

MSc(HS)(Physics/Medical Physics/Physics & Electronics)

1. A single point charge is situated at the origin and creates an electric field \vec{E} . It follows from the electrostatics that:
 - A. $\vec{\nabla} \times \vec{E} = 0$
 - B. $\vec{\nabla} \cdot \vec{E} = 1$
 - C. $\vec{\nabla} \cdot \vec{E} = 0$
 - D. $\vec{\nabla} \cdot \vec{E} = 4$
2. The deuteron is formed by a pair of proton and neutron. The reduced mass of this two body system will:
 - A. depend on the strength of the strong force.
 - B. depend on the strength of the weak force.
 - C. depend on the strength of the gravitational force.
 - D. not depend on the interaction between them.
3. A neutron collides with another neutron at rest. After collision the angle between the scattered and the recoil neutrons will be:
 - A. 0° .
 - B. 90° .
 - C. 120° .
 - D. 180° .
4. An object moving at constant velocity in an inertial frame must:
 - A. have a net force acting on it.
 - B. have no frictional force acting on it.
 - C. have zero net force acting on it.
 - D. not have any force of gravity acting on it.
5. The center of mass of a system of particles has a constant velocity if:
 - A. the forces exerted by the particles on each other sum to zero.
 - B. the external forces acting on particles of the system sum to zero.
 - C. the velocity of the center of mass is initially zero.
 - D. the center of mass is at the geometric center of the system.
6. The acceleration of a comet in an elliptical orbit about the Sun:
 - A. increases while it is receding from the Sun.
 - B. is constant.
 - C. is greatest when nearest from the Sun.
 - D. varies sinusoidally with time.
7. The amplitude and phase constant of an oscillator are determined by:
 - A. the frequency.
 - B. the initial displacement alone.
 - C. the initial velocity alone.
 - D. both the initial displacement and the velocity.
8. A sinusoidal force with a given amplitude is applied to an oscillator. At resonance the amplitude of the oscillation is limited by:
 - A. the damping force.
 - B. the initial velocity.
 - C. the initial amplitude.
 - D. the force of gravity.
9. The sum of two sinusoidal travelling waves is a sinusoidal travelling wave only if :

- A. their amplitudes are the same and they travel in the same direction.
 - B. their amplitudes are the same and they travel in the opposite direction.
 - C. their frequencies are the same and they travel in the same direction.
 - D. their frequencies are the same and they travel in the opposite direction.
10. Two separated sources emit sinusoidal travelling waves that have the same wavelength λ and are in phase at their respective sources. One travels a distance ℓ_1 to get to the observation point while the other travels a distance ℓ_2 . The amplitude is a maximum at the observation point if $\ell_1 - \ell_2$ is :
- A. an odd multiple of $\lambda / 2$.
 - B. a multiple of λ .
 - C. an odd multiple of $\lambda / 4$.
 - D. an odd multiple of $\pi / 2$.
11. The mean free path of molecules of a gas contained in a vessel is proportional to :
- A. the molecular diameter.
 - B. the reciprocal of the molecular diameter.
 - C. the molecular concentration.
 - D. the reciprocal of the molecular concentration.
12. The change in entropy is zero for:
- A. reversible adiabatic processes.
 - B. reversible isothermal processes.
 - C. reversible isobaric processes.
 - D. reversible processes during which no work is done.
13. Un-polarized monochromatic light is incident on a polarizer. A quarter-wave plate is placed after the polarizer so that the polarizer axis is at 45° to the two axes of the quarter-wave plate. The emerging light from the plate will be:
- A. un-polarized.
 - B. circularly polarized.
 - C. plane polarized.
 - D. elliptical polarized.
14. An electric field exerts a torque on a dipole only if:
- A. the field is parallel to the dipole moment.
 - B. the field is not parallel to the dipole moment.
 - C. the field is perpendicular to the dipole moment.
 - D. the field is uniform.
15. Magnetization is :
- A. the current density in an object.
 - B. the charge density of moving charges in an object.
 - C. the magnetic dipole moment of an object.
 - D. the magnetic dipole moment per unit volume of an object.
16. The spin magnetic dipole moment of an electron:
- A. is zero.
 - B. is in the same direction as the spin angular momentum.
 - C. is in the opposite direction of the spin angular momentum.
 - D. has magnitude that depends on the applied magnetic field.
17. A magnetic field B_0 is applied to a diamagnetic substance. In the interior the magnetic field produced by the magnetic dipoles of the substance is:
- A. greater than B_0 and in the opposite direction.

