disk space dependent
(B)   O. S. dependent
(C)   Machine independent
(D)   Machine dependent

9. Which of the following is not true about e journals?
(A)   They are distributed through digital methods
(B)   They also have editors or editorial boards
(C)   They are publications of serial nature
(D)   They are always free of cost

10. The expected value of a random variable is the
(A)   Value that has the highest probability of occurring
(B)   Mean value over an infinite number of observations of the variable
(C)   Largest value that will ever occur
(D)   Most common value over an infinite number of observations of the variable

11. The standard deviation of a data is 3. If each value is multiplied by 5 then the new variance is
(A)   3
(B)   15
(C)   5
(D)   225

12. Specialised processes such as graphical and numerical methods are utilised in which of the following?
(A)   Education statistics
(B)   Descriptive statistics
(C)   Business statistics
(D)   Social statistics

13. To which of the following options do individual respondents, focus groups, and panels of respondents belong?
(A)   Primary data sources
(B)   Secondary data sources
(C)   Itemised data sources
(D)   Pointed data sources

14. The main feature of a thesis is
(A)   Reliability
(B)   Originality
(C)   Stability
(D)   Dynamism

15. The application of scientific knowledge for practical purpose is _____.
(A)   Research
(B)   Technology
(C)   Qualitative Analysis
(D)   Statistics

16. A set of rules that govern overall data communications system is popularly known as
    (A)   Protocol
    (B)   Agreement
    (C)   Pact
    (D)   Memorandum

17. What is the name of the conceptual framework in which the research is carried out?
    (A)   Research hypothesis
    (B)   Synopsis of Research
    (C)   Research paradigm
    (D)   Research design

18. What is the major attribute of Correlation Analysis?
    (A)   Association among variables
    (B)   Difference among variables
    (C)   Regression among variables
    (D)   Variations among variables

19. Conference proceedings are considered as_____ documents.
    (A)   Conventional
    (B)   Primary
    (C)   Secondary
    (D)   Tertiary

20. The median of a frequency distribution is found graphically with the help of:
    (A)   Histogram
    (B)   Frequency polygon
    (C)   Frequency curve
    (D)   Ogive

21. The most commonly used device of presenting business and economic data is
    (A)   Pie diagram
    (B)   Pictogram
    (C)   Bar diagram
    (D)   Line diagram

22. If two dice are thrown simultaneously, what is the probability of getting a multiple of 2 on one dice and multiple of 3 on the other dice?
    (A)   5/4
    (B)   5/12
    (C)   11/36
    (D)   1/2

23. How would you judge the depth of any research?
    (A)   By research title
    (B)   By research duration
    (C)   By research objectives
    (D)   By total expenditure on research

24. All of the following increase the width of a confidence interval except:
   (A) Increased confidence level
   (B) Increased variability
   (C) Increased sample size
   (D) Decreased sample size

25. The p-value in hypothesis testing represents which of the following:
   (A) The probability of failing to reject the null hypothesis, given the observed results
   (B) The probability that the null hypothesis is true, given the observed results
   (C) The probability that the observed results are statistically significant, given that the
       null hypothesis is true
   (D) The probability of observing results as extreme or more extreme than currently
       observed, given that the null hypothesis is true

26. What is an MPR rating on air filters?
   (A) Magnitude performance rating
   (B) Micro-particle performance rating
   (C) Macro-particle performance rating
   (D) Moles per rate

27. Edmann degradation is used for the
   (A) Determination of amino acid sequence from the N-terminus of a protein
   (B) Nucleotide sequence of DNA
   (C) Determination of amino acid sequence from the C-terminus of a protein
   (D) Determination of RNA structure

28. Biodiversity hot spots are characterized on the basis of
   (A) Endemic species and threat perception
   (B) Endemic flowering plants
   (C) Species of flowering plants
   (D) Threat percetion

29. What is the nature of the genetic material of coronavirus?
   (A) Positive-sense ssRNA
   (B) Negative-sense ssRNA
   (C) dsRNA
   (D) dsDNA

30. Which of the following condition is of reverse phase chromatography?
   (A) The mobile phase is non-polar and stationary phase is polar
   (B) The mobile phase is polar and stationary phase is non-polar
   (C) Both the mobile phase and stationary phase are organic
   (D) Both the mobile phase and stationary phase are inorganic

31. Fungi of class *Deuteromycetes* are notable because they
    (A) Undergo photosynthesis
    (B) Lack septa
    (C) Produce basidiospores
    (D) Lack a known sexual cycle of reproduction

32. Dolly, the first cloned mammal was born on
    (A) 5 July 1997
    (B) 5 July 1996
    (C) 5 July 1998
    (D) 25 July 1995

33. Which of the following coronaviruses has caused thousands of deaths around the world as an 'emergent' virus?
    (A) MERS
    (B) SARS
    (C) OC43
    (D) HKU1

34. Budapest treaty was signed on
    (A) August 24, 1987
    (B) September 28, 1983
    (C) April 28, 1977
    (D) January 27, 1982

35. When milk has been pasteurized successfully, the milk will no longer contain the enzyme
    (A) Polymerase
    (B) Phosphatase
    (C) Peroxidase
    (D) Purinase

36. What property of biomembranes is responsible for their self-sealing nature?
    (A) Hydrophilicity of the phospholipid head group
    (B) Presence of protein in biomembranes
    (C) Presence of cholesterol in biomembranes
    (D) Hydrophobocity of the fatty acid side chains of phospholipids

37. Which one of the following types of ecosystems has invariably an inverted pyramid of biomass?
    (A) Grassland ecosystem
    (B) Forest ecosystem
    (C) Freshwater ecosystem
    (D) Mangrove ecosystem

38. Which of the following describes the coronavirus structure?
    (A)   Club shaped glycoprotein spikes protrude through a lipid bilayer
    (B)   An icosahedral structure with an envelope
    (C)   An icosahedral large pleomorphic virus
    (D)   Large regimented barrel shaped virus

39. Full expression of the *lac* operon requires
    (A)   Lactose and cAMP
    (B)   Allolactose and cAMP
    (C)   Lactose
    (D)   Allolactose

40. What do you mean by "Idiophase"?
    (A)   Production of waste materials
    (B)   Production of topical products
    (C)   Production of primary metabolites
    (D)   Production of secondary metabolites

41. The purity of a solute collected between two times t_1 and t_2 during chromatographic separation can be calculated as
    (A)   Amount of solute eluted-amount of impurity eluted
    (B)   Amount of solute eluted/amount of impurity eluted
    (C)   Amount of solvent eluted + amount of impurity eluted
    (D)   Amount of solvent eluted/amount of impurity eluted

42. Which factor(s) directly disrupt the proliferation of viruses?
    (A)   RNase-L
    (B)   Interferons
    (C)   Tumor necrosis factor
    (D)   Poly-A synthetases

43. Which of the following organism is widely used as a biocontrol agent in organic farming?
    (A)   *Rhizobium tropicii*
    (B)   *Trichoderma viride*
    (C)   *Fusarium oxysporum*
    (D)   *Nostoc muscorum*

44. Which of the following microorganisms is the cause of bacillary dysentery and uses a type III secretion system to deliver specific virulence factors to target epithelial cells?
    (A)   *Escherichia coli*
    (B)   *Salmonella* spp.
    (C)   *Shigella* spp.
    (D)   *Staphylococcus* spp.

45. Dendrogram in numerical taxonomy represents
   (A)   Phylogenetic similarities
   (B)   Phenetic similarities
   (C)   Evolutionary similarities
   (D)   No similarities

46. Which of the following statement is correct?
   (A)   Tc cells recognize MHC II molecule on the surface of the B cell and excretes
         cytokines
   (B)   Tc cells recognize antigen presented by MHC II molecule on the surface of the
   B
         cell and attacks cancer cells
   (C)   Tc cells proliferate to from cytotoxic T cells and interact with MHC II along
   with
         CD4 present on their surface
   (D)   Tc cells recognize antigen presented by MHC I molecule on the surface of
   virally
         infected cells/cancer cells and lead to cell death/cytotoxicity

47. The reason for the presence of histidine at the active site of enzymes is
   (A)   It is the only polar residue with a five-membered ring at the side chain
   (B)   It can form salt bridges
   (C)   Its pKa is close to 7
   (D)   It can interact with the substrates better than any other residue

48. What is the function of microcarrier beads?
   (A)   To give the cells the shape of beads
   (B)   It provides non-buoyancy condition
   (C)   It helps in the lysis of cells
   (D)   It provides protection and surface area

49. In malaria, the form of plasmodia that is transmitted from mosquito to human is the
   (A)   Sporozoite
   (B)   Gametocyte
   (C)   Merozoite
   (D)   Hypnozoite

50. Which of the following is true about Influenza viruses?
   (A)   Belongs to paramyxoviridae
   (B)   Are DNA viruses
   (C)   Attach to host cell by surface hemagglutinin
   (D)   Do not have an envelope

x-x-x

Microbiology(Ph.D.)   (Micro-Bio)

1. The end product of fermentation by molasses by yeast is
   (A)   Pyruvate
   (B)   Methyl alcohol
   (C)   Ethyl alcohol
   (D)   Lactate

2. Which is not a step in the southern blotting procedure
   (A)   Ligation of the DNA into a vector
   (B)   Separation of the DNA fragments on a gel
   (C)   Transfer of the DNA fragments to a nitrocellulose membrane
   (D)   Hybridization of the membrane with a labelled probe

3. Lyophilisation means
   (A)   Sterilization
   (B)   Freeze-drying
   (C)   Burning to ashes
   (D)   Concentration

4. Which of the following would not be possible to address using a Northern Blot
   (A)   Location of restriction sites in a particular gene
   (B)   Spatial expression of a particular gene
   (C)   Temporal expression of a particular gene
   (D)   mRNA size

5. Restriction fragment length polymorphism (RFLP) is the technique to know
   (A)   Fingerprint patterns of inheritance
   (B)   The difference in the restriction maps between the two alleles in a diploid cell
   (C)   The difference in the restriction maps between the two individuals of one
         species
   (D)   The difference in the restriction maps between the two individuals of two

         species

6. A mouse in which one particular gene has been replaced by its inactivated form
   generated in vitro is called
   (A)   Transgenic mouse
   (B)   Knockout mouse
   (C)   Nude mouse
   (D)   Mutant mouse

7. A crossed precipitin line following double immune diffusion is due to
   (A)   Shared epitopes between antigens
   (B)   Identity between antigens
   (C)   No common epitopes between antigens

(D)   Only few epitopes that are common between antigens

8. In order to separate the antibodies in an antibody mixture, the laboratory technologists may use a procedure called
    (A)   Transfusion
    (B)   Complement fixation
    (C)   Electrophoresis
    (D)   Gene amplification

9. The Immunofluorescence test can be used to identify
    (A)   Protein molecules and polysaccharide molecules
    (B)   Lipid molecules and nucleic acid molecules
    (C)   Antibody molecules and antigen molecules
    (D)   Cytoplasmic molecules and cell wall molecules

10. Tests for typhoid fever and blood typing utilize a serological test known as
    (A)   Precipitation
    (B)   Electrophoresis
    (C)   Agglutination
    (D)   Complement fixation

11. Phenol coefficient indicates
    (A)   Efficiency of a disinfectant
    (B)   Dilution of a disinfectant
    (C)   Purity of a disinfectant
    (D)   Quantity of a disinfectant

12. Which of the following enzymes does not require a primer?
    (A)   RNA dependent DNA polymerase
    (B)   DNA dependent DNA polymerase
    (C)   DNA dependent RNA polymerase
    (D)   *Taq* DNA polymerase

13. In recombinant DNA methods, the term vector refers to
    (A)   The enzyme that cuts DNA into restriction fragments
    (B)   The sticky end of a DNA fragment
    (C)   A plasmid used to transfer DNA into a living cell
    (D)   A DNA probe to identify a particular gene

14. The polymerase enzyme used in PCR is
    (A)   DNA polymerase I
    (B)   Taq polymerase
    (C)   Reverse transcriptase
    (D)   DNA polymerase II

15. Acid fast staining of gram positive mycobacterium is due to
    (A)   Presence of dipicolinic acid in cell wall
    (B)   Presence of mycolic acid in cell wall
    (C)   Presence of teichoic acid in cell wall
    (D)   Presence of diaminopimelic acid in cell wall

16. The staining technique used to stain the metachromatic granules of Corynebacterium
    (A)   Giemsa stain
    (B)   Alberts stain
    (C)   Acid fast staining
    (D)   Both A and B

17. The test used for detection of typhoid fever
    (A)   Widal test
    (B)   Tuberculin
    (C)   Rosewaller test
    (D)   VDRL

18. Aminopterine is used during the production of hybridoma cells because
    (A)   It blocks the *denovo* pathway
    (B)   It prevents the growth of B cells
    (C)   It prevents the growth of myeloma cells
    (D)   It blocks the synthesis of Ig by B cells

19. The growth kinetics that result from metabolizing one sugar before another is referred to as
    (A)   Exponential growth
    (B)   Diphasic growth
    (C)   Diauxic growth
    (D)   Chemotaxis

20. Through electron microscopy only following objects can be visualized
    (A)   Live objects
    (B)   Motile objects
    (C)   Dead and dried objects
    (D)   Slender objects

21. Different bacterial structures becomes visible with the help of phase contrast microscopy due to differences in
    (A)   Resolving power
    (B)   Refractive index
    (C)   Light scattering
    (D)   Chemical constituents of cells

22. Which method is commonly used for estimation of number of bacteria in milk
    (A)   Standard plate count
    (B)   Spread plate
    (C)   Lawn culture
    (D)   Roll tube method

23. Temperature required for pasteurization is
    (A)   Above 100°C
    (B)   Below 100°C
    (C)   100°C
    (D)   -20°C

24. Biological control for checking sterilization includes
    (A)   Bacillus
    (B)   Clostridium
    (C)   Mycobacterium
    (D)   E. coli

25. Wilson and Blair medium is used for isolation of
    (A)   Staphylococcus
    (B)   Salmonella typhi
    (C)   Vibrio cholera
    (D)   Shigella dysentriae

26. Characteristic unique to DNA is
    (A)   Denaturation and renaturation
    (B)   Polymer complex
    (C)   Replication
    (D)   Resistance to change of temperature

27. Transposons
    (A)   Insert into DNA by homologous recombination
    (B)   Cannot be transferred by phage mediated transduction
    (C)   Contain the equivalent of insertion (IS) elements
    (D)   Can insert into plasmids but not the bacterial chromosome

28. Satellite DNA consists of
    (A)   Extra chromosomal DNA
    (B)   Short repetitive nucleotide sequences
    (C)   Ribosomal RNA genes
    (D)   Single gene regions

29. Spontaneous mutations
    (A)   Are caused by chemicals such as acridinbe orange and caffeine
    (B)   Are caused by physical agents such as ultraviolet light or x-rays
    (C)   Are result of errors in the base pairing of nucleotides during replication
    (D)   Occur at a rate higher than the rate of induced mutations

30. Bacteria protect themselves from viruses by fragmenting viral DNA upon entry with
    (A)   Methylase
    (B)   Endonuclease
    (C)   Ligases
    (D)   Exonucleases

31. Encapsulated bacteria
    (A)   Are sometimes more virulent than their non encapsulated counterparts
    (B)   Are more susceptible to phagocytes destruction
    (C)   Have more signal for protein synthesis than non encapsulated bacteria
    (D)   More susceptible to bactericidal action of serum

32. All the following characteristics apply to spirochetes except
    (A)   They form spores
    (B)   They do not stain easily in the laboratory
    (C)   Certain species cause human disease
    (D)   They move freely by moving axial filaments

33. Diphtheria virulence test is
    (A)   Ames test
    (B)   Eleck's gel precipitation test
    (C)   C.R.P test
    (D)   M.R.T test

34. "Toxic shock syndrome" is caused by the toxin of
    (A)   *Staphylococcus aureus*
    (B)   *Streptococcus pyogenes*
    (C)   *Vibrio cholera*
    (D)   *Candida albicans*

35. Dengue virus is transmitted from man to man by the
    (A)   Sand fly
    (B)   Ticks
    (C)   Aedes aegypti
    (D)   Culex

36. Viral genome that can become integrated into bacterial genome is called
    (A)   Prophage
    (B)   Temperate phage
    (C)   Bacteriophage
    (D)   Metaphage

(5)

37. Alginic acids and its salts are obtained from the wall of
    (A)   Red algae
    (B)   Brown algae
    (C)   Green algae
    (D)   Red and Brown algae

38. Term vaccine was coined by
    (A)   Robert Koch
    (B)   Pasteur
    (C)   Needham
    (D)   Leeuwenhoek

39. An envelope is acquired during which of the following steps
    (A)   Penetration
    (B)   Release
    (C)   Lysis
    (D)   Assembly

40. Inflammation does not involve
    (A)   Cytokine production by macrophages
    (B)   Migration of leukocytes out of the circulation
    (C)   Pain and swelling at the site of infection
    (D)   Secretion of antibodies

41. Toll-like-receptors (TLRs) play an important role in immune defense by regognizing
    (A)   Microbial components
    (B)   Conformational differences in antigenic proteins
    (C)   MHC-peptide complexes
    (D)   Anti-idiotypic immunoglobulins

42. Hematopoietic stem cell are pleuripotent, which means that they are
    (A)   Antigen-specific cells
    (B)   Capable of developing into any blood cells
    (C)   Commited to produce cells of a single lineage
    (D)   Not self-renewing

43. Which of the following statements is *correct*?
    (A)   Helper T cells express surface CD8 receptors
    (B)   Cytotoxic T cells express surface CD4 receptors
    (C)   T cells express surface IgG molecules
    (D)   Cytotoxic T cells express surface CD8 receptors

44. Which of the following statements about MHC is *incorrect*?
    (A)   It codes for complement components
    (B)   It codes for both chains of the MHC class I molecules
    (C)   It codes for both chains of the MHC class II molecules
    (D)   It is associated with susceptibility and resistance to different diseases

45. In an immunoglobulin molecule, the region determining complementarity is present in
    (A)   Variable domain of heavy chain
    (B)   Variable domain of light chain
    (C)   Variable domains of heavy and light chain
    (D)   Variable and constant domains of the heavy chains

46. Monoclonal antibodies differ from polyclonal antibodies in their potency of reacting with
    (A)   Specific epitope
    (B)   Specific antigen
    (C)   Specific clone of cells
    (D)   Tissue receptors

47. Immunosuppressive measures are most effective when administered
    (A)   Just prior to antigen exposure
    (B)   One week before antigen exposure
    (C)   At the time of antigen exposure
    (D)   Following antigen exposure

48. The cell walls of gram-positive and gram-negative bacteria
    (A)   Are the sites of spore formation
    (B)   Both contain Peptidoglycan
    (C)   Are connected to the cell nucleus by the endoplasmic reticulum
    (D)   Are composed exclusively of proteins

49. Which algal group is mismatched with its descriptions?
    (A)   Dinoflagellates-glassy, two-part shells
    (B)   Green algae-closest relatives of land plants
    (C)   Red algae- no flagellated stages in life cycle
    (D)   Brown algae- include the largest seaweeds

50. Interferon is produced by cells in tissue culture when the cells are stimulated with which of the following?
    (A)   Botulinum toxin
    (B)   Chlamydia
    (C)   Gram-positive bacteria
    (D)   Viruses

x-x-x

Vocal & Instrumental

1. Term Kalawant stands for
   (A) Gayak   (B) Vadak
   (C) Composer   (D) Gayak & composer

2. How many Rasas were discussed by Acharya Bharat?
   (A) Seven   (B) Eight   (C) Nine   (D) Ten

3. Founder of Agra Gharana
   (A) Ustad Hassu-Haddu Khan   (B) Ustad Kallan Khan
   (C) Ustad Nattan Khan   (D) Ustad Natthan Peerbaksh

4. Name the disciple of Baba Allauddin Khan
   (A) Ustad Vilayat Khan   (B) Ustad Mubaraq Ali
   (C) Pt. Ravi Shankar   (D) Pt. Kumar Kartikey

5. Author of Sangeet Ratnakar
   (A) Acharya Bharat   (B) Matang Muni
   (C) Pt. Sharagdev   (D) Pt. Ahobal

6. Meaning of Research is
   (A) Anusandhan   (B) Writing Text Book
   (C) Writing Article   (D) Analysis

7. Rag Tilang is comprised of
   (A) Ga Ma Pa Ni Sa   (B) Ga Ma Dha Ni Sa
   (C) Ga Ma Pa Dha Sa   (D) Ga Ma Ni Pa Ni Sa

8. Distance of shruti of Shadaj-Madhyam Samvaad is
   (A) Nine   (B) Thirteen   (C) Fifteen   (D) Seventeen

9. What is not the part of Dhrupad
   (A) Sthayi   (B) Antara   (C) Vyabhichari   (D) Aabhog

10. Compositions of old film songs are mostly based on
    (A) Swar   (B) Raag   (C) Lay   (D) Taal

11. Name the PEN NAME of Ustad Tasadduq Hussain Khan
    (A) Prem Piya   (B) Pran Piya   (C) Daras Piya   (D) Vinod Piya

12. Name the Taal having 14 matras
    (A) Sultal   (B) Dhamar   (C) Tilwada   (D) Teevra

13. Natyashastra was written by
    (A) Bharat   (B) Matang   (C) Sharangdev   (D) Ahobal

14. Who is regarded as "PRANAV"?
    (A) Pt. Jasraj   (B) Pt. Bhimsen Joshi
    (C) Pt. Omkarnath Thakur   (D) Pt. V.D. Paluskar

15. Pt. Samta Prasad is known as
    (A) Sitar Maestro   (B) Sarod Maestro
    (C) Tabla Maestro   (D) Pakhawaj Maestro

16. First string in Sarod is tuned to
    (A) Sa   (B) Ga   (C) Ma   (D) Pa

17. Which Rag does not have Kalyan Ang
    (A) Puriya Kalyan   (B) Shyam Kalyan
    (C) Hem Kalyan   (D) Gorakh Kalyan

18. Which is Mishra Rag
    (A) Darbari Kanhada   (B) Adana
    (C) Kafi Kanhada   (D) Shahana

19. Which of the following Rag is not a type of Marwa Thaat
    (A) Puriya   (B) Marwa   (C) Sohni   (D) Paraj

20. Author of "Srimallakshya Sangeetam"
    (A) Pt. Sharngdev   (B) Pt. V.N. Bhatkhande
    (C) Pt. Sriniwas   (D) Pt. Lochan

21. Pt. Pannalal Ghosh belong to
    (A) Senia Gharana   (B) Maihar Gharana
    (C) Etawah Gharana   (D) Agra Gharana

22. Ada Chartal starts with the bol
    (A) Dha   (B) Dhin   (C) Dhi   (D) Ti

23. Gharana of Pt. Vidyadhar Vyas is
    (A) Agra   (B) Gwalior   (C) Delhi   (D) Kirana

24. Beghum Parveen Sultana belongs to gharana
    (A) Agra   (B) Indor   (C) Patiala   (D) Jaipur

25. What is not part of research?
    (A) Bibliography   (B) Editing
    (C) Footnotes   (D) Index

26. Name the granth written by Pt. Vyankatmakhi
    (A) Rag Tarangini   (B) Rag Vibodh
    (C) Chaturdandiprakashika   (D) Sangeet Parijat

27. Name the 14 matrataal having two matras in each vibhag
   (A) Dhamar (B) Jhumra (C) Deepchandi (D) Ada

   Chartal

28. Name the Dhrupad Gayak of Khandarbani
   (A) Pt. Chatur Malik (B) Pt. Siya Ram Tiwari
   (C) Gundecha Bandhu (D) Pt. Ritwik Sanyal

29. Name the Tabla Maestro
   (A) Pt. Nikhil Banerji (B) Pt. Kanthe Maharaj
   (C) Pt. Chhannu Lal (D) Pt. Birju Maharaj

30. How many jaties are there of Raagas
   (A) 3 (B) 6 (C) 9 (D) 12

31. Swaras were used in Saamgan
   (A) Udatt (B) Anudatt (C) Swarit (D) All

32. Taal comprising of seven matras
   (A) Sultal (B) Teevra (C) Chartal (D) Keherwa

33. Name the raag of Khamaj Thaat
   (A) Bageshree (B) Patdeep (C) Bhupali (D) Jhinjhoti

34. Name the PEN NAME of Pt. Jagannath Bua Purohit
   (A) Mohan Das (B) Guni Das
   (C) Prem Das (D) Hai Das

35. Which Raag does not enters in any thaat
   (A) Kalingada (B) Hameer (C) Malkauns (D) Lalit

36. Sa, Ma, Ma, Pa, Dha, Pa, Ma, Re, Sa… indicates which Raag?
   (A) Miyan Malhar (B) Kedar (C) Jaunpuri (D) Sughrayi

37. Name the Artiste of Patiala Gharana
   (A) Pt. Bhimsen Joshi (B) Pt. Ajay Chakrawarty
   (C) Pt. Ulhas Kashalkar (D) Pt. Jasraj

38. Which pair of Raag has similar swaras?
   (A) Vrindavani Sarang-Shuddh Sarang (B) Malkauns- Chandrakauns
   (C) Yaman-Bhupali (D) Megh- Madhumad- Sarang

39. Not applied in Khayal shaili
   (A) Alap (B) Taan (C) Tihayi (D) Upaj

40. A Raag of spring season
   (A) Malhar (B) Basant (C) Jaijaiwanti (D) Kamod

41. A famous Master of flute
    (A) Pt. V.G. Jog   (B) Pt. Shiv Kumar Sharma
    (C) Pt. Panna Lal Ghosh   (D) Suresh Talwankar

42. Folk singing style of Gujrat
    (A) Nati   (B) Garba   (C) Mirza   (D) Beehu

43. Name the Raag with two Nishad
    (A) Poorvi   (B) Shuddh Kalyan
    (C) Deshkar   (D) Bahar

44. Author of "Abhinav- Geetanjali"
    (A) Pt. Omkarnath Thakur   (B) Pt. V.N. Bhatkhande
    (C) Pt. Ramashreya Jha   (D) Pt. V.R. Patwardhan

45. How many Jaties are used in Dakshini Taal System
    (A) 3   (B) 5   (C) 7   (D) 9

46. How many parts are there of KRAMIK PUSTAK MALIKA
    (A) 4   (B) 5   (C) 6   (D) 7

47. Division of present shrutiswar vyavastha by Pt. Bhatkhande
    (A) 4-3-2-4-4-3-2   (B) 1-5-8-10-14-18-21
    (C) 4-3-2-3-4-2-2   (D) 1-4-7-9-14-17-20

48. How many important types of Saamgaan
    (A) 4   (B) 5   (C) 6   (D) 7

49. Name the 17th shruti according to Bharat
    (A) Kshobhini   (B) Chhandowati   (C) Aalapini   (D) Marjini

50. Brihaddeshi was written by
    (A) Kohal   (B) Matang   (C) Narad   (D) Sharangdev

x-x-x

1. When do we observe the Chi-square distribution?
   (A) When we deal with collections of values that involve adding up squares
   (B) When population standard deviation (σ_p) is not known
   (C) When sampling is from a normal population
   (D) When parameter value is not known and we have to estimate it from the sample

2. Research reporting is outcome of research. Which of the following is imperative about the method of research reporting?
   (A) Globalized
   (B) Ethical and attractive
   (C) Personal
   (D) Scientific

3. Why sign test is the parametric test?
   (A) It is used when the data happen to be nominal and relate to two related samples
   (B) It is based on the direction of the plus or minus signs of observations in a sample
   (C) It is based on the numerical magnitudes of the samples
   (D) It determines both, the direction and magnitude of difference between matched values of two related samples

4. Which of the following is not a type of research?
   (A) One-time research
   (B) Recessive research
   (C) Stimulation research
   (D) Longitudinal research

5. Hypothesis testing embark two simultaneous research processes, namely:
   (A) Generalization and interpretation
   (B) Quantitative and qualitative
   (C) Simulation and Generalization
   (D) Conclusive and interpretive

6. Which of the following depicts the theoretical aims of research?
   (A) Explanatory
   (B) Qualitativeness
   (C) Quantitativeness
   (D) Inferentia

7. How the difficulty which a researcher experiences in the context of either a theoretical or practical situation and in stride to obtain a solution for the same can be defined as
   (A) An Illustration
   (B) Pre-established assumptions
   (C) The hypothesis
   (D) The research problem

8. Which of the following principles of experimental design as enumerated by Professor Fisher indicates that we should design or plan the experiment in such a way that the variations caused by extraneous factors can all be combined under the general heading of "chance."
   (A)   The Principle of Replication
   (B)   The Principle of Randomization
   (C)   The Principle of Local Control
   (D)   The Principle of Randomization and the Principle of Replication

9. Which amongst the following is not the characteristic of a good sample design?
   (A)   Sample design must result in a truly representative sample.
   (B)   Sample design must not result in a small sampling error.
   (C)   Sample design must be viable in the context of funds available for the research study.
   (D)   Sample design must be such so that systematic bias can be controlled in a better way.

10. What is the major attribute of Correlation Analysis?
   (A)   Association among variables
   (B)   Difference among variables
   (C)   Regression among variables
   (D)   Variations among variables

11. What is the main aim of interdisciplinary research?
   (A)   To over simplify the problem of research
   (B)   To bring out the holistic approach to research
   (C)   To create a new trend in research methodology
   (D)   To reduce the emphasis on a single subject in the research domain

12. *In vivo* in Latin refers to
   (A)   Within the living
   (B)   Outside the living
   (C)   Within the glass
   (D)   Computer generated

13. Northern blotting is used for separation of
   (A)   DNA
   (B)   mRNA
   (C)   Protein
   (D)   Plasmids

14. In isoelectric focusing, proteins are separated
   (A)   In a pH gradient
   (B)   In a salt gradient
   (C)   In a density gradient
   (D)   In a temperature gradient

15. Which of the following techniques is primarily undertaken to amplify DNA?
    (A)   Polymerase chain reaction
    (B)   Microarrays
    (C)   Northern Blotting
    (D)   Southern Blotting

16. Roentgen is a measure of
    (A)   Radiation exposure to tissue
    (B)   Absorbed dose in tissue
    (C)   Radioactivity
    (D)   Effective dose to tissue

17. To minimize oxidation of stannous chloride, which of the following may be added to radiopharmaceutical kits?
    (A)   Oxygen
    (B)   Water
    (C)   Bacteriostatic saline
    (D)   Nitrogen

18. The exposure rate at the surface of a package to be shipped is 50 mrem/hr. What label is required?
    (A)   DOT Radioactive White I
    (B)   DOT Radioactive Yellow II
    (C)   DOT Radioactive Yellow III
    (D)   No radioactive label is required

19. When the daughter radionuclide has a half life longer than that of the parent, there is a _____ equilibrium
    (A)   Transient
    (B)   Secular
    (C)   Both transient and secular
    (D)   No equilibrium

20. What does metastable means?
    (A)   When an isomeric state is longer than 10^5 seconds
    (B)   When an isomeric state is longer than 10^7 seconds
    (C)   When an isomeric state is longer than 10^9 seconds
    (D)   When an isomeric state is longer than 10^{12} seconds

21. As a pinhole collimator is brought closer to the object being imaged, the count rate
    (A)   Increases
    (B)   Decreases
    (C)   Remains the same
    (D)   First increases and then decreases

22. The spatial resolution of gamma camera should be tested on a _____ basis
    (A)   Daily
    (B)   Weekly
    (C)   Monthly
    (D)   Annual

23. An empty syringe is used to draw 5 ml of blood. After several minutes, the blood appears separated into a liquid and a solid portion. Liquid portion is called
    (A)   Serum
    (B)   Plasma
    (C)   Anticoagulant
    (D)   Debris

24. The modern atomic mass scale is based on
    (A) $^1H_1$
    (B) $^1H_2$
    (C) $^6C_{12}$
    (D) $^8O_{16}$

25. The term used to refer something performed on computers or computer simulation models
    (A)   In vitro
    (B)   In vivo
    (C)   In silico
    (D)   Ex-vivo

26. ^{15}O, ^{16}O and ^{18}O are an example of
    (A)   Isotopes
    (B)   Isotones
    (C)   Isobars
    (D)   Isomers

27. Octreotide, the peptide that is labeled in Octreoscan, is _____ amino acid in length
    (A)   6
    (B)   7
    (C)   8
    (D)   9

28. What intracellular ion does thallium closely mimic?
    (A)   Sodium
    (B)   Potassium
    (C)   Calcium
    (D)   Magnesium

29. Where in the myocardial cell does 99mTc sestamibi localize?
   (A)   The golgi
   (B)   Endoplasmic reticulum
   (C)   Mitocondria
   (D)   Cytosol

30. What is akinesis?
   (A)   Reduced ventricular contraction
   (B)   Absence of ventricular contraction
   (C)   Outward ventricular movement during contraction
   (D)   Ventricular contraction present but delayed in timing

31. How long after injection of 99mTc-ECD does peak brain uptake occurs?
   (A)   15 minutes
   (B)   10 minutes
   (C)   7 minutes
   (D)   2 minutes

32. What does gallium primarily bind to in plasma?
   (A)   Albumin
   (B)   Globulin
   (C)   Transferrin
   (D)   Fibrinogen

33. Radiation weighting factor (w_R) for Gama-ray is:
   (A)   10
   (B)   20
   (C)   2
   (D)   1

34. Which of the following is not a chemical radiosensitizer?
   (A)   Nucleotide analogues
   (B)   Electronic affinic compounds
   (C)   Nitroimidazoles
   (D)   Aminothiols

35. Free 99mTc pertechnetate in a bone scan kit will result in activity in the:
   (A)   Breasts
   (B)   Thyroid
   (C)   Gastric mucosa
   (D)   Thyroid and gastric mucosa

36. In a scintillation counter the Cs^{137} (662 keV) peak is observed at a pulse height voltage of 53 volts. The spread in the peak profile is 100 keV. The percent resolution of the spectrometer will be
   (A)   ≈ 0.5%
   (B)   ≈ 1 %
   (C)   ≈ 5 %
   (D)   ≈ 15%

37. To get high resolving power and low noise background, semiconductor detector should be kept at
   (A)   Low temperature
   (B)   High temperature
   (C)   Any temperature
   (D)   Variable temperature

38. If concentration of a solution desired is 2 µCi/ml and the 325 µCi of solute is contained in a volume of 2.5 ml, how much water should be added to create the solution?
   (A)   160.0 ml
   (B)   162.5 ml
   (C)   650.0 ml
   (D)   125.0 ml

39. What energies are included if a 20% symmetric window is used for the 364Kev photopeak of ^{131}I?
   (A)   191-437
   (B)   328-400
   (C)   337-391
   (D)   344-384

40. *10mci of lutetium-177 after 14 hrs shall be*
   (A)   *9.83mci*
   (B)   *9.41mci*
   (C)   *9.33mci*
   (D)   *9.20mci*

41. What is the most likely size of an MAA particle if correctly prepared?
   (A)   0-100mm
   (B)   10-30mm
   (C)   10-30 µm
   (D)   100-250µm

42. If the HVL of lead for ^{131}I is 3 mm and a lead vial shield holding the iodine is 6 mm thick, what percentage of the original exposure rate will remain?
   (A)   75%
   (B)   50%
   (C)   25%
   (D)   12.5%

43. R-R interval in ECG represents
   (A)   Only repolarizaton
   (B)   The duration of conduction through the AV node
   (C)   Length of cardiac cycle
   (D)   Ventricular systole

44. What portion of a ECG wave represents the depolarization of the ventricles?
    (A)   QRS complex
    (B)   P wave
    (C)   ST Segment
    (D)   T- wave

45. The volume of air breathed in and out during normal breathing is called
    (A)   Vital capacity
    (B)   Tidal volume
    (C)   Inspiratory reserve volume
    (D)   Residual volume

46. Cardiac output is
    (A)   Equal to Stroke Volume
    (B)   Equal to end diastolic volume
    (C)   Stroke volume X End systolic volume
    (D)   Stroke volume X Heart rate

47. The exchange of oxygen and carbon dioxide between alveolar air and pulmonary blood (external respiration) is governed by
    (A)   Boyle's law only
    (B)   Boyle's law and Henry's law
    (C)   Dalton's law and Boyle's Law
    (D)   Dalton's law and Henry's law

48. Scintillation detectors convert
    (A)   Gamma ray energy into a current
    (B)   Visible light into ultraviolet light
    (C)   Gamma ray energy into visible light
    (D)   Electron energy into potential energy

49. The tissue weighing factor for brain is
    (A)   0.12
    (B)   0.08
    (C)   0.04
    (D)   0.01

50. Maximum limit on total discharge per day in sanitary sewage system for ^{125}I is
    (A)   0.37 MBq
    (B)   3.7MBq
    (C)   0.037MBq
    (D)   37MBq

x-x-x

(7)

Faculty of Pharmaceutical Sciences (PHARM)

1. How are research questions most often described?

   (A) Arising within a laboratory setting
   (B) Posed after important factors are identified
   (C) May arise from our everyday life experiences
   (D) Always answered if we follow a scientific method of inquiry

2. Which of the following best describes a hypothesis?

   (A) Statement that you set out to prove
   (B) Tested by collecting only the data that support it
   (C) Proposed before a good research question can be developed
   (D) Posits a clear relationship between different factors

3. Michael hands out a survey to find out the average age and schooling level of his class. What type of research is this?

   (A) Historical
   (B) Cause-and-effect
   (C) Quasi-experimental
   (D) Descriptive

4. Non-experimental research methods consist of which of the following?

   (A) Test causal relationships between variables
   (B) Only describe characteristics of existing phenomenon
   (C) Can be descriptive, historical, or correlational
   (D) Examine factors that are not related

5. What is the major difference between applied and basic research?

   (A) Basic research takes longer to complete
   (B) Applied research is less important
   (C) Basic research is more traditional
   (D) Basic research has no immediate application

6. Biostatistics is also called

   (A) Biometry
   (B) Statistic in biology
   (C) Bio numerology
   (D) Both A and B

7. Which of the following correlates highest correlation between variables

   (A) $r = + 0.25$
   (B) $r = + 0.5$
   (C) $r = - 0.75$
   (D) $r = + 2$

8. A random sample suggests that

   (A) A person in a control group will not be a member of the experimental group
   (B) Any member of a group to be studied has an equal opportunity to be included in the study
   (C) Every nth name on a list is selected
   (D) Subjects are volunteers

9. As sample size increases, standard deviation

   (A) Decreases
   (B) Increases
   (C) Remains same
   (D) May increase or decrease

10. In 3 ×3 table, number of degree of freedom is
(A) 4
(C) 8
(B) 3
(D) 9

11. Which of the following statements about plagiarism is most accurate?
(A) It is so easy to "copy and paste" from the internet that everyone does it nowadays. If a proper reference is given, where is the harm in that?
(C) Any suggestion that we have written what another actually wrote is morally wrong. The whole point of a literature review is to show what we have read and what we thought about it.
(B) How can we say for sure where our own ideas come from exactly? If we tried to give a reference for everything, we could never hope to succeed?
(D) Plagiarism is such an awful crime that those found guilty should be obliged to wear a scarlet "P" on their clothing.

12. _____ is the classical form of research
(A) Experiment
(C) Grounded theory
(B) Case study
(D) Narrative inquiry

13. The fundamental statistical indicators are
(A) Mean
(C) Variance
(B) Median
(D) Standard deviation

14. The Student's t test is
(A) a parametric test
(C) a test for comparing averages
(B) a nonparametric test
(D) a test for comparing variances

15. The following numbers represent exam scores in botany: 78, 93, 85, 8, 73, 96, 72, 86, 90, 85. If a stem and leaf diagram is developed from this data, how many stems will be used?
(A) 3
(C) 10
(B) 5
(D) 4

16. Autonomy is one of the main principles of bioethics, which mean:
(A) Selfishness
(C) The right to be selfish
(B) Self-promotion
(D) Self-governance

17. Which of the following ethical issues form the foremost part of Hippocratic Oath?
(A) Confidentiality
(C) Sexual boundaries
(B) Advertising
(D) Doctor's rights

18. The average life span and reproductive stage of rats respectively are
(A) 5.0- 6.0 years and 4-6 weeks
(C) 1.5- 3 years and 8-10 weeks
(B) 0.5- 1.0 years and 8-10 weeks
(D) 1.5- 3 years and 15-20 weeks

19. Granted informed consent ethically means:
    (A) The physician/surgeon should do what is medically indicated, and ought to be for the good for the patient and cause no harm
    (B) Patient and family signed to accept and complication including death as outcome of treatment or surgery
    (C) Patient and family signed to accept and complication including death as outcome of treatment or surgery
    (D) It is a routine procedure in the hospital

20. Which of the following is true about ethical research using animals?
    (A) It must ensure that discomfort to animals is minimized and harm only occurs where essential.
    (B) Ethics are not a major issue because participants are not deceived.
    (C) Because it is such a controversial topic, the issues it raises are only worth discussing in relation to medical research.
    (D) It is not really relevant to psychology.

21. The desire to maintain a safe laboratory environment for all begins with
    (A) Prevention
    (B) Microbiology
    (C) Ubiquity
    (D) Accidents

22. The full form of IAEC
    (A) Institutional animal education committee
    (B) Institutional animal ethics committee
    (C) Institutional animal education cooperation
    (D) International Animal ethical council

23. What are 3Rs in Animal Experimentation
    (A) Replacement, refinement, rehabilitation
    (B) Replacement, reduction and refinement
    (C) Reduction, reuse and replacement
    (D) Reuse, refinement and rehabilitation

24. The animal house facilities are approved by
    (A) PCI
    (B) CPCSEA
    (C) IAEC
    (D) AICTE

25. What is the Declaration of Helsinki?
    (A) A formal statement that governs ethical principles regarding research with human subjects developed for the medical community by the World Medical Association
    (B) A formal statement developed by the World Medical Association that states that the patient is always right
    (C) A formal statement that governs ethical principles regarding research with animal subjects developed for the medical community by the World Medical Association
    (D) All of the above

(3)

26. Microcrystalline cellulose is also called as

(A) Sugar tab   (C) Emdex

(B) Nutab   (D) Avicel

27. Simvastatin belongs to

(A) HMG CoA reductase inhibitor type   (C) Fibrate type of anticoagulant
    of anticoagulant
(B) HMG CoA reductase inhibitor type   (D) Fibrate type of antilipidemic agent
    of antilipidemic agent

28. The main mechanism of most drugs absorption in GIT is

(A) Filtration   (C) Passive diffusion

(B) Active transport   (D) Endocytosis

29. Talc is .... source of drug

(A) Animal   (C) Plant

(B) Mineral   (D) Marine

30. ELISA involves

(A) Using RBCs   (C) Using complement mediated cell lysis

(B) Using radiolabelled second   (D) Addition of substrate that is converted
    antibody   into a coloured end product

31. The DNA fragments have sticky ends due to

(A) Unpaired bases   (C) Calcium ions
(B) Endonuclease   (D) Free methylation

32. $CH_3O^-Na^+$ $CH_3Cl = CH_3OCH_3 + NaCl$. This reaction is an example for which of the
    following?
(A) Williamson reaction   (C) Wurtz's reaction

(B) Clemmenson reaction   (D) Reformatsky reaction

33. Which of the following antihypertensive drug used in the treatment of alopecia?

(A) Reserpine   (C) Minoxidil

(B) Diazoxide   (D) Hydralazine

34. Lecithin is incorporated in shampoos as

(A) Conditioning agent   (C) Opacifying agent

(B) Clarifying agent   (D) pH adjusting agent

35. According to Drugs and Cosmetics act, List of substances that should be sold by retail only on prescription of registered medical practitioner is given in which of the following Schedule?