- B. less than B_0 and in the opposite direction.
 C. greater than B_0 and in the same direction.
 D. less than B_0 and in the same direction.
18. Because ferromagnets exhibit hysteresis, the magnetization:
 A. can never vanish.
 B. can never be in the same direction as an applied field.
 C. may not vanish when an applied field is reduced to zero.
 D. is proportional to any applied magnetic field .
19. A magnetic field exists between the plates of a capacitor:
 A. always.
 B. never.
 C. when the capacitor is fully charged.
 D. while the capacitor is being charged.
20. One of the Maxwell equation is $\oint \vec{B} \cdot d\vec{A} = 0$. The infinitesimal vector area $d\vec{A}$ is always:
 A. tangent to surface.
 B. perpendicular to the surface and pointing outward.
 C. perpendicular to the surface and pointing inward.
 D. tangent to a field line.
21. The rms value of a sinusoidal voltage is $V_0 / \sqrt{2}$ where V_0 is the amplitude. What is the rms value of its fully rectified wave?
 A. $V_0^2 / \sqrt{2}$.
 B. $V_0^2 / 2$.
 C. $\sqrt{2} V_0$.
 D. $V_0 / \sqrt{2}$.
22. A charged capacitor and an inductor are connected in series. At time $t = 0$ the current is zero. If T is the period of the resulting oscillations, the next time, after $t = 0$ that the current is a maximum is :
 A. T .
 B. $T/4$.
 C. $T/2$.
 D. $2T$.
23. The time averaged energy in a sinusoidal electromagnetic wave is:
 A. overwhelmingly electrical.
 B. slightly more electrical than magnetic.
 C. equally divided between the electric and magnetic fields.
 D. slightly more magnetic than electrical.
24. A vertical automobile radio antenna is sensitive to electric fields that are polarized:
 A. horizontally.
 B. in circles around the antenna.
 C. vertically.
 D. none of the above.
25. In a Newton's ring pattern, as one approaches the pattern's edge, the dark rings :
 A. gets closer and thinner.
 B. gets closer but remain of equal thickness .
 C. are equally spaced but get thinner.
 D. get farther apart and thinner.

26. Which of the following is true for Bragg's diffraction but not for diffraction from grating?
- Two different wavelengths may be used.
 - For a given wavelength, a maximum may exist in several directions.
 - long waves deviated more than short ones.
 - Maxima occur only for particular angles of incidence.
27. In Compton scattering from stationary electrons the largest change in wavelength occurs when the photon is scattered through:
- 0° .
 - 45° .
 - 90° .
 - 180° .
28. A meson when at rest decays 2 microsec. after it is created. If moving in the laboratory at $0.99c$ (c -velocity of light), its lifetime according to laboratory clock would be:
- the same.
 - 0.28 ms.
 - 14 microsec.
 - 4.6 s.
29. A console lamp in the cabin of a spaceship appears green when the ship and observer are both at rest. When the ship is moving at $0.99c$ away from the Earth, passengers on board see :
- a green lamp.
 - a violet lamp .
 - a red lamp.
 - nothing (The frequency is too high to be seen).
30. The significance of the square of the magnitude of the wavefunction of the particle is:
- probability.
 - energy.
 - probability density.
 - energy density.
31. The reflection coefficient R for a certain barrier tunneling problem is 0.70. The corresponding transmission coefficient T is:
- 0.70.
 - 0.60.
 - 0.50.
 - 0.30.
32. If a wavefunction ψ for a particle moving along the z -axis is normalized, then:
- $\int |\psi|^2 dt = 1.$
 - $\int |\psi|^2 dz = 1.$
 - $\frac{\partial \psi}{\partial z} = 1.$
 - $|\psi|^2 = 1.$
33. The ground state energy of an electron in a one-dimensional potential well with zero potential energy in the interior and infinite energy potential at the walls:
- is zero.
 - decreases with temperature.
 - increases with temperature.
 - is independent of temperature.