(A) Schedule 'Y'

(C) Schedule 'V'

(B) Schedule 'X'

(D) Schedule 'H'

36. Opioid analgesics can produce

(A) Sedation and analgesia

(C) Nausea, vomiting and constiption

(B) Euphoria and respiratory depression

(D) All of the above

37. Identify the molecule which will not exhibit dipole moment?

(A) Chloroform

(C) Carbon monooxide

(B) Carbon dioxide

(D) Ammonia

38. The size of lycopodium spores is

(A) 15 μm

(C) 25 μm

(B) 45 μm

(D) 35 μm

39. Which of the following will result in value closest to the Glomerular Filtration rate?

(A) Albumin clearance

(C) Measure of blood urea nitogen

(B) Creatinine clearance

(D) Insulin clearance

40. In solid-solid mixing, large scale continuous type of mixer is

(A) Sigma blender

(C) Zigzag blender

(B) Ribbon blender

(D) Twin shell blender

41. 21 CFR part 211 of USFDA describes

(A) Current good clinical practice

(C) Current good manufacturing practice

(B) Current good packaging practice

(D) Current good laboratory practice

42. RNA molecules having intrinsic catalytic activity are called as

(A) snRNAs

(C) mRNAs

(B) Ribozymes

(D) rRNAs

43. Which one is the property of microemulsions?

(A) Particle size more than 1 micron

(C) Poor solubility

(B) Milky yellow colour

(D) Exhibit a viscoelastic gel phase, when internal phase is added in excess

44. The major property of Ayurvedic herbs, "Rasa" indicates

    (A) Taste   (C) Potency

    (B) Post digestive effect   (D) Physicochemical properties

45. d-tubocurarine produces skeletal muscle relaxation by inhibiting

    (A) Ganglionic nicotinic receptors (C) Nicotinic receptors in neuromuscular junction

    (B) Muscurinic receptors   (D) Alpha-adrenergic receptors

46. Shellac is a resinous substance produced from a secretion that encrusts the bodies of a scale insect

    (A) *Viverra civet*   (C) *Karria lacca*

    (B) *Acipensor huso*   (D) *Alverties moschferus*

47. A strong signal at 3400 cm–1 in an IR spectrum indicates the presence of

    (A) Alcohol   (C) Carbonyl

    (B) Ether   (D) Carboxyl

48. Chemical shifts (δ) are typically reported in units of

    (A) Gauss (G)   (C) Millitesla per meter (mT/m)

    (B) Parts per million (ppm)   (D) Percent (%)

(6)

49. The basic ring system in the antihypertensive and antiglaucoma drug Timolol is

    (A) 1,3, 5-Thiadiazole and Morpholine (C) 1,2, 5- Thiadiazole and Morpholine

    (B) 1,3- Thiazole and Morpholine   (D) 1,2, 4- Thiadiazole and Morpholine

50. Pungency of *Zingiber officinale* rhizome is due to the presence of

    (A) Gingerol   (C) Citral

    (B) Gingeral   (D) Commiphoric acid

x-x-x

Philosophy(M.Phil. & Ph.D) (PHI)

1. A null hypothesis is
   (A)   When there is no difference between the variables
   (B)   The same as research hypothesis
   (C)   Subjective in nature
   (D)   When there is difference between the variables

2. Manipulation is always a part of
   (A)   Historical research
   (B)   Fundamental research
   (C)   Descriptive research
   (D)   Experimental research

3. The combination of computing, telecommunications and media in a digital atmosphere is referred to as:
   (A)   Online communication
   (B)   Integrated media
   (C)   Digital combine
   (D)   Convergence

4. What do you consider as the main aim of inter disciplinary research?
   (A)   To bring out holistic approach to research
   (B)   To reduce the emphasis of single subject in research domain
   (C)   To over simplify the problem of research
   (D)   To create a new trend in research methodology

5. In web search, finding a large number of documents with very little relevant information is termed:
   (A)   Poor recall
   (B)   Web crawl
   (C)   Poor precision rate
   (D)   Poor web response

6. Which of the following statements is correct?
   (A)   Objectives of research are stated in first chapter of the thesis
   (B)   Researcher must possess analytical ability
   (C)   Variability is the source of problem
   (D)   All the above

7. The first step of research is:
   (A)   Selecting a problem
   (B)   Searching a problem
   (C)   Finding a problem
   (D)   Identifying a problem

8. The statement, 'To be non-violent is good' is a:
   (A)   Moral judgement
   (B)   Factual judgement
   (C)   Religious judgement
   (D)   Value judgement

9. Deductive reasoning proceeds from:
   (A) General to particular
   (B) Particular to general
   (C) One general conclusion to another general conclusion
   (D) One particular conclusion to another particular conclusion

10. Research Proposal is also called
    (A) Abstract
    (B) Summary
    (C) Synopsis
    (D) Methodology

11. Syllogistic reasoning is:
    (A) Deductive
    (B) Inductive
    (C) Experimental
    (D) Hypothetical

12. Second step in problem formulation is
    (A) Statement of the problem
    (B) Understanding the nature of the problem
    (C) Survey
    (D) Discussions

13. Objectives in problem formulation means
    (A) Questions to be answered
    (B) Methods
    (C) Techniques
    (D) Methodology

14. When a hypothesis is stated negatively it is called
    (A) Relational Hypothesis
    (B) Situational Hypothesis
    (C) Null Hypothesis
    (D) Casual Hypothesis

15. All the physical components of the computer are collectively called
    (A) Software
    (B) Hard ware
    (C) Firm Ware
    (D) Circuit

16. Office Editing and _____ are two types of Editing in Research
    (A) Lab editing
    (B) Field Editing
    (C) Class Roam Editing
    (D) Book Editing

17. Summarizing raw data and displaying them on compact statistical tables for analysis is
    (A) Tabulation
    (B) Coding
    (C) Transcription
    (D) Editing

18. The core elements of a dissertation are
    (A) Introduction; Data Collection; Data Analysis; Conclusion and Recommendations
    (B) Executive summary; Literature review; Data gathered; Conclusions; Bibliography
    (C) Research Plan; Research Data; Analysis; References
    (D) Introduction; Literature Review; Research Methodology; Results; Discussion and Conclusion

19. Digital Empowerment means :
    (A) Universal digit literacy
    (B) Universal access to all digital resources
    (C) Collaborative digital platform for participative governance
    (D) All of the above

20. Which of the following is not a / an image/ graphic file format?
    (A) PNG
    (B) GIF
    (C) BMP
    (D) GUI

21. The principles of fundamental research are used in
    (A) Action research
    (B) Applied research
    (C) Philosophical research
    (D) Historical research

22. The term 'Phenomenology' is associated with the process of
    (A) Qualitative Research
    (B) Analysis of Variance
    (C) Correlational Study
    (D) Probability Sampling

23. The term Anusandhan refers to :
    (A) Follower of an aim
    (B) Preying of an aim
    (C) Attain the aim
    (D) Become goal oriented

24. The need of Philosophical research method is desired in
    (A)   Philosophy related research
    (B)   All the researches involved in exploring the aims of social sciences
    (C)   Explorations of Atma and Paramatma
    (D)   Determining the role and extension of philosophy

25. In research thesis the importance of introduction is
    (A)   It imbibes the importance of problem in it
    (B)   It determines the direction of survey related to problem
    (C)   It explains the objectives of the problem
    (D)   All of the above

26. Kant has explained the moral theories in
    (A)   The Critique of Pure Reason
    (B)   The Critique of Practical Reason
    (C)   Religion within the limits of reason
    (D)   None of the above

27. Intuitionism is _____ intuitionalism
    (A)   Equivalent to
    (B)   Similar to
    (C)   Distinct from
    (D)   None of the above

28. Human Rights are required in a society where the following disparities are existent
    (A)   Caste
    (B)   Creed
    (C)   Culture
    (D)   All of the above

29. Which theory covers the interest of maximum number of people in the society
    (A)   Perfectionism
    (B)   Utilitarianism
    (C)   Eudemonia
    (D)   Rationalism

30. What does Universal Declaration of Human Rights includes
    (A)   Civil and Death Rights
    (B)   Economic Rights
    (C)   Civil Political and Economic Rights
    (D)   Commercial Rights

31. By right against exploitation we mean
    (A)   Non- abolition of trafficking in human beings
    (B)   Abolition of employment of children below the age of 14 years
    (C)   Stopping Sexual abuse
    (D)   Non Abolition

(4)

32. What is social disparity:
    (A)   Social Equality
    (B)   Social Inequality
    (C)   Social Harmony
    (D)   Social Disturbance

33. Select the right order of five Skandhas according to Buddhist ethic
    (A)   Roop, Saskār, Vijān, Samanya and Vednā
    (B)   Roop, Samjā, Vednā, Saskār and Vijān
    (C)   Roop, Vednā, Samjā, Saskār and Vijān
    (D)   Roop, Vijān, Samjā, Saskār and Vednā

34. The root meaning of Bhagvadgita's doctrine of Niskāma karma is
    (A)   Doing action considering oneself as an instrument of God
    (B)   Doing action without attachment
    (C)   Doing action for others
    (D)   Doing action for attaining liberation

35. The notion of Brahmavihara is found in
    (A)   Advaita Vedanta
    (B)   Dvaita Vedanta
    (C)   Both (A) and (B)
    (D)   Buddhism

36. For Gandhi, the political and economic organization of the State should be based on
    (A)   Growing mechanization and physical satisfactions
    (B)   The moral and intellectual development of the individual
    (C)   Full state control and direction
    (D)   By representation of workers

37. Point out from the following reason why Dr. B.R. Ambedkar opposes the caste system prevalent in India?
    (A)   As it creates discrimination, social injustice and inequality within the Indian Nation
    (B)   As it is foreign innovation
    (C)   As it is Vedic heritage
    (D)   As it is suggested by smritis

38. The theory of evolution accepted by Sri Aurobindo is known as
    (A)   Emergent Evolution
    (B)   Mechanical Evolution
    (C)   Integral Evolution
    (D)   None of the above

39. True knowledge according to J. Krishnamurthy is as follows:
    (A)   Accepted by Religious Text
    (B)   Prescribed by masters
    (C)   Unconditional awareness
    (D)   Conditional reactions

40. The method of phenomenological inquiry is
    (A)   Dialectical
    (B)   Intuitive
    (C)   Transcendental
    (D)   Technique of Bracketing

41. According to whom Hermeneutics is Ontology?
    (A)   Heidegger
    (B)   Schleiermacher
    (C)   Ranke
    (D)   Dilthey

42. Who believed that spiritual and appetites are two sections of soul?
    (A)   Plato
    (B)   Aristotle
    (C)   Parmenides
    (D)   Anaximander

43. Who acclaimed that man is the highest creature in the world?
    (A)   St. Anselm
    (B)   St. Augustine
    (C)   St. Thomas Aquinas
    (D)   All the above

44. Descartes explains body-mind relation through
    (A)   Psycho-Physical Parallelism
    (B)   Interactionism
    (C)   Pre-established harmony
    (D)   Epiphenomenalism

45. In Universal Negative Propositions, Which of the following term/terms is /are distributed
    (A)   Subject term
    (B)   Predicate term
    (C)   Neither (A) nor (B)
    (D)   Both (A) and (B)

46. Which of the theories given below holds the position that 'object of knowledge owes its existence as well as its properties to the creative activity of the knowing mind'?
    (A)   Absolute Idealism
    (B)   Phenomenalism
    (C)   Metaphysical Idealism
    (D)   Epistemological Idealism

47. Match List – I with List – II and select the correct answer from the codes given below:

List – I	List – II
a. Subjective Idealism	i. Kant
b. Commonsense Realism	ii. Thomas Reid
c. Absolute Idealism	iii. Hegel
d. Critical Idealism	iv. Berkeley

Codes:

	a	b	c	d
(A)	iv	iii	ii	i
(B)	i	ii	iii	iv
(C)	iv	ii	iii	i
(D)	iii	ii	iv	i

48. According to Shankar Brahman is away from which of the following three distinctions?
    (A)   Homogenous distinction, Heterogenous distinction, internal distinction
    (B)   Waking experience, Dreaming experience, Dreamless experience
    (C)   Experimental contradiction, Logical contradiction, illogical contradiction
    (D)   None of above

49. According to Aristotle the three kinds of soul are
    (A)   Ghost soul, animal soul, human soul
    (B)   God soul, ghost soul, human soul
    (C)   God soul, animal soul, plant soul
    (D)   Plant soul, animal soul, human soul

50. According to which of the following "theory of truth for a formal language could serve as a theory of meaning for natural language"?
    (A)   P.F. Strawson
    (B)   Ludwig Wittgenstein
    (C)   B. Russell
    (D)   Donald Davidson

x-x-x

(Physical Education)

1. Type of research in which the researcher has full control over the conditions
   (A) Action research   (B) Basic research
   (C) Survey research   (D) Descriptive research

2. Attempt to establish cause and effect relationship is
   (A) Historical research   (B) Experimental research
   (C) Philosophical research   (D) Survey research

3. Historical evidences are evaluated using
   (A) Observation   (B) Internal and external criticism
   (C) Experimentation   (D) All of the above

4. Criterion variable is also known as
   (A) Dependent variable   (B) Independent variable
   (C) Experimental variable   (D) None of the above

5. Skimming is related to
   (A) Planning experiment   (B) Writing research proposal
   (C) Library reading   (D) Writing research report

6. Likert scale is also known as
   (A) Interview protocol   (B) T-scale
   (C) Summated rating scale   (D) Z-scale

7. When each member of population has an equal chance to be selected, this is called
   (A) A sequential sampling   (B) A quota sampling
   (C) A purposive sampling   (D) A random sampling

8. Placebos and blind set up are the methods used in
   (A) Historical studies   (B) Experimental studies
   (C) Philosophical studies   (D) Survey studies

9. A possible short coming or influence that is beyond the control of investigator is
   (A) Limitation   (B) Delimitation
   (C) Independent variable   (D) None of the above

10. The other name of independent variable for an experimental research is
   (A) Treatment variable   (B) Experimental variable
   (C) Manipulated variable   (D) All of the above

11. The extent to which the results of a study can be attributed to the treatments used in the study is
   (A) External validity   (B) Internal validity
   (C) Null hypothesis   (D) None of the above

12. A _____ is a critical evaluation of recent research on a particular topic
   (A) Article   (B) Abstract

(C)   Review   (D)   None of the above

13.   _____ type of research is concerned with the status
       (A)   Analytical research   (B)   Experimental research
       (C)   Descriptive research   (D)   None of the above

14.   Having the same scientific paper published in more than one journal is called
       (A)   Copy right   (B)   Dual publication
       (C)   Fabrication   (D)   None of the above

15.   Verifying that you can correctly administer the tests and treatments for your study using appropriate participants is called
       (A)   Experimental work   (B)   Pilot work
       (C)   Control work   (D)   None of the above

16.   What do you understand by calibration of an equipment
       (A)   To purchase an equipment   (B)   To purchase an equipment from the
              from a reputed shop   manufactures
       (C)   To remove the error of   (D)   None of the above
              reading of instruments

17.   A threat to internal validity where in subject in the control group may try harder just because they are in control group
       (A)   Avis effect   (B)   Placebo
       (C)   Blind set up   (D)   None of the above

18.   Nine years old children are taller than 7 years old ones. It is an example of
       (A)   Vertical studies   (B)   Cross sectional studies
       (C)   Case studies   (D)   Experimental studies

19.   Electronic chronoscope measures
       (A)   Speed of movement   (B)   Height
       (C)   Reaction time   (D)   Strength

20.   Cumulative effect of two variables is studied in
       (A)   Single group design   (B)   Repeated measure design
       (C)   Reverse group design   (D)   Related group design

21.   Which of the following is not the nature of research?
       (A)   Logical   (B)   Systematic
       (C)   Reductive   (D)   Dynamic

22.   In the thesis writing which of the following is not in methodology?
       (A)   Hypothesis   (B)   Selection of subject
       (C)   Criterion measure   (D)   Statistical Technique

23.   Sampling is considered to be a key to
       (A)   Historical research   (B)   Philosophical research
       (C)   Library research   (D)   Experimental research

24. No difference hypothesis is also called as:
    (A) Logical hypothesis   (B) Research Hypothesis
    (C) Alternative hypothesis   (D) Null hypothesis

25. The ability of generalizing the results is called:
    (A) External validity   (B) Internal Validity
    (C) Logical Validity   (D) Invalidity

26. Due to lack of activity the weakening of the muscle is known as
    (A) Osteoporosis   (B) Muscular Hypertrophy
    (C) Muscular Atrophy   (D) Haematoma

27. When you perform straight knee sit-ups which muscles hinders the development of abdominal muscles?
    (A) Rectus Abdominis   (B) Gluteus Maximus
    (C) Ilio - Psoas   (D) Sartorius

28. What is the full form of NCTE?
    (A) National Control of Teacher Education
    (B) National Committee on Teacher Education
    (C) National Council of Teacher Education
    (D) National Conference of Teacher Education

29. Kinetics is the branch of mechanics that:
    (A) Study the forces acting on a body
    (B) Measures gravity and other accelerations
    (C) Describes the pattern of motion
    (D) Describes the anatomical basis of motion

30. Fartlek Training comes under which types of training:
    (A) Interval Training   (B) Repetition Training
    (C) Continuous Training   (D) Hill Training

31. Plyometric Training is used for improving:
    (A) Maximum Strength   (B) Explosive Strength
    (C) Strength Endurance   (D) None of the above

32. Which injury is the injury of muscle and tendon :
    (A) Contusion   (B) Sprain
    (C) Strain   (D) Fracture

33. Ambiverts are known as :
    (A) Introverts   (B) Extroverts
    (C) Both A and B   (D) None of the above

34. "You can bring a horse to river but you cannot make him drink the water" is related to.
    (A) Law of effect   (B) Law of use
    (C) Law of readiness   (D) None of the above

35. Sit and Reach is a standard test of measuring?
    (A) Agility   (B) Coordination
    (C) Strength   (D) None of the above

36. PNF is a method of improving:
    (A) Strength   (B) Flexibility
    (C) Endurance   (D) Coordination

37. Which injury needs the maximum time to heal :
    (A) Sprain   (B) Contusion
    (C) Fracture   (D) Tendinitis

38. In which training method you are not allowed to stop but you can change your intensity and surface.
    (A) Interval Training   (B) Repetition Training
    (C) Circuit Training   (D) Fartlek

39. If the muscle is contracting against the gravity what will happen to muscle:
    (A) The muscle will develop flexibility
    (B) The muscle will develop strength
    (C) The muscle will develop both flexibility and strength
    (D) None of the above

40. Behavioral theory of management (Hawthorn effect) was given by
    (A) Frederick Taylor   (B) Henri Fayol
    (C) Max Weber   (D) Helton Mayo

41. If you are targeting to reduce 4 kg of weight in four weeks how much calories per day you should cut through exercise and diet, if you are doing exercise seven days a week.
    (A) 500 Calories /day   (B) 750 Calories / day
    (C) 1000 Calories / day   (D) 1250 Calories / day

42. The process of redistributing or dispersing functions, powers, people or things away from a central location or authority is known as
    (A) Dispersion   (B) Centralization
    (C) Decentralization   (D) Distribution

43. There is no better tool than null hypothesis for testing
    (A) Significance of differences in means
    (B) Value of r
    (C) Reliability of the random sample
    (D) Stability of the measures of variability

44. What does result from plotting a distribution of scores on graph?
    (A) A hill-top image   (B) A camel-hump figure
    (C) The shape an inverted pear   (D) A bell-shaped curve

45. The degree to which a sample mean approximates its parameters depends on how
    (A) Intelligently the variables have been manipulated
    (B) Impartially has the sample been drawn
    (C) How meticulously has the experiment been planned
    (D) Deftly could the experimental techniques be used

46. Analysis of variance represents an extension of analysis variance to allow for the correlation between
   (A) Two groups scores   (B) Several groups scores
   (C) Initial and final scores   (D) Two different variables

47. The Null Hypothesis is also known by the name of
   (A) No-difference hypothesis
   (B) Alternative hypothesis
   (C) Research hypothesis
   (D) Statistical hypothesis

48. Law of end and middle for maintaining dynamic balance is applicable in:
   (A) Shotput   (B) Discus Throw
   (C) Long Jump   (D) Hammer Throw

49. Achilles tendon is found near which joint :
   (A) Ankle Joint   (B) Knee Joint
   (C) Hip Joint   (D) Shoulder Joint

50. In born, general tendency to be anxious, is an example of
   (A) Trait anxiety   (B) State anxiety
   (C) Conflict   (D) None of the above

x-x-x

Physics(Ph.D.) (PHY)

1. A granite block of 2m x 5 m x 3 m size is cut into 5 cm thick slabs of 2m x 5m size. These slabs are laid over a 2 m wide pavemet. What is the length of the pavement that can be covered with these slabs?
   (A)   100 m
   (B)   200m
   (C)   300m
   (D)   500m

2. Which is the least among the following

   (A) $0.33^{0.33}$

   (B) $0.44^{0.44}$

   (C) $\pi^{-1/\pi}$

   (D) $e^{-1/e}$

3. What is the next number in this "see and tell" sequence?
   1   11   21   1211   111221   _____
   (A)   312211
   (B)   1112221
   (C)   1112222
   (D)   1112131

4. A vertical pole of length a stand at the centre of a horizontal regular hexagonal ground of size a. A rope that is fixed taut in between a vertex on the ground and the tip of the pole has a length

   (A)   a

   (B) $\sqrt{2a}$

   (C) $\sqrt{3a}$

   (D) $\sqrt{6a}$

5. A peacock perched on the top of a 12 m high tree spots a snake moving towards its hole at the base of the tree from a distance equal to thrice the height of the tree. The peacock flies towards the snake in a straight line and they both move at the same speed. At what distance from the base of the tree will the peacock catch the snake?
   (A)   16m
   (B)   18m
   (C)   14 m
   (D)   12 m

6. The cities of a country are connected by intercity roads, If a city is directly connected to an odd number of other cities, it is called an odd city. If a city is directly connected to an even number of cities, it is called even city. Then which of the following is impossible
   (A)   There are even number of odd cities

(B)   There are odd number of odd cities
(C)   There are even number of even cities
(D)   There are odd number of even cities

7. A string of diameter 1 mm is kept on a table in the shape of a close flat spiral i.e. a spiral with no gap between the turns. The area of table occupied by spiral is $1m^2$. Then the length of string is
(A)   10 m
(B)   100m
(C)   1000m
(D) 10^6m

8. 25% of 25% of a quantity is x% of the quantity where x is
(A)   6.25%
(B)   12.5%
(C)   25%
(D)   50%

9. What is the minimum number of days between one Friday the 13th and next Friday the 13th? Assume that the year is a Leap year.
(A)   28
(B)   56
(C)   91
(D)   84

10. Cucumber contains 99% water. Ramesh buys 100 Kg of Cucumber. After 30 days of storing, the cucumbers loose some water. They now contain 98% water. What is the total weight of Cucumbers now?
(A)   9 Kg
(B)   50 Kg
(C)   75 Kg
(D)   98 Kg

11. In a museum there were old coins with their respective years on them,as follows.
(A)   1837 AD
(B)   1907 AD
(C)   1947 AD
(D)   22BC
 Identify the fake coin.

12. Consider the following equation

$$x^2 + 4y^2 + 9z^2 = 14x + 28y + 42z + 147$$

where x, y, z are real numbers. Then the value of $x + 2y + 3z$ is

(A)   7
(B)   14
(C)   21
(D)   Not unique

13. There is an equilateral triangle in the XY plane with its centre at the origin. The distance of its sides from the origin is 3.5 cm. The area of its circumcircle in cm^2 is
    (A)   38.5
    (B)   49
    (C)   63.65
    (D)   154

14. A sphere of iron of radius R/2 fixed to one end of a string was lowered into water in a cylindrical container of base radius R to keep exactly half the sphere dipped. The rise in level of water in the container will be

    (A)   R/3

    (B)   R/4

    (C)   R/8

    (D)   R/12

15. A solid cylinder of basal area A was held dipped in water in a cylindrical vessel of basal area 2A vertically such that a length h of the cylinder is immersed. The lower tip of the cylinder is at a height h from the base of the vessel. What will be the height of water in the vessel when the cylinder is taken out?
    (A)   2h
    (B)   3/2h
    (C)   4/3h
    (D)   5/4h

16. Of all the triangles that can be inscribed in a semicircle of radius R with a diameter as one side, the biggest one has the area
    (A)   R^2
    (B)   R$^2\sqrt{2}$
    (C)   R$^2\sqrt{3}\sqrt{}$
    (D)   2R^2

17. Choose the largest number
    (A)   2^{500}
    (B)   3^{400}
    (C)   4^{300}
    (D)   5^{200}

18. A daily sheet calendar of year 2021 contains sheets of 10x10 cm size. All the sheets of calendar are spread over the floor of a room of 5m x 7.3m size. What percentage of floor will be covered by these sheets
    (A)   0.1
    (B)   1
    (C)   10
    (D)   100

19. A square pyramid is to be made using a wire such that only one strand of wire is used for each edge. What is the minimum number of times that the wire has to be cut in order to make a pyramid
(A) 3
(B) 7
(C) 2
(D) 1

20. A crow is flying along a horizontal circle of radius R at a height R above the horizontal round. Each of a number of men on the ground found that the angular height of the crow was a fixed angle Θ ($< 45°$) when it was closest to him. Then all these men must be on a circle on ground with a radius
(A) $R + R \sin \Theta$
(B) $R + R \cos \Theta$
(C) $R + R \tan \Theta$
(D) $R + R \cot \Theta$

21. How many pairs of positive integers have gcd 20 and lcm 600? (gcd= greatest common divisor, lcm = least common multiple)
(A) 4
(B) 0
(C) 1
(D) 7

22. During an evening party, when Ms. Black, Ms. Brown and Ms. White met, Ms. Brown remarked, "It is interesting that our dresses are white, black or brown, but for each of us the name does not match the colour of the dress". Ms White replied. " But your white dress does not suit you". Pick the correct answer. Pick the correct answer
(A) Ms. White's dress was brown
(B) Ms. Black's dress was white
(C) Ms. White's dress was black
(D) Ms. Black's dress was black

23. Two integers are picked at random from the first 15 positive integers without replacement. What is the probability that sum of the first two numbers is 20.
(A) ¾
(B) 1/21
(C) 1/105
(D) 1/20

24. In a customer survey conducted during Monday to Friday, of the customers who asked for child care facilities in super markets, 23 % were men and rest, women. Among them, 19.9 % of the women and 8.8% of the men were willing to pay for the facilities.
1. What is the ratio of the men to women customers who wanted child care facilities?
2. If the survey had been conducted during the weekend instead, how will the result change
   With the above data
(A) Only 1 can be answered
(B) Only 2 can be answered
(C) Both 1 and 2 can be answered
(D) Neither 1 nor 2 can be answered

25. During summer vacation of a group of 20 friends each wrote a letter to each other. How many letters were written
   (A)   400
   (B)   380
   (C)   200
   (D)   20

26. The colours of four bands of a carbon resistance are Red, Red, Yellow and Gold then its value is

   (A)   330 Ω with tolerance level of $\pm5\%$

   (B)   220 kΩ with tolerance level of $\pm5\%$

   (C)   220 kΩ with tolerance level of $\pm1\%$

   (D)   330 kΩ with tolerance level of $\pm1\%$

27. For N_o gamma rays incident on an absorber (thickness t, absorption coefficient μ), the number of gamma rays absorbed, N, in the absorber is given by

   (A) $N_o \exp(-\mu t)$

   (B) $N_o \mu \exp(-t)$

   (C) $[1 - N_o \exp(-\mu t)]$

   (D) $N_o[1 - \exp(-\mu t)]$

28. The permissible values of orbital quantum number, l, for an electron in an orbital characterised by principal quantum number, $n=5$, are

   (A)   0, 1, 2 , 3, 4

   (B)   1, 2, 3, 4, 5

   (C)   0, 1, 2, 3, 4, 5

   (D)   -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5

29. Spin angular momentum of neutron is

(A) $\frac{1}{2}\hbar$

(B) $\frac{\sqrt{3}}{2}\hbar$

(C) $\frac{\sqrt{5}}{2}\hbar$

(D) $\frac{\sqrt{7}}{2}\hbar$

30. Possible values of L, S and the total angular momentum quantum number, J, under the LS coupling of two atomic electrons whose orbital quantum numbers are $l_1 = 1$ and $l_2 = 2$.

(A) $L = 1,2,3$; $S = 0,1$; $J = 1, 2, 3, 4$

(B) $L = 1,2,3$; $S = 1$; $J = 0, 1, 2, 3, 4$

(C) $L = 1,2,3$; $S = 0,1$; $J = 0, 1, 2, 3, 4$

(D) $L = 0,1,2,3$; $S = 0,1$; $J = 0, 1, 2, 3, 4$

31. In He-Ne laser, the laser transition takes place between

(A) Metastable state and the ground state of Ne

(B) Metastable state and the excited state of Ne

(C) Metastable state of He and the ground state of Ne

(D) Metastable state and the ground state of He

32. Light of wavelength 500 nm is made to pass from air to glass, its wavelength and frequency in the glass (refractive index = 1.5) will be

(A) 500 nm and 6 x 10^{14} Hz

(B) 500 nm and 4 x 10^{14} Hz

(C) 333 nm and 6 x 10^{14} Hz

(D) 333 nm and 4 x 10^{14} Hz

33. A match box exhibits

    (A)   orthorhombic geometry

    (B)   triclinic geometry

    (C)   cubic geometry

    (D)   tetragonal geometry

34. The Miller indices of a plane parallel to the x and y-axes can be

    (A)   (1 1 0)

    (B)   (0 0 1)

    (C)   (0 1 0)

    (D)   (1 1 1)

35. For a central force, the conserved quantity is

    (A)   angular momentum and its direction

    (B)   linear momentum and angular momentum

    (C)   angular velocity

    (D)   angular displacement

36. In case of body centred cubic, number of atoms per unit cell is

    (A)   4

    (B)   2

    (C)   6

    (D)   8

37. The kinetic energy of a body (rest mass m_o and relativistic mass m) moving with high speed v (comparable to the speed of light) is given by

    (A) mv^2

    (B) $\frac{1}{2}mv^2$

    (C) m_0c^2

    (D) $(m-m_0)c^2$

38. Above the curie temperature, the ferromagnetic material behaves

   (A)   like a diamagnetic one

   (B)   like a ferroelectric one

   (C)   like a paramagnetic one

   (D)   like a dielectric

39. Rest mass of photon is

   (A)   zero

   (B)   h

   (C) E/c^2

   (D)   c

40. The property of the superconductors that magnetic property does not penetrate into the body of superconductor is called

   (A)   Bose effect

   (B)   Curie effect

   (C)   Josephson effect

   (D)   Meissner effect

41. According to Debye's theory, at very low temperatures T >> Debye temperature, the specific heat

   (A)   varies as T^2

   (B)   becomes constant

   (C)   varies as $1/T^2$

   (D)   varies as T^3

42. Cooper pairs are formed due to

   (A)   attractive force between two electrons through strong interaction

   (B)   attractive force between two electrons through weak interaction

   (C)   attractive force between two electrons through interaction with lattice

(D)   attractive force between two electrons through nuclear interaction

43. In lab. system, two particles each of mass 2 kg are moving with velocities $3\hat{\imath} + 4\hat{\jmath}$ m/sec and $5\hat{\imath} + 6\hat{\jmath}$ m/sec. The velocity of the centre of mass is equal to

(A) $8\hat{\imath} + 10\hat{\jmath}$ m/sec

(B) $9\hat{\imath} + 9\hat{\jmath}$ m/sec

(C) $3\hat{\imath} + 4\hat{\jmath}$ m/sec

(D) $4\hat{\imath} + 5\hat{\jmath}$ m/sec

44. The process competing the gamma ray emission is

(A)   Electron capture

(B)   Internal conversion

(C)   External conversion

(D)   Auger emission

45. In case of face centred cubic, the coordination number for each corner atom is

(A)   6

(B)   16

(C)   12

(D)   8

46. The internal energy of the system remains constant in an

(A)   Isothermal process

(B)   Isochoric process

(C)   Adiabatic process

(D)   Isobaric process

47. For isobaric process, the entropy is function of

(A)   Pressure and temperature

(B)   Volume and temperature

(C) Volume only

(D) Volume and pressure

48. In Joule Thomson effect, the quantity remains constant

(A) Entropy

(B) Gibb's function

(C) Helmholtz function

(D) Enthalpy

49. For a perfect differential, u = f (P,V),

(A) $\left[\dfrac{\partial u}{\partial V}\right] = \left[\dfrac{\partial u}{\partial P}\right]$

(B) $\left[\dfrac{\partial^2 u}{\partial V^2}\right] = \dfrac{\partial}{\partial V}\left[\dfrac{\partial u}{\partial P}\right]$

(C) $\dfrac{\partial}{\partial P}\left[\dfrac{\partial u}{\partial V}\right] = \dfrac{\partial}{\partial V}\left[\dfrac{\partial u}{\partial P}\right]$

(D) $\dfrac{\partial}{\partial T}\left[\dfrac{\partial u}{\partial V}\right] = \dfrac{\partial}{\partial V}\left[\dfrac{\partial u}{\partial P}\right]$

50. The bandgaps in case of Ge, Si and GaAs semiconductors are

(A) Direct, indirect and direct, respectively

(B) Indirect, indirect and direct, respectively

(C) Indirect

(D) Indirect, direct and direct, respectively

Political Science(Ph.D.) (POL)

1. What is the name of the conceptual framework in which the research is carried out?
   - (A)   Research hypothesis
   - (B)   Synopsis of research
   - (C)   Research paradigm
   - (D)   Research design

2. Which of the following options are the main tasks of research in modern society?
   - (A)   To learn new things
   - (B)   To keep pace with the advancement in knowledge
   - (C)   To systematically examine and critically analyze the investigations/sources
   - (D)   All of the above

3. What is the main aim of interdisciplinary research?
   - (A)   To over simplify the problem of research
   - (B)   To bring out the holistic approach to research
   - (C)   To create a new trend in research methodology
   - (D)   To reduce the emphasis on a single subject in the research domain

4. Who can successfully conduct research?
   - (A)   Someone who is more studious
   - (B)   Possesses post-graduation degree
   - (C)   Has studied research methodology
   - (D)   Possesses thinking and reasoning ability

5. Authenticity of a research finding is its
   - (A)   Validity
   - (B)   Objectivity
   - (C)   Symmetry
   - (D)   All of the above

6. What does a good thesis involve?
   - (a)   Reducing punctuations as well as grammatical errors to minimalist
   - (b)   Correct reference citations
   - (c)   Consistency in the way of thesis writing
   - (d)   Well defined abstract

   Select the answers from the codes given below:
   - (A)   b), c) and d)
   - (B)   a), b), c) and d)
   - (C)   a), b) and c)
   - (D)   a), b) and d)

7. What are the core elements of a dissertation?
   - (A)   Introduction; Data Collection; Data Analysis; Conclusions and Recommendations
   - (B)   Executive Summary; Literature Review; Data Gathered; Conclusions; Bibliography
   - (C)   Research Plan; Research Data; Analysis; References

(D)   Introduction; Literature Review; Research Methodology; Results; Discussions and Conclusions

8. Which of the following is the most comprehensive source of population data?
    (A)   Census
    (B)   National Sample Surveys
    (C)   Demographic Health Surveys
    (D)   National Family Health Surveys

9. Action-research can be understood as?
    (A)   A longitudinal research
    (B)   An applied research
    (C)   A kind of research being carried out to solve a specific problem
    (D)   All of the above

10. Which of the following phrases does not correspond to the meaning of research as a process?
    (A)   Objective observation
    (B)   Trial and Error
    (C)   Problem solving
    (D)   Systematic Activity

11. Research is _____.
    (A)   Searching again and again
    (B)   Finding solution to any problem
    (C)   Working in a scientific way to search for truth of any problem
    (D)   None of the above

12. Sampling is advantageous as it _____.
    (A)   Saves time
    (B)   Helps in capital-saving
    (C)   Increase accuracy
    (D)   Both (A) and (B)

13. Uniting various qualitative and quantitative methods to collect data is called:
    (A)   Coalesce
    (B)   Triangulation
    (C)   Bipartite
    (D)   Impassive

14. Which of the following software is a paid software for checking the similarity index in a research paper?
    (A)   Viber
    (B)   Plag Track
    (C)   Urkund
    (D)   Copy leaks

15. Referred documents must be cited as
    (A)   End note
    (B)   Foot note
    (C)   Bibliography

(D)   All of these
16. After the data has been processed and analysed, the research process requires:
    (A)   Interpretation of data
    (B)   Presentation of data
    (C)   Reporting of data
    (D)   Testing of data

17. Which of the following options most appropriately explains 'Research Ethics'?
    (A)   It states how to write a research report flawlessly
    (B)   It gives the methodology of researching within social norms
    (C)   It governs the prevention of plagiarism
    (D)   It provides a common set of dos and don'ts of conducting an ethical research

18. Select the correct code which indicates the basic elements that leads the entire process of research.
    (A)   Objectives, data collection, survey, report writing
    (B)   Method and population observation
    (C)   Sample and hypothesis
    (D)   Hypothesis, sample and method

19. Which of the following must be mentioned by the researcher in the report:
    (A)   Problems in collecting the data
    (B)   Possible discrepancies in data collection
    (C)   Suggestions to subsequent investigators on the same topic in the same context
    (D)   All of the above

20. A Null Hypothesis is:
    (A)   The assumption that a significant result is unlikely
    (B)   The assumption there is no relationship or difference between tested variables
    (C)   The assumption that there is no difference between certain characteristics of a population
    (D)   The pattern between the variable you are testing

21. The objective of citation style manuals is:
    (A)   Attribution of other's intellectual work
    (B)   Attribution of own intellectual work
    (C)   Attribution of corporate intellectual outcomes
    (D)   All of these

22. Who is responsible for assessing ISBN in India?
    (A)   National Library, Kolkata
    (B)   Imperial Library, Kolkata
    (C)   Raja Ram Mohan Roy National Agency, Kolkata
    (D)   National Book Trust, New Delhi

23. Highlight the statistical tools that are available to a researcher in the research process:
    (A)   All the below
    (B)   Measure central tendency
    (C)   Measure of dispersion
    (D)   Measure of asymmetry

24. When accessing the internet, which of these steps is most important:
    (A) Recording the full URL
    (B) Noting the access date
    (C) Downloading material to be referenced
    (D) They are all equally important

25. Why do you need to review the existing literature
    (A) To avoid improper survey of the problem
    (B) To avoid the materialistic interpretation of history
    (C) To find out what is already known about your area of interest
    (D) A and B of the above

26. Who among the following strongly advocated that "Man is a Political Animal"?
    (A) Socrates of the Greece
    (B) Plato in his Republic
    (C) Aristotle, the founder of the Lyceum
    (D) Hannah Arendt (1906–1975)

27. Integration of Political Science with other Social Sciences is a basic principle of
    (A) Traditionalism
    (B) Behaviouralism
    (C) Liberalism
    (D) Post – Behaviouralism

28. What is meant by Social Justice?
    (A) All should have same Political Rights
    (B) All should have same Economic rights
    (C) All kinds of discrimination and privileges based on caste, colour, creed and sex should be eliminated
    (D) All should have the right to freedom of religion

29. Oath of office is conducted to the President of India by:
    (A) The Speaker of Lok Sabha
    (B) The Chief Justice of India
    (C) The Vice President of India
    (D) The Prime Minister of India

30. In Marxist theory, when members of the proletariat unwittingly misperceive their real position in society and systematically misunderstand their genuine interests within the social relations of production is called:
    (A) False consciousness
    (B) Left realism
    (C) Postmodern criminology
    (D) False realism

31. Which of the following statement is/are true about Jawaharlal Nehru?
    (A) He insisted on the secular and liberalist approach
    (B) He imparted modern values and thoughts
    (C) He encouraged India's industrialisation
    (D) All the above are correct

(4)

32. Mahatma Ghandhi's remarks, "A Post-dated cheque on a crumbling bank" was regarding the proposals of which of the following?
    (A)   Government of India Act 1935
    (B)   Wavel Plan
    (C)   Cripps Mission
    (D)   Simon Commission

33. Consider the following statements:
    1. A bill pending in the Legislature of a State shall not lapse by reason of the prorogation of the House or Houses thereof.
    2. A bill pending in the Legislative Council of a State which has not been passed by the Legislative Assembly shall not lapse on dissolution of the Assembly.
       Which of the statements given above is / are correct?
    (A)   Only 1
    (B)   Only 2
    (C)   Both 1 and 2
    (D)   Neither 1 nor 2

34. The process of Constitutional amendment in India is taken from_____.
    (A)   Republic of South Africa
    (B)   Japan
    (C)   United States of America
    (D)   Canada

35. Which of the following is matched correctly?
    (A)   Finance Commission   :   Article 256
    (B)   Money borrowed by the central government :   Article 262
    (C)   Power to delegate the work to the Federation of States: Article 278
    (D)   Grant by the Union to certain States   :   Article 275

36. Consider the following statements on the practice of federalism in India. Identify those which hold true for decentralisation after 1992.
    (i)   Local governments did not have any power or resources of their own
    (ii)   It became constitutionally mandatory to hold regular elections to local government bodies
    (iii)   The state governments are required to share some powers and revenue with local government bodies
    (iv)   Seats are selectively reserved in the elected bodies for scheduled castes, scheduled
            Tribes and other backward classes
    (A)   ii and iii
    (B)   i and iii
    (C)   i and iv
    (D)   ii and iv

37. Given below are two statements, one labelled as Assertion(A) and the other labelledas Reason(R). Select the correct answer from the codes given below.
    Assertion (A): Comparative Politics held that scientific study of government is possible.
    Reason (R) :   Comparative Politics objective is to develop a body of knowledge about government and politics that can be verified.

(A) Both A and R are true but R is not the correct explanation of A
(B) Both A and R are true and R is the correct explanation of A
(C) A is true, R is false
(D) A is false, R is true

38. Which of the following state is the member of "Seven Sisters"?
(A) West Bengal
(B) Bihar
(C) Orissa
(D) Tripura

39. Which of the following is not a feature of Election system in India?
(A) Universal Adult Franchise
(B) Communal Electorate
(C) Reservation of seats in the legislature for the members of SCs and STs
(D) Secret Voting

40. Which of the statements is correct with respect to retired judge of High Court?
(A) Cannot practice in Supreme Court of India
(B) Cannot practice in any High Court of India
(C) Cannot practice in the High Court from where the judge has retired
(D) Can practice in High Court with certain conditions laid down by Governor

41. What defines a good society, according to John Rawls
(A) A just Society
(B) A society that owns the most land
(C) A wealthy society
(D) A strong society

42. What are the conditions for a country to become a member of the UN?
(A) It must be a state, it must be peace loving
(B) It must accept the obligations laid down by the UN Charter
(C) It must be able to carry out these obligations
(D) All the above

43. The Members and Chairperson of NHRC are appointed on the recommendation of the committee that consists -

(A) The Prime Minister, Opposition's leader in the Lok Sabha, Lok Sabha Speaker, The Deputy Chairman of the Rajya Sabha
(B) The Prime Minister, The Home Minister, Opposition Leader in the Lok Sabha, Opposition leader in the Rajya Sabha, Lok Sabha Speaker, The Deputy Chairman of the Rajya Sabha
(C) The Prime Minister, The Home Minister, Opposition's leader in the Lok Sabha, Lok Sabha Speaker
(D) The President of India, Prime Minister, Chief Justice of Supreme Court

44. _____ is the multidisciplinary study of how assumptions and expectations about gender and biological sex influence cultural, social, and political ideas about women and men.
(A)   Social Studies
(B)   Women Studies
(C)   Gender Studies
(D)   LGBT Studies

45. Why was the Nuclear Non-Proliferation Treaty signed?
(A)   To prevent the spread of nuclear weapons
(B)   To disarm countries with nuclear weapons
(C)   To regulate the use of nuclear power for energy
(D)   To make nuclear technology accessible to all nations

46. Look West Policy of India advocated expansion of India's relations with?
(A)   West European countries
(B)   Countries in the west of United States
(C)   West Asian Countries
(D)   Countries of Africa and Latin America

47. Which article of Indian constitution directs to adopt foreign policy?
(A)   Article 50
(B)   Article 51
(C)   Article 52
(D)   Article 53

48. When the functions of the Legislature are entrusted to organs other than the legislature by the legislature itself, the legislation made up by such an organ is called
(A)   Delegated Legislation
(B)   Judicial Legislation
(C)   Procedural Legislation
(D)   Parliament Controlled legislation

49. Which five states are due for Assembly Elections early next year?
(A)   Uttar Pradesh, Bihar, Jharkhand, Chhattisgarhand, Arunachal Pradesh
(B)   Bihar, Gujrat, Uttar Pradesh, Meghalaya and Goa
(C)   Uttar Pradesh, Punjab, Uttarakhand, Goa and Manipur
(D)   Uttar Pradesh, Madhya Pradesh, Punjab and Goa

50. The provisions of environmental protection in the constitution were made under:
(A)   Article 5-A
(B)   Article 21-B (f)
(C)   Article 27-B (h)
(D)   Article 48-A and 51-A (g)

x-x-x

Police Administration(M.Phil.) (Police Adm.)