34. The quantum number n is most closely associated with what property of the electron in a hydrogen atom?
- Energy.
 - Orbital angular momentum.
 - Spin angular momentum.
 - Magnetic moment.
35. The atom is in a state with orbital quantum number $\ell = 2$. The number of possible values of the magnetic quantum number m_ℓ is :
- 2.
 - 3.
 - 4.
 - 5.
36. The Boolean expression $(A + B)(A + B)$ for the input logics A and B is equivalent to:
- OR gate.
 - AND gate.
 - NOR gate.
 - XOR gate.
37. A photon with the smallest wavelength in the continuous x-ray is emitted when:
- an electron is knocked from a K-shell.
 - the atom has the greatest recoil energy.
 - the incident electron loses all its energy in a single decelerating event.
 - a valence electron is knocked from the atom.
38. Which of the following group of particles follows Pauli exclusion principle?
- photon , electron and neutron.
 - anti-neutrino, Z-boson and electron.
 - electron, neutron and proton.
 - phonon, proton and electron.
39. Electrons in a certain LASER make transitions from a metastable state to the ground state. Initially there are 6×10^{20} atoms in the metastable state and 2×10^{20} atoms in the ground state. The number of photons that can be produced in a single burst is about :
- 2×10^{20} .
 - 3×10^{20} .
 - 4×10^{20} .
 - 6×10^{20} .
40. In a helium- neon LASER, The LASER light arises from a transition from a -----state to a ----
- state.
- He, He.
 - Ne, Ne.
 - He, Ne.
 - Ne, He.
41. The Fermi energy of a metal depends mainly on:
- the temperature.
 - the volume of the sample.
 - the strength of the applied magnetic field.
 - the number density of conduction electrons.
42. A hole refers to:
- a positively charged electron.

- B. an electron that has somehow lost its charge.
 C. the absence of an electron in an otherwise filled band.
 D. a microscopic defect in solid.
43. For a pure semiconductor the Fermi level is :
 A. is in the conduction band.
 B. well above the conduction band.
 C. in the valence band.
 D. near the center of the gap between the valence and conduction band.
44. Application of a forward bias to a p-n junction:
 A. narrows the depletion zone.
 B. increases the electric field in the depletion zone.
 C. increases the potential difference across the depletion zone.
 D. decreases the number of donors on the n-side.
45. Volumes of atomic nuclei are proportional to :
 A. mass number (A).
 B. $A(A-1)$.
 C. Atomic number(Z).
 D. none of these.
46. The greatest binding energy per nucleon occurs for nuclides with masses near that of:
 A. sodium.
 B. iron.
 C. mercury.
 D. uranium.
47. When ordinary sulfur, ^{32}S (Z=16), is bombarded with neutrons, the products are ^{32}P (Z=15) and:
 A. an alpha particle.
 B. a proton.
 C. a deuteron.
 D. a gamma ray.
48. A nucleus with mass number A and atomic number Z undergoes electron capture. The mass number and atomic number, respectively, of the daughter nucleus are :
 A. A , Z-1.
 B. A , Z+1.
 C. A+1 , Z-1.
 D. A-1 , Z+1.
49. The energies of electrons emitted in beta-decay have a continuous spectrum because:
 A. the daughter nucleus may have any energy.
 B. free electrons always have a continuous spectrum.
 C. more than one electron is emitted in each decay.
 D. the neutrino can carry off any energy up to a certain maximum.
50. The parity is NOT violated in the following nuclear transformation :
 A. $n \rightarrow p + e^- + \text{antineutrino}$.
 B. $p \rightarrow n + e^+ + \text{neutrino}$ (inside nucleus).
 C. $p + e^- \rightarrow n + \text{neutrino}$ (electron capture).
 D. $n + p \rightarrow {}^2\text{H} + \text{gamma}$.
51. Which of the following particles is stable?