1. Under the British Rule in India, Governor General was responsible to:
   (A) Secretary of India
   (B) Secretary of Britain
   (C) Secretary of State
   (D) Directly to British Prime Minister

2. Which Constitutional Article provides personal immunity for President and Governors for official act?
   (A) Article 362
   (B) Article 363
   (C) Article 361
   (D) Article 368

3. The Preamble of the Constitution of India declares the legal sovereign as:
   (A) President of India
   (B) The People of India
   (C) Constitution of India
   (D) Prime Minister of India

4. Fundamental Duties were inserted in the Constitution by the:
   (A) 42nd Amendment
   (B) 44th Amendment
   (C) 47th Amendment
   (D) 49th Amendment

5. The temporary release of a convicted prisoner from jail for a fixed period is called:
   (A) Bail
   (B) Parole
   (C) Acquittal
   (D) Discharge

6. Supreme Court struck down which section of IT Act 2000 as unconstitutional:
   (A) 66
   (B) 66A
   (C) 66B
   (D) 66C

7. When a woman is changing her clothes in a trial, 'A' captures the images through hidden camera and uploads on internet. What offence is committed by 'A'?
   (A) Rape
   (B) Sexual assault
   (C) Voyeurism
   (D) Stalking

8. What is plea bargaining?
   (A) A procedure by which a defendant/accused pleads guilty in exchange for a lesser sentence
   (B) A conference between opposing lawyers to settle claim
   (C) A conference between opposing lawyers and judge to determine the time a case should be heard
   (D) None of the above

9. A document issued by court, calling upon the person to whom it is directed to attend before the judge:
   (A) Summons
   (B) Call
   (C) Bailiff
   (D) Bond

10. Theft is an offence relating to:
    (A) Movable property only
    (B) Immovable property only
    (C) Movable and Immovable property only
    (D) Cash and Ornaments only

11. In legal parlance the term '*mensrea*' means:
    (A) Main culprit
    (B) Monopolies and restrictive trade practices
    (C) Measure of culpability
    (D) Mental element in crime

12. Where are juvenile delinquents sent?
    (A) Borstal
    (B) Asylum
    (C) Reformative Centre
    (D) Protective custody

13. Section _____ of the Indian Penal Code defines murder:
    (A) 299
    (B) 300
    (C) 301
    (D) 302

14. Who is a Recidivist?
    (A) Saint
    (B) Habitual criminal
    (C) Rash person
    (D) Reserved person

(2)

15. Inquest proceedings are initiated under which of the following section of the CrPC:
    (A) Section 169
    (B) Section 170
    (C) Section 172
    (D) Section 174

16. The Criminal Procedure Code (CrPC) came into force on:
    (A) September 1, 1859
    (B) October 5, 1860
    (C) January 1, 1862
    (D) January 1, 1892

17. A case diary is to be maintained by a police officer investigating a case under which of the following section of CrPC:
    (A) Section 170
    (B) Section 172
    (C) Section 178
    (D) Section 179

18. Any police officer may arrest someone without an order from a Magistrate and without a warrant under which of the following section of CrPC:
    (A) Section 39
    (B) Section 40
    (C) Section 41(1)
    (D) Section 36

19. Who is the author of the Book 'Dia D for Don'?
    (A) Julio Ribeiro
    (B) Neeraj Kumar
    (C) Rohit Choudhary
    (D) Joginder Singh

20. Which of the following State/UT Police launched Mobile App 'Tatpar' for the delivery of services to its citizens?
    (A) Mumbai Police
    (B) Delhi Police
    (C) Gujrat Police
    (D) Punjab Police

21. Preservation of footprint on snow can be done by:
    (A) Plaster of Paris cast
    (B) Sulphur casting
    (C) Tracing
    (D) Wax casting

22. Semen sample having no sperms is called:
    (A) Oligospermic
    (B) Aspermic
    (C) Histospermic
    (D) Hematospermic

23. Blood Alcohol Concentration (BAC) is measured in:
    (A) Weight/volume percent
    (B) Volume/volume percent
    (C) Weight/weight percent
    (D) All of the above

24. Ram rod is a part of:
    (A) 12 boregun
    (B) 8 boregun
    (C) Muzzle loaders
    (D) AK-47

25. Who among the following belongs to 'Positive School of Criminology'?
    (A) Cesare Lombroso
    (B) Prof. Gillin
    (C) Cesare Beccaria
    (D) Edwin Sutherland

26. Which of the following is not a characteristic of a good hypothesis:
    (A) The good hypothesis is conceptually clear
    (B) The good hypothesis is testable
    (C) The good hypothesis is unrelated to the existing body of theory and facts
    (D) The good hypothesis is one which has logical unity and comprehensiveness

27. Empirical research is the one which:
    (A) Relies on the experiences or observation
    (B) Is data based research
    (C) Is verified by further observation or experiment
    (D) All the above

28. Which of the following is not correct for probability sampling?
    (A) Every unit of the population has an equal probability of being selected for the sample
    (B) It offers a high degree of representativeness
    (C) It is expensive, time consuming and relatively complicated method
    (D) Every unit of the population does not get the chance of being selected in the sample

29. ICSSR stands for:
    (A) Indian Committee of Social Scientists and Researchers
    (B) Indian Council of Social Science Research
    (C) International Council of Social Scientists for Research
    (D) International Conference of Social Scientists and Researchers

30. A proposition relating more than two variables is called:
   (A) Univariate proposition
   (B) Bivariate proposition
   (C) Multivariate proposition
   (D) None of the above

31. Measurement of variables can be performed at:
   (A) Nominal level
   (B) Ordinal level
   (C) Interval and Ratio level
   (D) All the above

32. Which among the following social scientist has defined research as "a systematic and objective attempt to study a problem for the purpose of deriving general principles":
   (A) D. Slesinger and M. Stephenson
   (B) L.V. Redman and A.V.H. Mory
   (C) Theodorson and Theodorson
   (D) Fred. N. Kerlinger

33. Defining the terms, concepts and variables used in the title of the research problem operationally means:
   (A) Define them in such a way that everyone understands them well
   (B) Defining them in standard ways as defined in the literature, dictionaries, and encyclopedias, etc
   (C) Defining them in the way as others have defined them
   (D) Defining them in the behavioural terms they are going to be measured in the study

34. The most common method of sampling in marketing researches and election polls is:
   (A) Random sampling
   (B) Stratified random sampling
   (C) Quota Sampling
   (D) Proportionate stratified sampling

35. Itemised rating scales are otherwise known as:
   (A) Numerical scales
   (B) Rank order scales
   (C) Graphic rating scales
   (D) Comparative scales

36. Research is based upon:
   (A) Scientific method
   (B) Experiments
   (C) Scientists
   (D) General principles

37. Reliability is the fundamental quality of a research which also reflects:
   (A) Validity
   (B) Verifiability
   (C) Purity of data
   (D) Superiority

38. The factual aims are most important in:
   (A) Behavioural researches
   (B) Theoretical researches
   (C) Philosophical researches
   (D) Historical researches

39. Research approaches are:
   (A) Longitudinal and cross-sectional
   (B) Oblique and horizontal
   (C) Long and short section
   (D) None of the above

40. The method of Randomization is:
   (A) Lottery or coin method
   (B) Blind folded on dice method
   (C) Tippit's Table of irregular
   (D) All the above

41. The advantage of Research report writing in a scientific manner is:
   (A) Global standardization
   (B) Global Communication
   (C) Global Awakening
   (D) Global Welfare

42. The title page of Research Thesis should be:
   (A) Brief and meaningful
   (B) Scientific and logical
   (C) Aesthetic and attractive
   (D) All the above

43. In order to ensure maximum acceptability of data analysis and its interpretation, the help should be taken from:
   (A) Statistics
   (B) Graphs and diagrams
   (C) Computer floppy
   (D) Appreciable typing

44. Reference serves the purpose:
   (A) The authenticity of the given content
   (B) Of insightful decision making by the researcher
   (C) Of giving ornamental value to the research
   (D) It exhibits the great achievements of the piece of research

45. The content edited in Encyclopedia is:
   (A) Primary source
   (B) Secondary source
   (C) Continuous source
   (D) Infinite source

46. Find the median of the following data 16, 18, 20, 28, 30, 32, 40:
   (A) 18
   (B) 30
   (C) 28
   (D) 20

47. The co-efficient value of co-relation lies between:
   (A) -1 to 1
   (B) 0 to 1
   (C) 0 to -1
   (D) 1 to 10

48. The power of statistical test can be increased by:
   (A) Decreasing the size of the sample
   (B) Avoiding the use of the null hypothesis
   (C) Designing for small error effects
   (D) Avoiding random sampling

49. Rank order co-efficient of correlation can be easily calculated when the data are in:
   (A) Inter scale
   (B) Ratio scale
   (C) Nominal scale
   (D) Ordinal scale

50. Unstructured interviews are:
   (A) Planned
   (B) Focused
   (C) Informal
   (D) Guided

x-x-x

Public Administration(Ph.D. & M.Phil.) (PUB-2101)

1. Who said "Gathering knowledge for knowledge's sake is termed 'pure' or 'basic' research."
   (A)   Good & Hatt
   (B)   P.V. Young
   (C)   Stephen L. Wasby
   (D)   P. Odum

2. Which of the following is NOT basic assumption of Social Research?
   (A)   Relationship of cause and effect
   (B)   Sequence in Social Events
   (C)   Possibility of Partiality
   (D)   Possibility of Ideal types

3. Which of the following Statements correctly describe the meaning and characteristics of research?
   (i)   Deductive and inductive methods get integrated in a research process.
   (ii)   Research is creativity and charisma.
   (iii)   Research is the use of scientific method to provide answers to meaningful questions.
   (iv)   The answers provided by research can be empirically verified.
   (A)   (i),(ii) and (iv)
   (B)   (ii),(iii) and (iv)
   (C)   (i),(ii) and (iii)
   (D)   (i),(iii) and (iv)

4. In-depth study of a unit specified for the purpose
   (A)   Ex-post facto method
   (B)   Case study method
   (C)   Philosophical method
   (D)   Descriptive survey method

5. A variable that is manipulated is known as:
   (A)   Dependent variable
   (B)   Control variable
   (C)   Independent variable
   (D)   Confounding variable

6. A research intends to explore the effect of possible factors for the organization of effective mid-day meal interventions. Which research method will be most appropriate for this study?
   (A)   Ex-post facto method
   (B)   Historical method
   (C)   Descriptive survey method
   (D)   Experimental method

7. Which of the following steps are required to design a questionnaire?
   (a) Writing primary and secondary aims of the study.
   (b) Review of the current literature.

(c) Prepare a draft of questionnaire.
(d) Revision of the draft.

Select the correct answer from the codes given below:
(A)   (a), (b), (c) and (d)
(B)   (a), (b) and (c)
(C)   (a), (c) and (d)
(D)   (b), (c) and (d)

8. The findings of which type of research cannot be generalized to other situations?
    (A)   Causal Comparative Research
    (B)   Experimental Research
    (C)   Historical Research
    (D)   Descriptive Research

9. The frequency distribution of a research data which is symmetrical in shape similar to a normal distribution but center peak is much higher, is
    (A)   Skewed
    (B)   Mesokurtic
    (C)   Platykurtic
    (D)   Leptokurtic

10. Which one of the following is a non probability sampling?
    (A)   Simple Random
    (B)   Purposive
    (C)   Systematic
    (D)   Stratified

11. The research stream of immediate application is
    (A)   Action research
    (B)   Conceptual research
    (C)   Fundamental research
    (D)   Empirical research

12. What is a Research Design?
    (A)   A way of conducting research that is not grounded in theory.
    (B)   The choice between using qualitative or quantitative methods.
    (C)   The style in which you present your research findings e.g. a graph.
    (D)   A framework for every stage of the collection and analysis of data.

13. A hypothesis which specifies the population distribution completely is known as
    (A)   Composite hypothesis
    (B)   Null hypothesis
    (C)   Simple hypothesis
    (D)   Alternate hypothesis

14. In sampling, the lottery method is used for
    (A)   Interpretation
    (B)   Theorisation
    (C)   Conceptualisation

(D)   Randomisation

15. Which is the main objective of research?
    (A)   To discover new facts or to make fresh interpretation of known facts
    (B)   To review the literature
    (C)   To summarize what is already known
    (D)   To get an academic degree

16. Sampling error decreases with the
    (A)   Decrease in sample size
    (B)   Increase in sample size
    (C)   Process of randomization
    (D)   Process of analysis

17. The Principles of fundamental research are used in
    (A)   Action research
    (B)   Applied research
    (C)   Philosophical research
    (D)   Historical research

18. There are two sets given below. Set – I specifies the name of thinkers, while Set –II definition given by thinkers. Match the two and given your answer by selecting the appropriate code.

Set – I (Name of Thinkers)	Set – II (Definition of Research by Thinkers)
(a) Walteonr E. Spohr and Rineheart J. Swens	(i) Systematic effort to gain new knowledge
(b) George A. Lundhberg	(ii) Any scholarly investigation is search for truth, for facts, for certainties.
(c) L.V. Redman and A.V.H. Mory	(iii) Sufficiently objective and systematic to make possible classification, generalization and verification of the data observed.
(d) Best and Kahn	(iv) Systematic and objective analysis and recording of controlled observations that may lead to the development of generalization, principles or theories, resulting in prediction and possibly ultimate control of events
	(v) Systematic quest for knowledge that is characterized by disciplined enquiry. Efficient and effective approach to expand knowledge is the conduct of special, planned and structured investigations."

Codes:

	(a)	(b)	(c)	(d)
(A)	(i)	(ii)	(iii)	(iv)
(B)	(i)	(ii)	(iii)	(v)
(C)	(ii)	(iii)	(i)	(iv)
(D)	(ii)	(iii)	(i)	(v)

19. In qualitative research paradigm, which of the following features may be considered critical?
   (A)   Data collection with bottom-up empirical evidences.
   (B)   Data collection with standardized research tools.
   (C)   Sampling design with probability sample techniques.
   (D)   Data gathering to take with top-down systematic evidences.

20. What is the correct sequencing of Steps in Scientific method in research?
   i.   Identification of the problem
   ii.   Formation of hypothesis
   iii.   Collection of data
   iv.   Classification of data
   v.   Generalization of facts & Testing of hypothesis

   Codes:
   (A)   iv, ii, ii, i, v
   (B)   ii, iii, iv, v, i
   (C)   iii, iv, v, i, ii
   (D)   i, ii, iii, iv, v

21. **Assertion (A):** Random sampling is considered one of the most popular and simple data
                    collection methods in research fields
   Reason (R): Random sampling allows for unbiased data collection and unbiased
                    conclusions.
   (A)   Both (A) and (R) are correct (R) is the correct explanation of (A)
   (B)   Both (A) and (R) are correct (R) is not the correct explanation of (A)
   (C)   (A) is true, but (R) is false
   (D)   (A) is false, but (R) is true

22. Which of the following NOT correct paired?
   (A)   Null Hypothesis- An assumption that no difference exists between two variables
   (B)   Validity- A measure of accuracy of results and their generalization to other situations
   (C)   Experimental Group- Group not exposed to any treatment
   (D)   Sample- A formulated subset of population to represent in miniature the whole population to be researched

23. Which of the following is direct source of Primary Data collection?
   (A)   Interviews
   (B)   Questionnaire
   (C)   Panel Techniques
   (D)   Radio Appeals

24. Which of the following is source of secondary data collection?
   (A)   Published documents
   (B)   Unpublished documents
   (C)   Life –histories
   (D)   All the above

25. A rudimentary or preliminary work to study the viability of the research problem for its successful completion and useful results is:
   (A)   Exploratory Research
   (B)   Diagnostic Research
   (C)   Descriptive Research
   (D)   Comparative Research

26. Which of the following concept is NOT associated with Herbert A. Simon?
   (A)   Administrative Man
   (B)   Mean-End Chain
   (C)   Zone of Indifference
   (D)   Satisfying Decisions

27. Which of the following pair is NOT correctly matched?
   (A)   Contribution –Satisfaction Equilibrium-   Chester Bernard
   (B)   Differential Piece Rate System-   F.W.Taylor
   (C)   Esprit de Corps-   Luther Gulick
   (D)   Gangplank   Henri Fayol

28. Match **List-I** with **List-II** and select the correct answer from the code given below:

List-I	**List-II**
a) Reinventing Government	i) Janet V. Denhardt and Robert B. Denhardt
b) Design for Policy Science	ii) David Osborne & Ted Garbler
c) The New Public Services	iii) Yehezkel Dror
d) Models of Man	iv) Andre Arato
	v) Herbert A. Simon

   CODE

	a)	b)	c)	d)
(A)	ii	i	iii	v
(B)	ii	i	iii	iv
(C)	iv	iii	i	v
(D)	ii	iii	i	v

29. **Assertion (A):** Administrative man takes Satisficing decisions.
   Reason (R): The bounded rationality of administrative man leads to Satisficing decisions.
   Codes:
   (A)   Both (A) and (R) are correct and (R) is the correct explanation of (A).
   (B)   Both (A) and (R) are correct, but (R) is not the correct explanation of (A).
   (C)   (A) is true, but (R) is false.
   (D)   (A) is false, but (R) is true.

30. Which of the following is not part of Kautily's Saptang (Seven principals) Theory of state?
   (A)   King
   (B)   Treasury
   (C)   Fort
   (D)   Enemy

31. Which of the following is not the assumption of theory X?
    (A)   Most people must be corrected and controlled.
    (B)   The average human being prefers to be directed.
    (C)   Most of the people do not dislike work inherently.
    (D)   People have relatively little ambitions and wants.

32. Which of the following are the foci areas of research in Comparative Public Administration as identified by Ferrel Heady?
    (i) Component approach
    (ii) Modified traditional approach
    (iii) Development system model
    (iv) General system model
    (v) Middle range theory

    Select the correct answer by using codes given below:
    Codes:
    (A)   (i), (ii), (iii), (iv)
    (B)   (ii), (iii), (iv), (v)
    (C)   (i), (iii), (iv), (v)
    (D)   (i), (ii), (iii), (v)

33. Which of the following features of Development Administration are shared by New Public Administration?
    (i) Effective coordination
    (ii) Change orientation
    (iii) Temporal dimension
    (iv) Goal orientation
    (v) Ecological perspective
    Codes:
    (A)   (ii) and (iv)
    (B)   (i) and (ii)
    (C)   (iii) and (v)
    (D)   (iv) and (v)

34. Under which Article of the Indian Constitution, the procedure for impeachment of the President of India is explained?
    (A)   Article 53
    (B)   Article 72
    (C)   Article 59
    (D)   Article 61

35. Who compared the District Collector (Deputy Commissioner) to tortoise on whose back stood the elephant of the Government of India?
    (A)   Mohan Mukharjee
    (B)   Ramsay MacDonald
    (C)   E.N. Mangat Rai
    (D)   Warren Hastings

36. Consider the following statements regarding All India Services established as per the provision of Article 312.
    (i) All India Services are created consequent upon a resolution of Council of States declaring that it is necessary and expedient in the national interest to create an All India
        Service.
    (ii) The Parliament may provide for the creation of new All India Service by making a law
        as per the resolution of the council of states.
    (iii) Executive branch of government can create All India Service by approval of cabinet.
    (iv) All the services proposed to be established under the All India Service (Amendment)
        Act, 1963 have been established.
    Select the correct answer from the codes given below:
    Codes:
    (A)   (i), (ii)
    (B)   (i), (ii), (iii)
    (C)   (i), (ii), (iv)
    (D)   (i), (ii), (iii), (iv)

37. Which of the following statements about Budget are correct?
    (i) Budget is a tool of socio-economic development of the country.
    (ii) Budget is a political document which provides a glimpse of entire philosophy of
        Government.
    (iii) Budget is formulated by legislature.
    (iv) Budget is nut-bolt of public policy.

    Select the correct answer from the codes given below:
    Codes:
    (A)   (i), (ii)
    (B)   (i), (ii), (iii)
    (C)   (i), (iii), (iv)
    (D)   (i), (ii), (iv)

38. **Assertion (A):** Public Policy is whatever Governments choose to do or not to do.
    Reason (R): Policy making is clearly related to decision making.
    Codes:
    (A)   Both (A) and (R) are correct and (R) is the correct explanation of (A).
    (B)   Both (A) and (R) are correct, but (R) is not the correct explanation of (A).
    (C)   (A) is true, but (R) is false.
    (D)   (A) is false, but (R) is true.

39. Who is Vice Chairperson of NITI Aayog
    (A)   V.K. Saraswat
    (B)   Dr. Rajiv Kumar
    (C)   Prof. Ramesh Chand
    (D)   Narender Singh

40. Networked Government' is the idea of
    (A)   2nd Minnowbrook Conference 1988

(B)   Honey Report 1967
(C)   1st Minnowbrook Conference 1968
(D)   3rd Minnowbrook Conference 2008

41. **Assertion (A):** The fundamental ethos of the employee-employer relationship is utilitarian and contractual.
    Reason (R):   Both employees and employers are tied into mutual exchange relations.
    Codes:
    (A)   Both (A) and (R) are correct and (R) is correct explanation of (A).
    (B)   Both (A) and (R) are correct, but (R) is not correct explanation of (A).
    (C)   (A) is true, but (R) is false.
    (D)   (A) is false, but (R) is true.

42. Which of the following NOT correct about Lokpal in India?
    (A)   Justice Pinaki Chandra Ghose is Chairperson of Lokpal.
    (B)   Institute established under Lokpal and Lokayuktas Act 2013.
    (C)   First time 2nd Administrative Reform commission recommended for Lokpal.
    (D)   Lokpal as institution formed on 19th March 2019.

43. Under which article of the Indian Constitution an appropriate legislature may by law regulate the recruitment and conditions of service of Union or State Public Services?
    (A)   Article 308
    (B)   Article 309
    (C)   Article 310
    (D)   Article 311

44. Who is Chairman of 15th Finance Commission of India?
    (A)   Shri N.K. Singh
    (B)   Ajay Narayan Jha
    (C)   Prof. Anoop Singh
    (D)   Shri Ashok Lahiri

45. How many functional items placed within the purview of Panchayats in Eleventh Schedule on Indian Constitution?
    (A)   18
    (B)   26
    (C)   29
    (D)   22

46. Which of the following Committee recommended the official participation of political parties at all levels of Panchayat elections?
    (A)   G.V.K. Rao Committee
    (B)   Ashok Mehta Committee
    (C)   Balwantray Mehta Committee
    (D)   L. M. Singhvi Committee

47. The Unspent money by the end of the financial year expires and returned to the treasury. This practice is known as:
    (A)   Vote of Credit
    (B)   Excess Grant
    (C)   Token Cut

(D)   Rule of Lapse

48. **Assertion (A):** Mahatma Gandhi National Rural Employment Guarantee Scheme proved its potential in COVID-19 pandemic in rural India.
    Reason (R): Mahatma Gandhi National Rural Employment Guarantee Scheme provided employment in COVID-19 pandemic situation to the rural people.
    Codes:
    (A)   Both (A) and (R) are correct and (R) is correct explanation of (A).
    (B)   Both (A) and (R) are correct, but (R) is not correct explanation of (A).
    (C)   (A) is true, but (R) is false.
    (D)   (A) is false, but (R) is true.

49. What if full name of AMRUT
    (A)   Atal Mission for Rejuvenation and Urban Transformation
    (B)   Atal Mission for Rejuvenation and Urban Trust
    (C)   Achievement Mission for Rode and Urban Transport
    (D)   Atal Mission for Reorganization and Urban Transformation

50. Indian Institute of Public Administration established in New Delhi in 1954 on recommendation of :
    (A)   Pt. Jawahar Lal
    (B)   Sardar Patel
    (C)   Hukam Singh
    (D)   Paul. H. Appleby

x-x-x

(Sikh Studies)

1. The research that aims at immediate application is:
    (A)   Action Research
    (B)   Empirical Research
    (C)   Conceptual Research
    (D)   Fundamental Research

2. When two or more successive footnotes refer to the same work which one of the following expressions is used?
    (A)   ibid
    (B)   et.al
    (C)   op.cit
    (D)   loc.cit

3. Some steps of research are given below
    a. Identification of research problem
    b.   Listing of research objectives
    c. Action
    d.   Collection of Data
    e. Methodology

    Identify a correct sequence from beginning to end.
    (A)   a, c, b, e, d
    (B)   a, b, e, d, c
    (C)   a, e, d, b, c
    (D)   a, b, c, d, e

4. A working hypothesis is:
    (A)   A proven hypothesis for an argument
    (B)   Not required to be tested
    (C)   A provisionally accepted hypothesis for further research
    (D)   A scientific theory

5. Research ethics are
    (A)   Social obligation
    (B)   Morals
    (C)   Values
    (D)   Set of principles of professional behaviour

6. A research paper
    (A)   Is a complication of information on a topic
    (B)   Contains original research as deemed by the author
    (C)   Contains peer-reviewed original research or evaluation of research conducted by others
    (D)   Can be published in more than one journal

7.   Which is the main objective of research?
    (A)   To review the literature
    (B)   To summarize what is already known
    (C)   To get an academic degree

(D)   To discover new facts or to make fresh interpretation of known facts

8. A thesis statement is:
   (A)   An observation
   (B)   A fact based idea
   (C)   An assertion
   (D)   A discussion

9. What is a Research Design?
   (A)   A way of conducting research that is not grounded in theory
   (B)   The choice between using qualitative or quantitative methods
   (C)   The style in which you present you research findings e.g. a graph
   (D)   A frame work for every stage of the collection and analysis of data

10. Aim of sampling in research is
    (A)   To make research easy
    (B)   To find suitable data
    (C)   To find big data
    (D)   To find representative data

11. Epistemology mainly deals with
    (A)   Cognitive issues
    (B)   Social issues
    (C)   Religious issues
    (D)   Spiritual issues

12. The main feature of research is_____.
    (A)   Subject matter
    (B)   View point
    (C)   Approach
    (D)   Scientific Methodology

13. Postmodernism in research is known as
    (A)   Process of social change
    (B)   Theory
    (C)   Concept
    (D)   Thesis

14. A Latin abbreviation e.g. means
    (A)   Exempli grati
    (B)   Exempli gratiam
    (C)   Exempli gratia
    (D)   Exempli gratium

15. Religious experience in research is called
    (A)   Empirical data
    (B)   Experimental data
    (C)   Meta data
    (D)   Secondary data

16. The common Latin abbreviation et.al. in references stands for
    (A)   Single author
    (B)   Editor of a book
    (C)   Co-author of a book
    (D)   Multiple authors

17. In the literature related with research, abbreviation of MLA stands for
    (A)   Member of Legislative Assemble
    (B)   Member of Legal Affairs
    (C)   Modern Languages Association
    (D)   Modern Legal Association

18. In-text citation is composed of three elements: name of author, page number and
    (A)   Year of Publication
    (B)   Place of Publication
    (C)   Edition of Publication
    (D)   Title of publication

19. Names of scriptures typed in a thesis are usually
    (A)   Italicised
    (B)   Enclosed in quotation marks
    (C)   Underlined
    (D)   Capitalised

20. Title of a research paper from journal or a book is cited in a thesis is
    (A)   Capital letters
    (B)   Italicised
    (C)   Enclosed in quotation marks
    (D)   Bold

21. The full form of URL is_____.
    (A)   United Research Location
    (B)   Uniform Resource Locator
    (C)   University Research Logistics
    (D)   Universal Resource Location

22. A peer reviewed publication is referred to a publication
    (A)   Published in reputed journal
    (B)   Published in a special issue
    (C)   Examined by the subject Experts
    (D)   Recommend by a good scholar of the subject

23. Formulation of a research problem depends upon:
    (A)   What is the objective behind the researcher's choice?
    (B)   What are the research questions?
    (C)   What is the concept model?
    (D)   What are negative factors in mind of scholar?

(3)

24. In a thesis, translator is treated as an author, such reference is
    (A)   Correct
    (B)   Incorrect
    (C)   Partially correct
    (D)   Partially incorrect

25. Plagiarism in research is
    (A)   Original views of a scholar
    (B)   Ideas of others used with acknowledgment
    (C)   Ideas of others are incorporated without referring the original authors
    (D)   Citation of other scholars

26. Animism is a belief in :
    (A)   Belief in a God
    (B)   Belief in Spirit
    (C)   Belief in Magic
    (D)   Belief in humanism

27. In a given table match the List-I to List-II.

List I		List II	
Name of Author		Title of book	
a.	Robert N. Bellah	i.	The Protestant Ethics And The Spirit of Capitalism
b.	Max Weber	ii.	The Clash of Civilization
c.	Samuel Huntington	iii.	Towards a Theology of World Religions
d.	W. Cantwell Smith	iv.	Beyond Belief

    Find out the correct codes from the followings.
    (A)   a-iv, b-i, c-ii, d-iii
    (B)   a-ii, b-ii, c-iii, d-iv
    (C)   a-iii, b-ii, c-iv, d-i
    (D)   a-iv, b-ii, c-i, d-iii

28. Pluralistic Society is :
    (A)   In which people of different faiths live in peaceful manner
    (B)   In which people worship God
    (C)   In which people are atheists
    (D)   In which people believe in the worship of nature

29. The God 'Apollo' belongs to which one of the following tradition.
    (A)   Indus mythology
    (B)   Greek mythology
    (C)   Chinese mythology
    (D)   Egyptian mythology

30. The essential element for religious harmony is
    (A)   Faith in sacred texts
    (B)   Understanding and respecting other religious
    (C)   Faith in a God
    (D)   Studying other religious

31. "*vedokhilo dharma mulam*" is quoted from :
    (A)   Manu Smriti
    (B)   Ramayana
    (C)   Hitopdesh
    (D)   Shakuntalam

32. The traditional base of Hindu social life is:
    (A)   Mahavrata
    (B)   Sangat-Pangat
    (C)   Aryasatya
    (D)   Purusarth-Chatustaya

33. The main cause of the origin of 'Reform Movements' in Hinduism was
    (A)   Society suppressed by traditional rituals and casteism
    (B)   The rulers of that period promoted the movements
    (C)   New machines were brought from foreign countries
    (D)   The farmers wanted to start business

34. Who was the first Tirthankar in Jain tradition?
    (A)   Rsabhadeva
    (B)   Bhawan Mahavira
    (C)   Sidharath
    (D)   Suparshva

35. The term 'Anekãntavãda' is related to
    (A)   Vedic tradition
    (B)   Buddhism
    (C)   Yoga Philosophy
    (D)   Jainism

36. Three tattvas in Jainism are
    (A)   Right faith, right conduct and right posture
    (B)   Right thought, right faith and right mind
    (C)   Right faith, right knowledge and right conduct
    (D)   Right view, right speech and right conduct

37. The religious symbol of Judaism is
    (A)   Synagogue
    (B)   Church
    (C)   Magen
    (D)   Chuppah

(5)

38. Most important religious festival in Judaism is
    (A)   Good Friday
    (B)   Easter Sunday
    (C)   Passover
    (D)   New Year

39. The head of Catholic Church is_____.
    (A)   Bishop
    (B)   Priest
    (C)   Cardinal
    (D)   Pope

40. When did Saint Thomas arrive in India
    (A)   72 AD
    (B)   52 AD
    (C)   92 AD
    (D)   32 AD

41. As per Islamic faith, during the day of _____the doors of heaven open and door of hell is closed.
    (A)   The day of Judgement
    (B)   Ramazan
    (C)   Prayer
    (D)   Reciting Koran

42. *Rak'a* is a
    (A)   Form of Yoga
    (B)   A posture of Muslim prayer
    (C)   A form of Buddhi meditation
    (D)   A form of samadhi in Jain tradition

43. As per Muslim calendar Ramazan is observed in
    (A)   Fifth month
    (B)   Seventh month
    (C)   Nineth month
    (D)   Eleventh Month

44. Who is theauthor of the book "Sachi Sakhi"
    (A)   Bhai Meharban
    (B)   Bhai Balaji
    (C)   Bhai Veer Singh
    (D)   S. Kapur Singh

45. The 400th birth anniversary of Ninth Guru Tegh Bahadur Ji was celebrated in the year of
    (A)   2017
    (B)   2018
    (C)   2019
    (D)   2021

46. Find out the correct combination
    (A)   Christianity – Hebrew Bible
    (B)   Hinduism- Agmas
    (C)   Jews- Torah
    (D)   Sikhism- Vedas

47. Identify the a scripture which was prepared and compiled by the founder of same tradition.
    (A)   Old Testament
    (B)   New Testament
    (C)   Sri Guru Granth Sahib
    (D)   Dhammapada

48. The number of Salokas in Japubani are
    (A)   Two
    (B)   Three
    (C)   Four
    (D)   Thirty seven

49. The first *Rāg* of Sri Guru Granth Sahib is
    (A)   Mājh
    (B)   Gujrī
    (C)   Sirī Rāg
    (D)   None of these

50. Institution of Langar was started by
    (A)   Guru Nanak Dev Ji
    (B)   Guru Angad Dev Ji
    (C)   Guru Amar Das Ji
    (D)   Guru Gobind Singh Ji

x-x-x

1. Which scale is the simplest form of measurement?
   (A) Ordinal
   (B) Interval
   (C) Ratio
   (D) Nominal

2. The scale consisting of absolute zero is
   (A) Interval
   (B) Ordinal
   (C) Ratio
   (D) Nominal

3. Match the following lists:

List 1	List 2
Measurement Scale	**Properties**
a. Nominal b. Ordinal c. Interval d. Ratio	1. Classification, order and equal units 2. Classification, order, equal units and absolute zero 3. Classification only 4. Classification and order

   (A) a-1, b-2, c-3, d-4
   (B) a-3, b-4, c-1, d-2
   (C) a-2, b-3, c-1, d-4
   (D) a-1, b-3, c-4, d-2

4. A random sample of 500 households in a city was selected and several variables are recorded for each household. Which of the following is NOT CORRECT?
   (A) Household total income is a ratio scaled variable.
   (B) Socioeconomic status was coded as 1=low income, 2=middle income, 3=high income and is an interval scaled variable.
   (C) The primary language used at home is a nominal scaled variable.
   (D) The number of persons in the household is a discrete variable.

5. As part of a study to investigate the effects of stubble burning, the following variables were measured at several sites around Patiala:
   pH of soil (to one decimal place, e.g., 6.5);

   Crop grown (0=wheat, 1=barley, 2=rice, 3=other);

   Amount of stubble (0=light, 1=medium, 2=heavy);

   Date of final harvesting (e.g. 10 Oct, 2020).

   The scales of these variables are:

   (A) interval, ordinal, ratio, ratio
   (B) interval, nominal, nominal, interval

(C)   interval, nominal, ordinal, interval

(D)   interval, nominal, ordinal, ratio

6. Which of these is not a method of data collection?

(A)   Questionnaires

(B)   Interviews

(C)   Experiments

(D)   Observations

7. Which of the following terms best describes data that were originally collected at an earlier time by a different person for a different purpose?

(A)   Primary Data

(B)   Secondary Data

(C)   Experimental Data

(D)   Field Notes

8. The average monthly production of a factory for the first 8 months is 2,500 units, and for the next 4 months, the production was 1,200 units. The average monthly production of the year will be approximately

(A)   2066 units

(B)   5031 units

(C)   4021 units

(D)   3012 units

9. Given n values in a series, the geometric mean is

(A)   Third root of the product of n values

(B)   Square root of the product of n values

(C)   Fourth root of the product of n values

(D) N^{th} root of the product of n values

10. Approximately what percentage of scores fall within one standard deviation of the mean in a normal distribution?

(A)   34%

(B)   95%

(C)   99%

(D)   68%

11. Which of the following plots is most useful for detection of outliers?

(A)   Histogram

(B)   Box and whisker plot

(C)   Stem and leaf plot

(D)   Scatter plot

12. Consider the pair of observations on X and Y as (-1,-2), (0,-1),(1,0) and (2,1).If r denotes the correlation coefficient between X and Y and s denotes the correlation coefficient between X^2 and Y^2 ,then

(A)   r > 0 and s > 0

(B)   r > 0 and s < 0

(C)   r < 0 and s < 0

(D)   r < 0 and s > 0

13. A hypothesis which specifies the population distribution is called
    (A) Null Hypothesis
    (B) Statistical Hypothesis
    (C) Simple Hypothesis
    (D) Composite Hypothesis

14. The probability of rejection of Null Hypothesis when it is true is
    (A) Level of Confidence
    (B) Level of Significance
    (C) Level of Margin
    (D) Level of Rejection

15. The point where the Null Hypothesis gets rejected is known as
    (A) Significant Value
    (B) Rejection Value
    (C) Acceptance Value
    (D) Critical Value

16. Which of the following p-values will lead us to reject the null hypothesis if the significance level of the test is 5 %?
    (A) 0.15
    (B) 0.10
    (C) 0.06
    (D) 0.025

17. Suppose that we reject a null hypothesis at the 5 % level of significance. For which of the following levels of significance, will the null hypothesis be always rejected ?
    (A) 6 %
    (B) 2.5 %

    (C) 4 %
    (D) 3 %

18. The p-value in hypothesis testing represents which of the following:
    (A) The probability of failing to reject the null hypothesis, given the observed results
    (B) The probability that the null hypothesis is true, given the observed results
    (C) The probability that the observed results are statistically significant, given that the
         null hypothesis is true
    (D) The probability of observing results as extreme or more extreme than currently observed, given that the null hypothesis is true

19. All of the following increase the width of a confidence interval except
    (A) Increased confidence level
    (B) Increased variability
    (C) Increased sample size
    (D) Decreased sample size

20. Research is
    (A) Searching again and again
    (B) Working in a scientific way to search for truth of any problem
    (C) Finding solution to any problem
    (D) None of the above

21. Which of the following is the first step in starting the research process ?
    (A)   Searching sources of information to locate problem
    (B)   Survey of related literature
    (C)   Identification of a problem
    (D)   Searching for solutions to the problem

22. Likert scale is also known as
    (A)   Interview protocol
    (B)   Event Sampling
    (C)   Summated Rating Scale
    (D)   Ranking

23. A census taker generally collects data through
    (A)   Interviews
    (B)   Secondary Data
    (C)   Observations
    (D)   Tests

24. How is random sampling helpful?
    (A)   Reasonably accurate
    (B)   An economical method of data collection
    (C)   Free from personal biases
    (D)   All of the above

25. Which one is called non-probability sampling?
    (A)   Quota sampling
    (B)   Cluster sampling
    (C)   Systematic sampling
    (D)   Stratified random sampling

26. If w is a complex cube root of unity, then
$\begin{pmatrix} 1 & \omega^2 \\ \omega & \omega \end{pmatrix}\begin{pmatrix} \omega & \omega^2 \\ 1 & \omega^2 \end{pmatrix}$ is

    (A) $\begin{pmatrix} -1 & -1 \\ -1 & 2 \end{pmatrix}$
    (B) $\begin{pmatrix} -1 & -1 \\ -1 & 0 \end{pmatrix}$
    (C) $\begin{pmatrix} 0 & 0 \\ -1 & 2 \end{pmatrix}$
    (D) $\begin{pmatrix} -1 & -1 \\ 0 & 1 \end{pmatrix}$

27. Let M = $\begin{bmatrix} 1 & 2 & 0 \\ 2 & 1 & 0 \\ 2 & -3 & 1 \end{bmatrix}$, then
    (A)   All eigen values are equal
    (B)   All eigen values are distinct
    (C)   Two eigen values are same but third one is different
    (D)   Eigen values of M are -1, 0 and +1

28. Let $f(x, y) = \begin{bmatrix} 6xy^2, & x, y \geq 0, x + y \leq 1 \\ 0, & otherwise \end{bmatrix}$ be the probability density function of

(X,Y). Then $P\left(X + Y < \frac{1}{2}\right)$ is equal to

(A) $\dfrac{1}{320}$

(B) $\dfrac{1}{160}$

(C) $\dfrac{1}{80}$

(D) $\dfrac{1}{24}$

29. Which one among the following distributions does not possess the reproductive property?
   (A) Normal distribution
   (B) Poisson distribution
   (C) Chi-square distribution
   (D) Exponential distribution

30. If V_{ran}, V_{prop} and V_{opt} respectively denote the variance of the estimator of the population mean under SRSWOR, stratified sampling under proportional and Neymann allocation, then
   (A) $V_{ran} > V_{prop} > V_{opt}$
   (B) $V_{ran} < V_{prop} < V_{opt}$
   (C) $V_{ran} > V_{prop}$ and $V_{prop} < V_{opt}$
   (D) $V_{ran} < V_{prop}$ and $V_{prop} > V_{opt}$

31. Rao-Blackwell theorem enables us to obtain minimum variance unbiased estimator through
   (A) Unbiased estimators

   (B) Complete statistics

   (C) Efficient statistics

   (D) Sufficient statistics

32. For large sample size n in Wilcoxon's signed rank test, the statistic T^+ is distributed with mean
   (A) n(n + 1)/4
   (B) n(n + 1)/2
   (C) n(2n + 1)/4
   (D) n(n - 1)/4

33. If X_1, X_2 and X_3 be independent random variables, each having a standard Normal distribution. Which of the following has a Chi square distribution with 1 degree of freedom?
   (A) $\frac{1}{3}(X_1 + X_2 - X_3)^2$
   (B) $\frac{1}{2}(X_1^2 + X_2^2)$
   (C) $(X_1^2 + X_2^2 - X_3^2)$
   (D) $(X_1 + X_2 - X_3)^2$

34. If A and B are square matrices of order nxn, then which of the following is not true?
   (A) $\det(AB) = \det(A).\det(B)$

   (B) $\det(kA) = k^n \det(A)$
   (C) $\det(A+B) = \det(A) + \det(B)$
   (D) $\det(A^T) = 1/ \det(A^{-1})$

35. Let X be a p-dimensional random vector which follows $N(\mathbf{0}, I_p)$ distribution and let A be a symmetric matrix. Which of the following is true?

   (A) $X^T AX$ has a Chi-square distribution if $A^2 = A$ but converse is not true

   (B) $X^T AX$ has a Chi-square distribution with p as degrees of freedom

   (C)   If $X^T AX$ has a Chi-square distribution, then the characteristic roots of A are either 0 or 1

   (D)   If $X^T AX$ has a Chi-square distribution, then A is necessarily positive definite

36. A fair die is rolled 10 times. Let X be the number of 1's observed and Y be the number of 2's observed. Then correlation coefficient between X and Y is
   (A) $\frac{1}{5}$
   (B) $-\frac{1}{5}$
   (C) $\frac{1}{8}$
   (D) $\frac{1}{2}$

37. Let X follow $U\left(1 - \frac{1}{\sqrt{3}}, 1 + \frac{1}{\sqrt{3}}\right)$. Then $P\left(|X - 1| \geq \frac{1}{2}\right)$ has
   (A)   Lower bound as $\frac{4}{9}$
   (B)   Upper bound as $\frac{4}{9}$
   (C)   Lower bound as $\frac{2}{9}$
   (D)   Upper bound as $\frac{5}{9}$

38. If $x \geq 1$ is the critical region for testing $H_0 : \theta = 2$ $against$ $H_1 : \theta = 1$. Based on a single observation from

   $$f(x) = \theta e^{-\theta x}, x \geq 0, \theta > 0,$$ the probability of Type II error is
   (A) $\frac{1}{e^2}$
   (B) $\frac{1}{e}$
   (C) $\frac{e-1}{e}$

   (D) $\frac{1}{e^3}$

39. The median of exponential distribution with parameter 3 is
   (A)   ln2
   (B)   ln3
   (C)   ln2 /3
   (D)   3

40. Let $X_1, X_2, \ldots, X_n, n \geq 1$ be a random sample of size n from a $U(2\theta - 1, 2\theta + 1), \theta \in \mathbb{R}$ population. Let $Y_1 = \min(X_1, X_2, \ldots, X_n)$ and $Y_n = \max(X_1, X_2, \ldots, X_n)$. Which of the following statistic is a maximum likelihood estimator of θ?

(A) $\frac{Y_1 + Y_n}{2}$

(B) $\frac{Y_1 + Y_n}{6}$

(C) $\frac{2Y_1 + Y_n + 1}{2}$

(D) $\frac{2Y_1 + Y_n + 1}{6}$

41. Let $X_1, X_2, \ldots$ be independent and identically distributed random variables from a Poisson distribution with parameter λ. Which of the following statement is correct?