- A. Neutron.
 - B. Proton.
 - C. Pion.
 - D. Muon.
52. An example of a fermion is:
- A. photon.
 - B. pion.
 - C. neutron.
 - D. kaon.
53. All leptons interact with each other via the:
- A. strong force.
 - B. electromagnetic force.
 - C. weak force.
 - D. strange force.
54. The DC signal can be converted to AC signal through the use of:
- A. p-n diode.
 - B. astable multivibrator.
 - C. monostable multivibrator.
 - D. bistable multivibrator.
55. The attenuation coefficient of aluminium for soft X-rays is 1.73/cm. The fraction of X-rays transmitted by 1.157cm thick aluminium sheet is :
- A. 10%.
 - B. 13.5%.
 - C. 16.5%.
 - D. 19.5%.
56. The mass of proton is 1.67×10^{-27} kg and the charge 1.60×10^{-19} Coulomb. The frequency of rotation of a proton in cyclotron whose magnetic field is 1.0T , is :
- A. 45.3 MHz.
 - B. 35.3 MHz.
 - C. 25.3 MHz.
 - D. 15.3 MHz.
57. Which of the following particles has no magnetic moment associated with it?
- A. Photon.
 - B. Proton.
 - C. Electron.
 - D. Neutron.
58. Deuteron and proton are moving with the same velocity in a medium. If the stopping power for a proton is 2.0 MeV/g-cm^2 , the stopping power of deuteron will be:
- A. 2.0 MeV/g-cm^2 .
 - B. 4.0 MeV/g-cm^2 .
 - C. 6.0 MeV/g-cm^2 .
 - D. 8.0 MeV/g-cm^2 .
59. The gas multiplication factor of a GM counter increases if the:
- A. potential difference is decreased and the radius of the anode wire increased.
 - B. only the potential difference is decreased.
 - C. the distance between the anode wire and the cathode is decreased.
 - D. the length of the anode wire is reduced.

60. Charged particles get accelerated in a cyclotron because of its motion:
- A. inside dee in the presence of electric field.
 - B. inside dee in the presence of magnetic field.
 - C. outside dee in the presence of electric field.
 - D. outside dee in the presence of magnetic field only.
61. For the same sine wave, the ratio of the frequency of the output voltage of the half-wave rectifier to the full wave rectifier is:
- A. 0.5.
 - B. 1.0.
 - C. 1.5.
 - D. 2.5.
62. Impedance matching between two stages is generally accomplished through:
- A. common base amplifier.
 - B. common emitter amplifier.
 - C. common collector amplifier.
 - D. none of the above.
63. The stability of the amplifier is increased by adding the portion of the output voltage to the overall input voltage with the phase difference:
- A. 0° .
 - B. 90° .
 - C. 180° .
 - D. 360° .
64. The modulation index of an AM wave is changed from 0 to 1. The transmitted power is:
- A. unchanged.
 - B. halved.
 - C. doubled.
 - D. increased by 50%.
65. The input current and the emitter current in the common emitter configuration are 0.79mA and 15.79mA, respectively. The voltage drop across the 1kOhm load is:
- A. 0.79V.
 - B. 15.79V.
 - C. 15V.
 - D. 16.58V.
66. Reciprocal lattice of a body centered cubic lattice has :
- A. 1-fold rotational symmetry only.
 - B. 2-fold rotational symmetry.
 - C. 4-fold rotational symmetry.
 - D. 6-fold rotational symmetry.
67. The experimental evidence of the quantization of elastic waves in solids is provided by the:
- A. photoelectric effect.
 - B. Compton effect.
 - C. Meissner effect.
 - D. lattice heat capacity.
68. Hall coefficient of a solid is:
- A. increased by decreasing strength of the magnetic field.
 - B. increased by increasing strength of the magnetic field.
 - C. decreasing current through the sample.

- D. unaffected by the change of above factors.
69. The number of energy states in a band is equal to the:
- A. total number of electrons.
 - B. total number of atoms.
 - C. total number of primitive cells.
 - D. total number of unit cells.
70. Which of the following is not associated with the superconducting phase of solids?
- A. Small mean free path of electrons.
 - B. Discontinuity in the heat capacity.
 - C. Josephson effect.
 - D. Meissner effect.
71. The hysteresis loop is associated with the:
- A. diamagnetic substances.
 - B. paramagnetic substances.
 - C. para-electric substances.
 - D. ferroelectric substances.
72. The working substance in the process of adiabatic demagnetization:
- A. is ferroelectric in nature.
 - B. is ferromagnetic nature.
 - C. is paramagnetic nature.
 - D. is diamagnetic nature.
73. In gamma ray transition:
- A. atomic mass(A) may change.
 - B. atomic number(Z) may change.
 - C. atomic volume may change.
 - D. angular momentum of the states may or may not change.
74. Quarks are the constituents of:
- A. all particles.
 - B. all leptons.
 - C. all strongly interacting particles.
 - D. only mesons.
75. Thermal neutrons:
- A. raise the temperature of the substance when passing through it.
 - B. are essential for the fusion reactions.
 - C. has kinetic energy equivalent to free atoms at room temperature.
 - D. has more kinetic energy than that of fast neutrons.