(A) $X_1 + X_2$ is sufficient for λ

(B) $X_1 + X_2$ is not sufficient for λ

(C) $X_1 + 2X_2$ is sufficient for λ

(D) $2X_1 + X_2$ is sufficient for λ

42. Let $X \sim Exp(\lambda_1)$ and $Y \sim Exp(\lambda_2)$ be independent random variables. Then the probability density function of Z=X+Y is given by

(A) $\frac{\lambda_1 \lambda_2}{(\lambda_1 - \lambda_2)}(e^{-\lambda_2 z} - e^{-\lambda_1 z})$

(B) $\frac{\lambda_1 \lambda_2}{(\lambda_2 - \lambda_1)}(e^{-\lambda_2 z} - e^{-\lambda_1 z})$

(C) $\frac{\lambda_1}{(\lambda_1 - \lambda_2)}(e^{-\lambda_2 z} - e^{-\lambda_1 z})$

(D) $\frac{\lambda_2}{(\lambda_1 - \lambda_2)}(e^{-\lambda_2 z} - e^{-\lambda_1 z})$

43. Which of the following terms best describes an interaction effect?

(A) The effect of one independent variable depends on the level of another independent variable

(B) Eliminating any differential influence of extraneous variables

(C) The effect of one independent variable on the dependent variable

(D) Sequencing effect that occurs from the order in which the treatment conditions are administered

44. A drunkard takes a forward step with probability p and a backward step with probability q. After taking 11 steps, the probability that he is one step away from the starting point is

(A) $p^6 + q^6$

(B) $2(p^6 + q^5)$

(C) $462 \, p^6 q^5$

(D) $462 \, p^5 q^5$

(7)

45. The following ANOVA table is obtained for a two variable linear regression model:

Source of Variation	Degrees of Freedom	Sum of Squares
Regression	1	124.5
Residual	3	86.1
Total	4	210.6

Then the correlation between the regressor and regressand is

(A)   0.2691

(B)   0.4088

(C)   0.5871

(D)   0.6843

46. Let Y_1, Y_2, Y_3 and Y_4 be four random variables such that $E(Y_1)=\theta_1-\theta_3$;
    $E(Y_2)=\theta_1+\theta_2-\theta_3$; $E(Y_3)=\theta_1-\theta_3$; $E(Y_4)=\theta_1-\theta_2-\theta_3$ where $\theta_1, \theta_2, \theta_3$ are unknown parameters. Assume that $V(Yi)=\sigma^2$, i=1, 2, 3, 4. Which of the following is true ?

(A) $\theta_1, \theta_2, \theta_3$ are estimable

(B) $\theta_1 + \theta_3$ is estimable

(C) $\theta_1 - \theta_3$ is estimable and $(Y_1+Y_3)/2$ is the best linear unbiased estimate of $\theta_1-\theta_3$

(D) $\theta_2 - \theta_3$ is estimable

47. $\int_0^2 [x]\, dx^2$ is equal to
(A)   2
(B)   1

(C)   3

(D)   4

48. Let X_1, X_2 ,…, X_n be independent random variables each Bernoulli with p as probability of success. Then sufficient statistic for p is
(A) $\bar{X}$

(B) $\sum_{i=1}^{n} X_i$

(C) $\prod_{i=1}^{n} X_i$

(D) $\sum_{i=1}^{n} X_i^2$

49. Maximize $3x + 4y$ subject to
$$\frac{x}{2} + y \le 4, x + y \le 5, x \le 3, x \ge 0, y \ge 0.$$
Which of the following is correct?

(A)   The optimal value is 19.
(B)   The optimal value is 18.
(C)   (3, 1) is an extreme point of the feasible region.
(D) $\left(3, \frac{5}{2}\right)$ is an extreme point of the feasible region.

50. Which of the following is false?
   (A) $X_n \to X$ in probability $\Rightarrow X_n \to X$ in distribution
   (B) $X_n \to k$ in distribution $\Rightarrow X_n \to k$ in probability
   (C) $X_n \to X$ almost surely $\Rightarrow X_n \to X$ in probability
   (D) $X_n \to X$ in probability $\Rightarrow X_n \to X$ almost surely

x-x-x

(8)

Space for Rough Work

Stem Cell Tissue Engineering & Biomedical Excellence(Ph.D) (SCTE)

1. The regulatory body that oversees and monitor the activities related to use of human samples for research work falls under the preview of which of the following;
   (A)   Institutional Bio-safety Committee
   (B)   Institutional Ethics Committee
   (C)   Institutional Complaint Committee
   (D)   Institutional committee for safe use of experimental animals

2. Science Citation Index, a multidisciplinary index to international science literature is published by Institute of Scientific Information at Philadelphia, what is the frequency of this publication;
   (A)   Yearly
   (B)   Six monthly
   (C)   Quarterly
   (D)   Bi-monthly

3. While designing a research problem, A researcher often reads primary literature and should always summarize and record all the following except one;
   (A)   Problem Statement
   (B)   Hypothesis
   (C)   Experimental design
   (D)   Pages Numbering

4. The Intellectual property refers to which of the following;
   (A)   To the creation of mind such as invention, artistic and literary creations
   (B)   To collectively account for property tax of intellectual from different fields
   (C)   To uniformly divide the property among intellectuals
   (D)   To create a property and other earning database of the intellectuals

5. In research, the disposal of lab animal carcass are generally disposed by which of the following method;
   (A)   Incineration
   (B)   Dumping under ground
   (C)   Through biological decay in the marked area
   (D)   Throwing in flowing water

6. The term inbreeding of animals in research refers to which of the following;
   (A)   Breeding between animals when carried out inside the animal house
   (B)   Breeding between animals having one or more ancestors in common
   (C)   Breeding between the animals from different ancestors
   (D)   Breeding between the animals obtained from different countries

7. The system IMRAD for organizing a research paper is represented as which of the following:
   (A)   Introduction, Methodology, Review And Discovery
   (B)   Introduction, Methodology, Review, Abstract and Discovery
   (C)   Introduction, Material & Methods , Results Abstract and Discussion
   (D)   Introduction, Material & Methods Results and Discussion

8. Which of the following best describes the Good laboratory Practice and Good Manufacturing practices;

   (A) Practice that every researcher devises to carry out the research activity in laboratory and in industry by a worker to manufacture a product
   (B) Codes of practice to record research activity through established procedures to curtail the accidents that could affect a research projects or manufactured product
   (C) Codes of conduct agreed by researcher to carry out the research activity through individually developed methodology so that research project is completed in given time or product manufactured
   (D) Practice of doing research by a good researcher in the laboratory and by a good worker in the industry to manufacture a product

9. Following warning signal is an internationally accepted signal displayed on the entrance of a laboratory represents which of the following warning;

   (A)   Biohazard Components
   (B)   Corrosive Components
   (C)   Radioactive Materials
   (D)   Inflammable Materials

10. Which bio-safety containment would be applicable in case the pathogenic agent is associated with a serious or lethal human disease for which preventive or therapeutic
    intervention is available;
    (A)   Bio-safety level -1
    (B)   Bio-safety level -2
    (C)   Bio-safety level -3
    (D)   Bio-safety level -4

11. The Copyright is granted for published literary, dramatic, musical or artistic work for which of the following period;
    (A)   Only after death of the creator
    (B)   For a period of 10 years
    (C)   For a total period of 20 years
    (D)   Life time of the creator plus 60 years following calendar year after death

12. A series having values 10, 35, 55, 45, 5, 40, 50, 20, 60, 30, what is the value of mean and median, respectively;
(A)   35 and 37.5
(B)   35 and 350
(C)   35 and 35.5
(D)   35 and 32.5

13. During the cell growth, the cells double every next day, suppose a petriplate gets half filled by day 2nd, in how many days does this petriplate get completely filled;
(A)   Day 8
(B)   Day 4
(C)   Day 3
(D)   Day 2.5

14. How much level of the radioactivity in milicurie (mCi) one should get exposed to;

(A)   0
(B)   0.0001
(C)   0.000001
(D)   0.00000001

15. During an experimental set up, the null hypothesis was that drug does not produce toxic effect. After completion of experiment, the statistical comparison between control and drug treated group indicated level of significance with $p < 0.05$. Based on the statistical outcome which of the following would you refer to;

(A)   Accept the Null hypothesis
(B)   Reject the null Hypothesis
(C)   This outcome has no relation to null hypothesis
(D)   The starting hypothesis is wrongly planned

16. A Statistical method that uses arrays allowing a maximum number of main effects to be estimated in an unbiased fashion with a minimum number of experimental runs is represented as;
(A)   Taguchi process
(B)   Chi process
(C)   Wilcoxon method
(D)   Spearman's rank correlation

17. While performing a previously conducted experiment that used 2 animals each in control and treated group to study the effect of a drug, the outcome was drug caused inhibition of enzyme X. However when this experiment was carried out using 6 animals each in control and treated group, the outcome of this current experiment was that drug did not produce any affect on the enzyme X. Which of the following inference would you arrive at;
(A)   The current experiment is true positive
(B)   The pervious experiment was true positive
(C)   The previous experiment was false negative
(D)   The Current experiment is false positive

(3)

18. During the project submission to a funding agency the contingency amount is used for all the following except one;

(A)   Purchase of high end equipment
(B)   Purchase of spare parts and service charges of equipments
(C)   Purchase of postage, stationary, printing cartridges etc.
(D)   Paying Manuscript publication charges, report preparation etc.

19. You were asked to consult the earlier literature for the plan of your research work in   stem cell biology, which database would you consult to seek this information;

(A)   PUBMED
(B)   EMBL
(C)   SCOPUS
(D)   Research Gate

20. Which one of the following is best perceived as an outcome for translational research;

(A)   To upgrade research facility for the furtherance of research
(B)   To provide the introductory knowledge of the subject
(C)   To provide Application based outcome of the research
(D)   To provide Statistical significance of the research problem

21. The term *ibid* is often used while citing the reference for which of the following;

(A)   To quote the work from a manuscript which has been communicated
(B)   To quote the work from a book which is recently published
(C)   To quote the work from the same source which has been mentioned in a previous reference
(D)   To quote the work from the different source which has not been mentioned in earlier references

22. For the tangible research both the creativity and critical thinking are very important. All the following contribute to these aspects except one of the following;

(A)   Technological trainings
(B)   Research based presentations
(C)   Multidisciplinary approach
(D)   Creating inventory of research equipments

23. In case your research involves the use of rats, and rabbits, the approval of which one of the following committee is mandatory;

(A)   Committee for the purpose of control and supervision of experimental animals
(B)   Committee for the purpose of commercial sale of all small & big animals
(C)   Committee for the purpose of commercial sale of trained animals
(D)   Committee for the purpose of commercial sale of only endangered animals

24. The term euthanasia is commonly used during the research activity, the term is used to represent which of the following;

(A)   Saving the experimental animal following surgery
(B)   A quick, painless method of killing animal without causing fear and anxiety
(C)   Reviving an animal after accidental over-exposure to noxious chemical
(D)   Sacrificing an animal through step wise exposure of low dose of different anesthesia followed by cardiac puncture

25. A commonly used term in medical research is a cohort, what do cohort studies reflect;

(A)   A group of people used for observing risk factors or cause of disease
(B)   A researcher carrying out medical study to identify risk factors or cause of disease
(C)   The Supervisor of the researcher who initiated the study to risk factors or cause of disease
(D)   Principal investigator of the research proposal who developed idea for finding the risk factors or cause of disease

26. The side population cells retrieved following Flow-cytometry are selected based on which of the following;
(A)   Efflux of DNA-binding dye Hoechst 33342
(B)   Influx of DNA-binding dye Hoechst 33342
(C)   Efflux of Protein -binding dye Coomassie brilliant Blue G250
(D)   Influx of Protein -binding dye Coomassie brilliant Blue G250

27. You were asked to retrieve the embryonic stem cells from ICM of blastocyst. Which of the following methodology would you use to retrieve the embryonic stem cells from blastocysts;

(A)   Ouchterlony double immunodiffusion
(B)   *In situ* hybridization
(C)   Immunosurgery
(D)   ELISA

28. During *in vitro* fertilization, the researcher used enucleated egg for generating embryos to be used in retrieving the stem cells for futuristic use. Which of the following aptly represent the procedure used;

(A)   Therapeutic cloning
(B)   Therapeutic surgery
(C)   Reproductive cloning
(D)   Reproductive surgery

29. In comparison to all the other naturally isolated stem cells, the embryonic germ cells display highest probability of which of the genetic character;

(A)   Gene repression
(B)   Gene deregulation
(C)   Gene imprinting
(D)   Gene crossing

30. All the following except one does not possess totipotential character during development;

(A)   Zygote
(B)   Blastomere
(C)   ICM cells
(D)   Cells at morula stage

31. A drug "x" modified the global methylation pattern of homeotic genes. In order to validate this effect the homeotic genes were sequenced. Which of the following sequencing method the scientist might have used to observe the global methylation pattern;

(A)   Bisulfite sequencing
(B)   Dideoxy sequencing
(C)   Sanger sequencing
(D)   Pyrosequencing

32. All the following statements about embryonic stem cells are correct except one;

(A)   Possess normal karyotype
(B)   Undergo extensive proliferation but remain undifferentiated
(C)   Release neurotransmitters during development
(D)   Possess ability to be frozen and thawed

33. The loss of genetic information that provides cell identity with acquisition of more primitive cell identity is represented by which of the following process;

(A)   Cell Functional commitment
(B)   Cell Differentiation
(C)   Cell De-differentiation
(D)   Cell reorientation

34. All the following are important polymers for tissue engineering application, which one of the following is a natural biodegradable scaffold;
(A)   Polyglycolic acid
(B)   Poly L-lysine
(C)   Polylactic acid
(D)   Gelatine

(6)

35. An anatomical location in different tissues providing the specific microenvironment that impact the stem cell self renewability is represented as which one of the following;

(A)   Calyx
(B)   Niche
(C)   Hypoblast
(D)   Placenta

36. During cell transplantation, when the cells are obtained from the body of a donor of the same species as the recipients, this type of transplantation would be referred to as;

(A)   Autologous
(B)   Allogenic
(C)   Xenogenic
(D)   Syngenic

37. You were asked to amplify 256 bp signature sequence of Oct-4 gene. During which cycle   of PCR would you observe amplification of 256 bp fragment for the first time;

(A)   3rd cycle
(B)   13th cycle
(C)   23rd cycle
(D)   30th cycle

38. Fusion of established myeloma cell line with primary lymphocytes would produce which type of cell line;

(A)   Carcinoma
(B)   Teratoma
(C)   Sarcoma
(D)   Hybridoma

39. The embryoid body formation represents one of the important methodologies to identify the stem cell characteristic of the isolated cell types. Such structures are formed under which of the following condition;

(A)   *In vivo* growth of the isolated cell
(B)   *In vitro* growth of isolated cells
(C)   Intra hepatic growth of cells
(D)   Aborted human embryo following excessive mutation

40. In order to understand precise role of cell population **"x",** the cell population from rabbit were taken and injected to wistar strain of rat. The cell tracing studies identified the presence of rabbit cell population **"x"** in the liver of the rat. The outcome of the experiment concluded generation of which one of the following;

(A)   Knock out rat
(B)   Chimeric rat
(C)   Chimeric rabbit
(D)   Knock out rabbit

41. Using radioactive tracer studies, a lineage of cell type were identified where in the radiolabel was found to be retained in the cells upon cell division. What inference do you make from such an outcome;

(A)   The radioactive retention was characteristic of stem cells
(B)   The radioactive retention was due to loss of enzyme for pumping out the radioactive compound
(C)   The radioactive retention was due to thickening of the cell membrane of the cells
(D)   The radioactive retention was due to death of the cell which showed the presence of radioactivity

42. During western blotting experiment, for identification of the target, the blot was first probed with primary antibody that was raised in rabbit. This was followed by exposure to secondary antibody. Identify which among the following can not be used as the source of secondary antibody;

(A)   Horse
(B)   Donkey
(C)   Rabbit
(D)   Rat

43. You were asked to retrieve large number of mesenchymal stem cells from one of the richest source for these type of cells, which of the following source would you work with to retrieve such a large number of these cells ;

(A)   Wharton Jelly
(B)   Adipose tissue
(C)   Bone marrow
(D)   Subventricular tissue

44. Stem cell markers are key to discriminate between embryonic stem cells from different species which of the following is specific for mouse embryonic stem cells in comparison to primates;

(A)   Stage specific embryonic antigen-1
(B)   Stage specific embryonic antigen 4
(C)   Tumour recognition antigen-1-60
(D)   Tumour recognition antigen-1-81

45. The regulatory body to currently oversee and monitor the activities related to stem cells research falls under the preview of which one of the following committee. ;

(A)   National Apex Committee for Stem Cell Research and Regenerative Medicine
(B)   National Apex Committee for Stem Cell Regeneration and Theraeutics
(C)   National Apex Committee for Stem Cell Research and Therapy
(D)   National Apex Committee for Stem Cell Research and Treatment

(8)

46. With respect of immunity, the innate immunity provides which one of the following defence to the humans;

  (A)   Fourth line
  (B)   Third line
  (C)   Second line
  (D)   First line

47. Two Fab monovalent and one Fc fragment is produced when IgG is treated with which one of the following ;

  (A)   Galactosidase
  (B)   Lipase
  (C)   Ribozyme
  (D)   Papain

48. Upon treatment of developing embryo with drug that destroyed the initial band of cells from which embryo begin to develop actually interfered with formation of which of the following;

  (A)   Germ layer formation
  (B)   Trophoectoderm formation
  (C)   Inner cell mass differentiation
  (D)   Primitive streak

49. Yamanaka factors revolutionized the field of stem cell biology through providing the cocktail of transcription factors leading to induction of pleuripotency in the differentiated cell types. Which of these factors contributed to this outcome?

  (A)   Oct3/4, Stat4 , HIF4 and c-Myc
  (B)   Oct3/4, Sox2, Kif4 and c-Myc
  (C)   Oct3/4, nanog2, Stat and HIF 4
  (D)   Oct3/4, Sox2, FGF2 and c-Myc

50. You were asked to exploit a methodology to produce embryonic stem cell clone of the somatic cell, which of the following methodology would you exploit to achieve this;

  (A)   Transfer of nucleus from fertilized egg to enucleated somatic cell
  (B)   Transfer of mitochondria from fertilized egg to enucleated somatic
  (C)   Transfer of nucleus from somatic cell to enucleated fertilized egg
  (D)   Transfer of mitochondria somatic cell to enucleated fertilized egg

x-x-x

System Biology & Bioinformatics(Ph.D.) (SBB)

1. Which of the following is not an essential element of report writing?
   - (A)   Research Methodology
   - (B)   Reference
   - (C)   Conclusion
   - (D)   None

2. Which method can be applicable for collecting qualitative data?
   - (A)   Artifacts
   - (B)   People
   - (C)   Media products
   - (D)   All

3. Partial Least Squares Regression is
   - (A)   Both a transformer and a regressor
   - (B)   Only a transformer not a regressor
   - (C)   A regressor
   - (D)   A transformer

4. Who is father of research teaching
   - (A)   N. L Gage
   - (B)   David Berliner
   - (C)   Egon Brunswik
   - (D)   Donal T

5. What are the advantages in batch processing mode in computers?
   - (A)   Error detection is simple
   - (B)   System design is simple
   - (C)   Error detection is complex
   - (D)   Both A & B

6. Mean, Median and mode are
   - (A)   Measure of deviation
   - (B)   Ways of sampling
   - (C)   Ways of control tendency
   - (D)   None

7. Uniting various qualitative methods with quantitative methods can be called as........
   - (A)   Coalesceb
   - (B)   Triangulationc
   - (C)   Bipartited
   - (D)   Impassive

8. The subset of population is called
   - (A)   Element
   - (B)   Sampling unit
   - (C)   Sample
   - (D)   Sampling frame

9. Which variable cannot expressed in quantitative terms
   - (A)   Socio economic status
   - (B)   Marital status
   - (C)   Numerical aptitude
   - (D)   Professional aptitude

10. Research paper reports based on
    - (A)   Primary data only
    - (B)   Secondary data only
    - (C)   Both
    - (D)   Data only

11. Classification of all type of library is made by
    - (A)   IFLA
    - (B)   UNISIST
    - (C)   UNISCO
    - (D)   INDOC

12. Which of the following can be determined using molecular mechanics?
    - (A)   Molecular orbital energies
    - (B)   Minimum energy conformation
    - (C)   Electrostatic potentials
    - (D)   Transition-state geometries

13. Questionnaire disadvantages are
    - (A)   Applicable to section of society
    - (B)   Adaptability
    - (C)   Anonymity
    - (D)   Fast and economical

14. Research done to test and validate study hypothesis is
    - (A)   Fundamental
    - (B)   Applied
    - (C)   Conclusive
    - (D)   Exploratory

15. What does this E value mean mostly dependent on
    - (A)   Database size
    - (B)   Database type
    - (C)   Database diversity
    - (D)   Do not depend on database

16. Between Mean- one Standard Deviation
    - (A)   Approximately 69.5% of the data falls
    - (B)   Approximately 60% of the data falls
    - (C)   Approximately 68% of the data falls
    - (D)   Approximately 67% of the data falls

(2)

17. Most effective quantitative data collection methods is
    - (A) Web based
    - (B) Telephone based
    - (C) Mail survey
    - (D) Schedule

18. What is the range of sample size used in chromatography methods?
    - (A) Micrograms
    - (B) Naonograms
    - (C) Picograms
    - (D) Milligrams

19. In an airline reservation system, the entities are date, flight number, place of departure, destination, type of plane and seats available. The primary key is
    - (A) Flight number
    - (B) Flight number + place of departure
    - (C) Flight number + date
    - (D) Flight number + destination

20. Bit Score in BLAST analysis dependent on
    - (A) K parameters
    - (B) Lambda parameters
    - (C) Both
    - (D) E value

21. Which one is correct?
    - (A) 8 bit = 1 byte
    - (B) 1024 KB = 1MB
    - (C) 1024GB = 1 Terabyte
    - (D) All the above

22. _____ is a preferred sampling method for the population with finite size.
    - (A) Systematic sampling
    - (B) Purposive sampling
    - (C) Cluster sampling
    - (D) Area sampling

23. Which protocol is used by browsers to communicate between two machines?
    - (A) ftp
    - (B) ssl
    - (C) tcp
    - (D) http

24. Statistical thermodynamics deals with
    - (A) Pressure
    - (B) Entropy
    - (C) Free energy
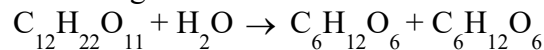   - (D) All of the above

25. Type 1 Error occurs if
    (A)   Null hypothesis is rejected even though it is true
    (B)   Null hypothesis is rejected even though it is false
    (C)   Both and alternative Null hypothesis rejected
    (D)   Both and alternative Null hypothesis rejected