MSc(HS/2Yr)(Botany)

- 1 Agar agar is extracted from
 - (A) *Laminaria*
 - (B) *Gracilaria*
 - (C) *Fucus*
 - (D) *Dictyota*

- 2 Gametic meiosis occurs in
 - (A) Haplontic cycle
 - (B) Diplohaplontic cycle
 - (C) Diplontic cycle
 - (D) Isomorphic Haplodiplontic cycle

- 3 Chlorophyll 'c' is present in
 - (A) Chlorophyta
 - (B) Rhodophyta
 - (C) Phaeophyta
 - (D) Cyanophyta

- 4 All algae have
 - (A) Chlorophyll a and Carotene
 - (B) Chlorophyll a and Chlorophyll b
 - (C) Chlorophyll b and Carotene
 - (D) Phycobilins and Carotene

- 5 Male sex organs in *Chara* are called
 - (A) Glomerule
 - (B) Nocule
 - (C) Globule
 - (D) Pinnule

- 6 Floridean starch is reserve food material in
 - (A) Myxophyceae
 - (B) Chlorophyceae
 - (C) Phaeophyceae
 - (D) Rhodophyceae

- 7 Zygospores are formed in
 - (A) *Alternaria*
 - (B) *Puccinia*
 - (C) *Mucor*
 - (D) *Penicillium*

- 8 '*Mycorrhizae*' are useful for plants mainly due to their following attribute
 - (A) Killing insects and pathogen
 - (B) Fixing atmospheric nitrogen
 - (C) Providing resistance against Abiotic stress
 - (D) Enhanced absorption of nutrients from soil

- 9 Which group among the following is not true fungi
 - (A) Ascomycetes
 - (B) Basidiomycetes
 - (C) Oomycetes
 - (D) Coelomycetes