26. What are the advantages in batch processing mode in computers?
    (A)   Error and system detection is simple
    (B)   System design is simple
    (C)   Error detection is complex
    (D)   System error

27. Mention the type of the following reaction
$$C_{12}H_{22}O_{11} + H_2O \rightarrow C_6H_{12}O_6 + C_6H_{12}O_6$$
    (A)   Synthesis
    (B)   Hydrolysis
    (C)   Dehydration
    (D)   Hydrogenation

28. The Southern blotting technique depends on
    (A)   Similarities between the sequences of probe DNA and experimental DNA
    (B)   Similarities between the sequences of probe RNA and experimental RNA
    (C)   Similarities between the sequences of probe protein and experimental protein
    (D)   The molecular mass of proteins

29. Agrobacterium tumefaciens is
    (A)   A disease in humans that causes loss of sight
    (B)   A bacterium that can be used to introduce DNA into plants
    (C)   A fungi that is used to produce antibiotics in large amounts
    (D)   A disease in humans that causes loss of weight

30. One-third of all human cancers has
    (A)   MAPK pathways
    (B)   ER Pathways
    (C)   CAT pathways
    (D)   RAS pathways

31. Starch content of potatoes can be increased by using a bacterial gene, known as
    (A)   Sucrose phosphate synthase gene
    (B)   ADP glucose pyrophosphorylase gene
    (C)   Polygalactouranase gene
    (D)   None of the above

32. What is the major Disadvantage of DOT PLOT analysis?
    (A)   Identify repeat
    (B)   Identify few possible mismatch
    (C)   Identify all gapped match
    (D)   Time consuming

33. To compare DNA sequence in DOT PLOT we need
    (A)   Low window and high stringencies
    (B)   Low stringencies and high window
    (C)   Low window and low stringencies
    (D)   High window and high stringencies

34. Charge–charge relationship of noncovalent interactions to the distance separating the interaction molecules is
    (A) $1/r$
    (B) $1/r^2$
    (C) $1/r^3$
    (D) $1/r^4$

35. Log odd matrices of PAM highly dependent on
    (A)   1572 change amino acid changes in PAM
    (B)   71 groups of PAM
    (C)   Entropy of PAM
    (D)   None of the above

36. The spindle forms in the
    (A)   G1 phase
    (B)   G2 phase
    (C)   M phase
    (D)   S phase

37. What is amphibolic pathway means
    (A)   Anabolic reaction
    (B)   Catabolic reaction
    (C)   Both
    (D)   Anabolic reaction only

38. In prokaryotes, just before the cell divides, the two daughter genomes are attached side by side to the
    (A)   Cell membrane
    (B)   Replication origin
    (C)   Centromeres
    (D)   Equatorial plate

39. Three dimension protein structure is stabilized with
    (A)   Non covalent bonding
    (B)   Covalent bonding
    (C)   Manly non covalent bonding
    (D)   Both A & B

40. Who coined the term mitosis
    (A)   Strasburger
    (B)   Flemming
    (C)   Strasburger & Flemming
    (D)   None of the above

41. In hemoglobin structure which amino acid is involved in oxygen binding?
     (A)   Seventh and eighth residues in helices F and E
     (B)   Seventh and eighth residues in helices E and F
     (C)   Leu & Val
     (D)   None of the above

42. Which is 2D molecular descriptor
     (A)   H Bonds
     (B)   Randic
     (C)   Bond count
     (D)   SMART

43. Plasmid DNA is
     (A)   Positively supercoiled
     (B)   Negatively supercoiled
     (C)   Early supercoiled
     (D)   Supercoiled

44. Topology of DNA could be described by
     (A)   Linking number
     (B)   Twisting number
     (C)   Writhing number
     (D)   All of the above

45. Which of these amino acids is highly conserved?
     (A)   Glycine
     (B)   Alanine
     (C)   Both
     (D)   None

46. Triad tools in molecular modeling consist of
     (A)   Force field, Parameter sets, molecular mechanism
     (B)   Force field, Minimization algorithm, Parameter sets
     (C)   Force field, molecular dynamics, parameter sets
     (D)   All of the above

47. AMBER family
     (A)   Program for molecular minimization
     (B)   It is a force feild
     (C)   Force field parameter
     (D)   None of the above

48. How many copies of mitochondria is present in an eukaryotic cell
     (A) 10^3 - 10^4
     (B) 10^2 - 10^3
     (C)   1000
     (D) 10^6- 10^7

49. Local minimum energy conformation is always an active conformation of the model having
    - (A)   Multiple local maximum and minimum
    - (B)   Few local maximum and minimum
    - (C)   One global maximum and minimum
    - (D)   Maximum and minimum surfaces

50. Which of them are rare amino acid
    - (A)   Citrulline
    - (B)   Selenocysteine
    - (C)   3,4-dihydroxy-phenylalanine
    - (D)   All the above

x-x-x

(Tabla-2101)

1. Research ethics do not include
   (A) Honesty   (B) Subjectivity   (C) Integrity   (D) Objectivity

2. In finalizing a thesis writing format which of the following would form part of supplementary pages?
   (A) List of tables and figures   (B) Table of contents
   (C) Conclusions of the study   (D) Bibliography and Appendices

3. In which of the following arrangements a wider spectrum of ideas and issues may be made possible?
   (A) Research Article   (B) Workshop mode
   (C) Conference   (D) Symposium

4. The research that aims at immediate application is
   (A) Action Research   (B) Empirical Research
   (C) Conceptual Research   (D) Fundamental Research

5. Which is the main objective of research?
   (A) To review the literature
   (B) To summarize what is already known
   (C) To get an academic degree
   (D) To discover new facts or to make fresh interpretation of known facts

6. In thesis, figures and tables are included in
   (A) The appendix   (B) A separate chapter
   (C) The concluding chapter   (D) The text itself

7. The conclusions/findings of which type of research cannot be generalized to other situations?
   (A) Historical Research   (B) Descriptive Research
   (C) Experimental Research   (D) Comparative Research

8. Ethical norms in research do not involve guidelines for:
   (A) Thesis format   (B) Copyright
   (C) Patenting policy   (D) Data sharing policies

9. Which of the following research types focuses on ameliorating the prevailing situations?
   (A) Fundamental Research   (B) Applied Research
   (C) Action Research   (D) Experimental Research

10. Conferences are meant for
    (A) Multiple target groups   (B) Group discussions
    (C) Show-casing new Research   (D) All the above

11. A working hypothesis is
    (A) A proven hypothesis for an argument
    (B) Not required to be tested

(C)   A provisionally accepted hypothesis for further research
(D)   A scientific theory

12.   Deconstruction is a popular method of research in
(A)   Basic Science   (B)   Applied Science
(C)   Social Science   (D)   Literature

13.   The principles of fundamental research are used in
(A)   Action research   (B)   Applied research
(C)   Philosophical research   (D)   Historical research

14.   A thesis statement is
(A)   An observation   (B)   A fact
(C)   An assertion   (D)   A discussion

15.   A researcher is interested in studying the prospects of a particular political party in an urban area. What tool should he prefer for the study ?
(A)   Rating scale   (B)   Interview
(C)   Questionnaire   (D)   Schedule

16.   The first step of research is:
(A)   Selecting a problem   (B)   Searching a problem
(C)   Finding a problem   (D)   Identifying a problem

17.   Which of the following is not the method of research?
(A)   Observation   (B)   Historical
(C)   Survey   (D)   Philosophical

18.   Mailed questionnaire, observation, interview and collective questionnaire are instances of
(A)   Secondary sources   (B)   Personal sources
(C)   Primary sources   (D)   Tertiary sources

19.   Quantitative research is also called the
(A)   Ethnographic approach   (B)   Unstructured approach
(C)   Descriptive approach   (D)   Structured approach

20.   In the research method, generalization may be made that will be applicable to other situation of the same type. What is this called?
(A)   Cohort study   (B)   Case study
(C)   Panel study   (D)   Blind study

21.   Which one of the following is a research tool?
(A)   Graph   (B)   Illustration
(C)   Questionnaire   (D)   Diagram

22.   The principles of fundamental research are used in
(A)   Action research   (B)   Applied research
(C)   Philosophical research   (D)   Historical research

23. The process not needed in experimental researches is
    (A) Observation   (B) Controlling
    (C) Manipulation and replication   (D) Reference collection

24. Field study is related to
    (A) Real life situation   (B) Experimental situation
    (C) Laboratory situation   (D) None of these

25. Preliminary data collection is a part of the
    (A) Descriptive research   (B) Exploratory research
    (C) Applied research   (D) Explanatory research

26. Ustad Alla Rakkha Khan belongs to Gharana of
    (A) Delhi   (B) Lucknow   (C) Farukhabad   (D) Punjab

27. Who was very much famous for 'NA DHIN DHIN NA'?
    (A) Kanthe Maharaj   (B) Kishan Maharaj
    (C) Gudai Maharaj   (D) Anaukhe Lal

28. Tabla-Baaj in which 'Aad' is prominently used:
    (A) Delhi Baaj   (B) Poorab Baaj
    (C) Ajarada Baaj   (D) None of these

29. Bol of which 'Prastaar' is not possible:
    (A) Quaida   (B) Peshkara   (C) Gat   (D) Laggi

30. How many 'Ghar' are there in Dayan Tabla?
    (A) 8   (B) 10   (C) 12   (D) 16

31. Total Matras of Brahma Taal is
    (A) 20   (B) 24   (C) 26   (D) 28

32. Sangit Makaranda is written by:
    (A) Saranga Deva   (B) Matanga
    (C) Narada   (D) Bharat

33. 'Dhati Ta Dha Tita Dha Dha Tita Dhage Tina Kina' this Quaida is related with Which Gharana?
    (A) Delhi   (B) Punjab
    (C) Nana Pansegharana   (D) Ajarada

34. Tilwada Theka accompanies the singing style of
    (A) Thumri   (B) Ghazal   (C) Bada Khyal   (D) Chhota Khyal

35. First well-known lady Tabla Player
    (A) Dr. Yogmaya Shukla   (B) Dr. Aban E. Mistri
    (C) Rimpa Shiva   (D) Anuradha Pal

36. 'Paran' belongs to
(A) Tabla (B) Pakhawaj (C) Dholak (D) Nakkara

37. 'Dedh Gun' is depicted by
(A) 3/2 (B) 2/3 (C) 3/4 (D) 4/3

38. Fraction depicting 'Sawa Gun'
(A) 4/5 (B) 5/4 (C) 5/3 (D) 3/5

39. Which material is used in putting 'Syahi' on tabla?
(A) Wood powder (B) Iron powder
(C) Stone powder (D) None of these

40. Taal which is mostly used with Khayal style of singing?
(A) Khemta (B) Dhumali (C) Ek Taal (D) Punjabi

41. The Taal usually used with Thumari style of singing.
(A) Teen Taal (B) JhapTaal
(C) Addha Titala (D) Deep Chandi

42. 'Laggi' is used in
(A) Khayal (B) Tappa (C) Thumari (D) Sadara

43. Tabla Player awarded Sangat-Samrat:
(A) Ahamad Jaan Thirakua (B) Alla Rakha
(C) Habibuddin (D) Munne Khan

44. Tabla Player well versed in all the main four styles.
(A) Ahmed Jaan Thirakua (B) Alla Rakha
(C) Habibuddin (D) Munne Khan

45. Eminent player well versed in both Tabla & Pakhawaj
(A) Ayodhya Prasad (B) Pagal Das
(C) Prem Vallabh (D) Pran Vallabh

46. The Chakkardar of Dhammar Taal can be played in which of the following Taals without
any change?
(A) Chautaal (B) Sool Taal (C) Swaari Taal (D) Gajjhampa

47. Gharana of Tabla which is directly related with Pakhawaj:
(A) Delhi Gharana (B) Punjab Gharana
(C) Ajarada Gharana (D) Farukhabad Gharana

48. Tabla-Baaj in which 'AAD' is prominently used:
(A) Delhi Baaj (B) Poorab Baaj
(C) Ajarada Baaj (D) None of these

49. Gharana of Ustad Quader Baksha
    (A)   Delhi   (B)   Punjab   (C)   Lucknow   (D)   Banaras

50. How many Taal systems practice in Karnatic music?
    (A)   4   (B)   5   (C)   6   (D)   3

x-x-x

Zoology(Ph.D)(ZOO)

1. Resolving power of a microscope depends upon
    (A) The focal length and aperture of the eye lens
    (B) The focal length and objective of the eye lens
    (C) The apertures of the objective and the eye lens
    (D) The wavelength of light illuminating the object

2. Which of the following additive is added to the fixative of EM to better preserve
    (A) Ca2+ and Li+ ions
    (B) Ferrocyanide
    (C) Tannic and picric acid
    (D) All of these

3. Which of the following is used as a media for density gradient in biology laboratories?
    (A) Agarose
    (B) Ficoll
    (C) Luria broth
    (D) Propylene glycol

4. In RT – PCR the enzyme deoxynucleotidyl transferase adds poly – G residues in the
    (A) 5' end of RNA
    (B) 3' end of RNA
    (C) 3' end of cDNA
    (D) 5' end of cDNA

5. Which enzyme is used to avoid ligation of separate DNA?
    (A) Kinase
    (B) Phosphatase
    (C) Endonuclease
    (D) Ligase

6. Which of the following enzymes is responsible for the digestion of the RNA strand in the RNA-DNA hybrid?
    (A) RNase A
    (B) RNase H
    (C) DNase
    (D) Exonuclease

7. In order to pursue the research, which of the following is priorly required?
    (A) Developing a research design
    (B) Formulating a research question
    (C) Deciding about the data analysis procedure
    (D) Formulating a research hypothesis

8. Which one is called non-probability sampling?
    (A) Quota sampling
    (B) Cluster sampling
    (C) Systematic sampling

(D) Stratified random sampling

9. Which of the following method helps in investigating DNA - protein interactions?
(A) DNA fingerprinting
(B) DNA footprinting
(C) Western blotting
(D) Real Time PCR

10. Which of the following test is essential for an accurate faecal examination for ova and cysts is
(A) Serological test
(B) Floatation method
(C) PCR
(D) Permanent stained slide

11. Which class of plasmids assists in the production of bacteriocins?
(A) F plasmid
(B) F' plasmid
(C) Col plasmid
(D) R plasmid

12. Which of the following is incorrect regarding the terminologies of phylogenetics?
(A) A group of taxa descended from a single common ancestor is defined as a clade or monophyletic group
(B) In a monophyletic group, two taxa share a unique common ancestor shared by other taxa as well
(C) Lineage is often synonymous with a tree branch leading to a defined monophyletic group
(D) When a number of taxa share more than one closest common ancestors, they do not fit the definition of a clade. In this case, they are referred to as paraphyletic

13. Range of optimum glutamine concentration present in the culture media is
(A) 1-2 mmol/litre
(B) 2-7 mmol/litre
(C) 7-15 mmol/litre
(D) 15 - 20 mmol/litre

14. The hierarchical genome sequencing approach is _____
(A) Entirely dissimilar to the shotgun approach
(B) Dissimilar to the shotgun approach
(C) Similar to the shotgun approach, but on a larger scale
(D) Similar to the shotgun approach, but on a smaller scale

15. For glycoproteins, most commonly used probe is
(A) Antibodies
(B) Lectins
(C) Antigens
(D) Interferons

16. In a chromatographic separation, which of the following is most appropriate for the qualitative analysis of a substance?
(A) Taking factor
(B) Capacity factor
(C) Retention time
(D) Resolution

17. Which of the following statement is incorrect regarding HAT selection?
(A) B cells are HGPRT + and can grow in HAT medium but undergoes normal cell death
(B) Myeloma cells cannot grow in HAT medium as these cells lack HGPRT
(C) Hybrid cell survive in HAT medium as it inherits HGPRT form B cells
(D) Aminopterin in HAT medium blocks de novo pathway of nucleotide synthesis only in myeloma cells

18. Dixon's Q-test is used for detecting
(A) Outliers in a data set
(B) Interquartile range
(C) Difference in mean
(D) Correlation

19 Hybridoma technology was developed by
(A) Kohler and Milstein
(B) Khorana and Nirenberg
(C) Khorana and Korenberg
(D) Beedle and Tautum

20. All are differences in procedure between Northern and Southern hybridization except
(A) DBM membrane is used in Northern hybridization
(B) RNA: DNA hybrids are formed in Northern hybridization
(C) Initially fragments are separated by electrophoresis in Northern hybridization
(D) DNA denaturation is required before blotting in Southern hybridization

21. In flow cytometry, what magnitude of cells can be analysed per minute?
(A) 10^{-1}
(B) 10^{1}
(C) 10^{2}
(D) 10^{4}

22. Which radiation source has electrode in its construction causing emissions of UV?
(A) Tungsten lamp
(B) Hydrogen discharge lamp
(C) Xenon Discharge Lamp
(D) Mercury lamp

23. An investigator wants to study the effect of an antihypertensive drug on systolic blood pressure. For this study, he notes down the initial systolic blood pressure (mmHg) of 100 patients and then administers the antihypertensive drug to these patients. After a month of treatment, he again measures the systolic blood pressure

of the same patients. Which of the following is the most appropriate test to study the statistical significance of the effect of antihypertensive drug on systolic blood pressure?
(A) Paired t-test
(B) Unpaired t-test
(C) Analysis of variance
(D) Chi-square test

24. Full form of URL is
(A) Uniform Resource Locator
(B) Uniform Resource Link
(C) Uniform Registered Link
(D) Unified Resource Link

25. At what speed do you centrifuge blood?
(A) 3000-3200 RPM
(B) 1000-1500 RPM
(C) 4000 RPM
(D) 2200-2500 RPM

26. Which one of the following cause serious damage to oysters.
(A) Urosalpinx
(B) Murex
(C) Buccinum
(D) Natica

27. Cecropins are protective proteins found in
(A) Tunicates
(B) Drosophila
(C) Moths
(D) Sponges

28. *Entocolax* is a parasite of
(A) Starfish
(B) Sea urchin
(C) Mussel
(D) Holothurian

29. Odoriferous or stink glands are present in
(A) Centipedes
(B) Millipedes
(C) Ticks
(D) Mites

30. Many chambered gelatinous house of *Cephalodiscus* is called as
(A) Zooid
(B) Coenecium
(C) Tubes

(D) Trails

31. *Loreal pits, extremely sensitive infrared detecting organ are present in*
    (A) Python family
    (B) Anaconda
    (C) Cobras
    (D) Viperidae family

32. Which of the following is a physiological uncoupler of oxidative phosphorylation:
    (A) 2,4-Dinitrophenol
    (B) Dinitrocresol
    (C) Pentachlorophenol
    (D) Thermogenin

33. Familial hypercholesterolaemia is caused by mutation in the gene which encodes what?
    (A) HMG-CoA reductase
    (B) High density lipoprotein
    (C) Low density lipoprotein
    (D) Low density lipoprotein receptor

34. HLA-DR2 is a risk factor for
    (A) Insulin-dependent (type I) diabetes
    (B) Multiple sclerosis
    (C) Rheumatoid arthritis
    (D) Myasthenia gravis

35. Ryanodine receptor controls uptake of
    (A) Calcium by sarcoplasmic reticulum
    (B) K+ by sarcoplasmic reticulum
    (C) Na+ by mitochondria
    (D) Mg2+ by nucleus

36. The T helper cell population that promotes IgE production is composed of
    (A) Th1 cells
    (B) Th2 Cells
    (C) Th0 cells
    (D) Tdh cells

37. Which of the following models is an example of a spontaneous organ-specific autoimmune disease?
    (A) MRL-lpr/lpr
    (B) Experimental autoallergic encephalomyelitis
    (C) Thyroiditis induced by early thymectomy and irradiation
    (D) Non-obese diabetic (NOD) mouse

38. Nucleoporins contain which of the following repeating sequence of amino acids in central meshwork of nuclear pore complex:
    (A) Phenylalanine-Glycine
    (B) Glycine-Methionine

(C) Proline-Glycine
(D) Phenylalanine-Methionine

39. Clathrin is a protein that plays a major role in
(A) Receptor-mediated endocytosis
(B) Caveolae
(C) Pinocytosis
(D) Phagocytosis

40. First genetically modified rhesus monkey is
(A) Genie
(B) ANDi
(C) Rosie
(D) SANDi

41. Klenow fragment of *E. coli* DNA polymerase I does not have
(A) 5' → 3' polymerase activity
(B) 3' → 5' exonuclease activity
(C) 5' → 3' exonuclease activity
(D) Both A and B

42. Which of the following maternal effect gene products regulate production of anterior structures in Drosophila embryo?
(A) Bicoid and Nanos
(B) Bicoid and Hunchback
(C) Bicoid and Caudal
(D) Nanos and Caudal

43. The blastopore region of amphibian embryo that secretes BMP inhibitors and dorsalizes the surrounding tissue is known as
(A) Bracher's cleft
(B) Nieuwkoop center
(C) Spemann's organizer
(D) Hensen's node

44. Cytoplasmic determinants coding for anterior structure of Drosophila embryo, if injected elsewhere in the recipient embryo, would lead to
(A) Normal development
(B) Formation of additional ectopic head
(C) Degeneration
(D) A phenotype with two heads and two tails

45. Philadelphia chromosome is:
(A) An obsolete term for Y chromosome
(B) Produced as a result of fusion of X and Y chromosome
(C) Defective chromosome 22, because of reciprocal translocation between chromosome 9 and chromosome 22
(D) Defective chromosome 21, produced during Down Syndrome

46. Nissl granules of neurons are functionally similar to

(A) Ribosomes
(B) Smooth endoplasmic reticulum
(C) Rough endoplasmic reticulum
(D) Lysosomes

47. The mutual exchange of food and other desirable substances between members of a social insect colony is called
(A) Mutualism
(B) Omnivorism
(C) Trophallaxis
(D) Heterotrophis

48. Among the following cell structure-function pairs, identify the correctly paired one
(A) Microvilli – engulfment of foreign bodies
(B) Cytoskeleton – cell migration
(C) Peroxisomes – cellular respiration
(D) Nucleolus – mRNA transcription

49. Lamprey, a jawless fish, belongs to which one of the following 'Classes'?
(A) Myxini
(B) Cephalaspilomorphi
(C) Conodonta
(D) Hyperoartia

50. Kalutas are dasyurids, the only group of mammals known to contain
(A) Oviparous species
(B) Viviparous species
(C) Iteroparous species
(D) Semelparous species

x-x-x