- 10 Which one of the following lack conidiomata
 - (A) Coelomycetes

- (B) Ascomycetes
- (C) Hypomycetes
- (D) Saprolegniales

11 The unilocular fruiting body in which conidiophore and conidia are formed is called as

- (A) Pycnidia
- (B) Acervulus
- (C) Synnemeta
- (D) Sporodochia

12 Elaterophore is present in capsule of

- (A) *Marchantia*
- (B) *Pellia*
- (C) *Porella*
- (D) *Sphagnum*

13 Protonema of moss is

- (A) Haploid
- (B) Diploid
- (C) Triploid
- (D) Sporophytic

14 Pseudoelaters are present in

- (A) *Marchantia*
- (B) *Anthoceros*
- (C) *Pellia*
- (D) *Porella*

15 Pseudopodium is present in sporophyte of

- (A) *Porella*
- (B) *Pogonatum*
- (C) *Polytrichum*
- (D) *Sphagnum*

16 Foot and seta are absent in the sporophyte of

- (A) *Riccia*
- (B) *Marchantia*
- (C) *Pellia*
- (D) *Porella*

17 The major constituent of Peat is

- (A) *Marchantia*
- (B) *Pogonatum*
- (C) *Polytrichum*
- (D) *Sphagnum*

18 The protostele in which xylem core is smooth and rounded is

- (A) Haplostele
- (B) Actinostele
- (C) Plectostele
- (D) Siphonostele

19 The inner most layer of sporangium of *Selaginella* is

- (A) Elators
- (B) synangium
- (C) Tapetum
- (D) Jacket

- 20 The stele present in *Equisetum* is
(A) Haplostele
(B) Actinostelele
(C) Plectostele
(D) Siphonostele
- 21 Spore dissemination in many ferns is affected by
(A) Inducium
(B) Sorus
(C) Annulus
(D) Tepetum
- 22 The endosperm of gymnosperms is
(A) Haploid
(B) Diploid
(C) Triploid
(D) Polyploid
- 23 Most of the gymnosperms have
(A) Both antheridia and archegonia
(B) Neither antheridia nor archegonia
(C) Archegonia but no antheridia
(D) Only antheridia
- 24 Corolloid roots in *Cycas* are
(A) Dichotomously branched and negatively geotropic
(B) Dichotomously branched and positively geotropic
(C) Extensively branched and negatively phototropic
(D) Dichotomously branched with horizontal growth
- 25 Male gametes of angiosperms are produced by
(A) Vegetative cell
(B) Tube cell
(C) Generative cell
(D) Pollen tube
- 26 Female gametophyte (megagametophyte) of angiosperms is represented by
(A) ovule
(B) embryo sac
(C) megaspore mother sac
(D) megasporophyll
- 27 The plant part of angiosperms, which consists of two generations one within the other is
(A) Germinated pollen grains
(B) Seed
(C) Embryo
(D) Unfertilized ovule
- 28 In angiosperms, triple fusion produces
(A) Primary endospermic nucleus
(B) Secondary nucleus
(C) Zygotic nucleus
(D) Polar nucleus
- 29 When the body of the ovule is transversely placed and is at right angle to the stalk/funicle of the ovule, it is called
(A) Anatropous
(B) Circinotropous
(C) Orthotropous

(D) Hemianatropous

30 An inflorescence bearing sessile, bisexual flowers in acropetal succession is called as

- (A) Spike
- (B) Spadix
- (C) Corymb
- (D) Raceme

31 Cork cambium and vascular cambium are

- (A) Parts of secondary xylem and phloem
- (B) Parts of pericycle
- (C) Lateral meristem
- (D) Apical meristem.

32 A bicollateral vascular bundle is characterised by

- (A) Phloem being sandwiched between xylem
- (B) Xylem being sandwiched between phloem
- (C) Longitudinal splitting of vascular bundle
- (D) Transverse splitting of vascular bundle

33 Heartwood differs from sapwood in

- (A) Absence of vessels and parenchyma
- (B) Presence of rays and fibres
- (C) Having dead and non-conducting elements
- (D) Being susceptible to pests and pathogens

34 Interfascicular cambium is a

- (A) Type of Protoderm
- (B) Primordial meristem
- (C) Primary meristematic tissue
- (D) Secondary meristematic tissue

35 Pith and cortex do not differentiate in

- (A) Monocot stem
- (B) Dicot stem
- (C) Monocot root
- (D) Dicot root.

36 Collateral bundles occur in

- (A) Dicot as well as monocot stem
- (B) Leaves only
- (C) Monocot stem only
- (D) Dicot stem only

37 A pair of genes representing alternative forms of the same character and located on two homologous chromosomes is called as

- (A) Alleles or allelomorphous pairs
- (B) Non allelic alleles
- (C) Homozygous genes
- (D) Heterozygous genes

38 If an organism produces 32 types of gametes, its genotype should be heterozygous for

- (A) 4 genes
- (B) 5 genes
- (C) 8 genes
- (D) 16 genes

- 39 Genes which have similar genotypic effect when present separately but together interact to produce a different trait and a ratio of 9:7 in F₂ generation are called as
- (A) Supplementary genes
 - (B) Complementary genes
 - (C) Hypostatic genes
 - (D) Epistatic genes
- 40 A gene which can occur in more than two alternative forms present on the same locus is called as
- (A) Polygene
 - (B) Pleiotropic gene
 - (C) Multiple allele
 - (D) Lethal gene
- 41 When two genes are located very close to each other on the same chromosome
- (A) Frequency of crossing over increases
 - (B) Hardly any crossing over takes place
 - (C) Linkage is zero
 - (D) Only double cross over can occur
- 42 Crossing over during meiosis occurs at which of the following stages?
- (A) Diakinesis
 - (B) leptotene
 - (C) zygotene
 - (D) pachytene
- 43 What will you call this set up $2n-2+2$
- (A) Nullisomy
 - (B) Nullisomy tetrasomy
 - (C) Double nullisomy
 - (D) Double tetrasomy
- 44 A polyploid species having multiple and identical sets of chromosomes is called as
- (a) Allopolyploid
 - (b) Amphipolyploid
 - (c) Aneuploidy
 - (d) Autopolyploid
- 45 Point mutations occur during
- (A) DNA replication
 - (B) DNA repairing
 - (C) Cell division
 - (D) Transcription
- 46 The type of interaction between two non-allelic genes in which one masks, inhibits or suppresses the expression of other is called
- (A) Epistasis
 - (B) Co-dominance
 - (C) Expressivity
 - (D) Dominance
- 47 A bivalent of meiosis-1 consist of
- (A) Four chromatids and four centromeres
 - (B) Two chromatids and for two centromeres
 - (C) Two chromatids and one centromere
 - (D) Four chromatids and two centromeres

48 Initiation Codon is

- (A) AUG
- (B) GUC
- (C) CUC
- (D) AAA

49 Which one is a termination codon

- (A) AGG
- (B) UUA
- (C) UAA
- (D) AUG

50 Replacement of a purine by a pyrimidine during DNA replication is called as

- (A) Transition
- (B) Transversion
- (C) Translocation
- (D) Translation

51 Which one of the following is essential fatty acid

- (A) Acetic acid
- (B) Oleic acid
- (C) Linoleic acid
- (D) Palmitic acid

52 The variations among the plants with gametic chromosome number is popularly described as

- (A) Somaclonal variations
- (B) Gametoclonal variations
- (C) Inter specific variations
- (D) Intraspecific variations

53 Which one of the following acts as energy source in nutrient medium

- (A) Agar
- (B) Chelators
- (C) Sucrose
- (D) Plant growth regulators

54 Which one of the following is not an application of plant tissue culture

- (A) Conservation of germplasm
- (B) Plant breeding
- (C) Genetic engineering
- (D) Biochemical analysis

55 Which of the following chemicals is **not** used for surface sterilization of explants

- (A) HgCl_2
- (B) CaCl_2
- (C) NaClO
- (D) Ethanol

56 Which one of the following is naturally occurring auxin

- (A) NAA
- (B) IAA
- (C) 2,4-D
- (D) Picloram

57 Heaviest wood is obtained from

- (A) *Krugiodendron ferreum*
- (B) *Quercus rubra*

- (C) *Juglans cinerea*
- (D) *Tectona grandis*

58 Quinine is obtained from
(A) *Raulfia serpentina*
(B) *Cincona calisaya*
(C) *Claviceps perpuria*
(D) *Digitalis perpuria*

59 Drying oil is obtained from
(A) *Arechis hypogia*
(B) *Ricinus communis*
(C) *Linum usitaticimum*
(D) *Cocos nucifera*

60 Cinamom is obtained from bark of which plant?
(A) *Elettaria cardamomum*
(B) *Cuminum cyminum*
(C) *Cinamomum camphora*
(D) *Cinamomum vernum*

61 Jute fibre is obtained from
(A) *Corchous capsularis*
(B) *Crotolaria junctia*
(C) *Cannabis sativa*
(D) *Ceiba pentandra*

62 Increasing skin cancer and high mutation rate are due to
(A) Ozone depletion
(B) CO pollution
(C) CO₂ pollution
(D) Acid rain

63 In an ecosystem the population of
(A) Secondary consumers is largest
(B) Primary consumers is least dependent upon primary producers
(C) Primary consumers outnumber primary producers
(D) Primary producers is greater than number of primary consumers

64 Energy pyramid is always
(A) Upright
(B) Inverted
(C) Parallel
(D) Inclined

65 'Smog' is
(A) Dust storm
(B) Smoke and fog
(C) Smoke
(D) Moistened air gases

66 Energy flow in an ecosystem through a path is
(A) Producer > Carnivores > Herbivores > Decomposers
(B) Producer > Herbivores > Carnivores > Decomposers
(C) Herbivores > Producer > Carnivores > Decomposers
(D) Herbivores > Carnivores > Producer > Decomposers

67 Chlorophyll is present

- (A) On the surface of chloroplast
- (B) In the stroma of chloroplast
- (C) In the grana of chloroplast
- (D) Dispersed through the chloroplast

68 In case of C_4 pathway, CO_2 combines with

- (A) PGA
- (B) RuBP
- (C) PEP
- (D) RMP

69 Which one of the following is **not** a micronutrient?

- (A) Magnesium
- (B) Molybdenum
- (C) Boron
- (D) Zinc

70 Which is the first stable compound produced in calvin cycle?

- (A) OAA
- (B) PGA
- (C) PEP
- (D) RuBP

71 Deficiency of which mineral causes shortning of internodes and reduction in cambium activity?

- (A) K
- (B) Fe
- (C) Cu
- (D) B

72 The number of photons required to release one mole of O_2 in photosynthesis is called as

- (A) Quantum yield
- (B) Quantum requirement
- (C) Red drop
- (D) Emerson's effect

73 Bacteria prepare food by oxidation of

- (A) N_2
- (B) NO_2
- (C) O_2
- (D) Glycogen

74 A fully formed infectious viral particles called as

- (A) Viroid
- (B) Virusoid
- (C) Virion
- (D) Capsid

75 Which of the following statements is false with respect to Mycoplasma

- (A) They are the smallest prokaryotic organisms that can grow in cell free culture media
 - (B) They are obligate intracellular organisms
 - (C) They lack a cell wall
 - (D) They are resistant to Beta-lactam drug
-

MBAFEX

1. Atmospheric pressure generated on the earth's surface is due to :
 - a. Earth rotation
 - b. Earth revolution
 - c. Gravitational force of earth
 - d. Moon's rotation
2. Among the following gases which is responsible for climate change?
 - a. Oxygen
 - b. Carbon-di-oxide
 - c. Nitrogen
 - d. Helium
3. Which state has longest coastline in India?
 - a. Tamilnadu
 - b. Gujrat
 - c. Andhra Pradesh
 - d. West Bengal
4. The Karakoram Highway connects which of the following countries?
 - a. India – Nepal
 - b. China – India
 - c. China – Pakistan
 - d. India – Bangladesh
5. Which of the following latitudes passes through India?
 - a. Equator
 - b. Tropic of Capricorn
 - c. Arctic Circle
 - d. Tropic of Cancer
6. India share longest International boundary with which of the following country?
 - a. Bangladesh
 - b. China
 - c. Nepal
 - d. Bhutan
7. The branch of medical science which is concerned with the study of disease as it affects a community of people is called
 - a. Epidemiology
 - b. Oncology
 - c. Paleontology
 - d. Pathology
8. Superconductivity is a material property associated with
 - a. cooling a substance without a phase change
 - b. frictionless liquid flow
 - c. a loss of thermal resistance
 - d. a loss of electrical resistance
9. Yeast, used in making bread is a
 - a. Fungus
 - b. Plant
 - c. Bacteria
 - d. Seed
10. Titan is the largest natural satellite of planet
 - a. Mercury

- b. Venus
 - c. Saturn
 - d. Neptune
11. The weight of an object will be minimum when it is placed at?
- a. The North Pole
 - b. The South Pole
 - c. The Equator
 - d. The center of the Earth
12. What does airbag, used for safety of car driver, contain?
- a. Sodium bicarbonate
 - b. Sodium azide
 - c. Sodium nitrite
 - d. Sodium peroxide
13. Chemically, lime water is
- a. Calcium hydroxide
 - b. Sodium carbonate
 - c. Sodium hydroxide
 - d. Calcium carbonate
14. Chemically, bleaching powder is
- a. Calcium hypochlorite
 - b. Calcium hydroxide
 - c. Sodium hydroxide
 - d. Calcium sulphate
15. Consider the following statements:
1. Hepatitis B is several times more infectious than HIV / AIDS.
 2. Hepatitis B can cause liver cancer.
- Which of the statement given above is/are correct?
- a. 1 only
 - b. 2 only
 - c. Both 1 and 2
 - d. Neither 1 nor 2
16. Plants get their nitrogen from
- a. Rain
 - b. the soil
 - c. the air
 - d. the bedrock
17. In summer, man with excess perspiration feels weak, because of the
- a. Loss of more water through evaporation
 - b. Loss of salts through evaporation
 - c. Loss of carbohydrates through evaporation
 - d. All factors mentioned above
18. Considering industrial structures, economies who are rich in mineral resources but are poor in other manufacturing ways are classified as
- a. raw material exporting economies
 - b. subsistence economies
 - c. emerging economies
 - d. industrial economies
19. Considering industrial structures, economies that are large exporters of manufactured products or services are classified as

- a. raw material exporting economies
 - b. subsistence economies
 - c. emerging economies
 - d. industrial economies
20. Countries having industrial economic structure are
- a. Saudi Arabia and Chile
 - b. Brazil and China
 - c. United States and Japan
 - d. both a and b
21. Considering industrial structures, economies who are heading further with fast growth leading to overall economic growth of country is classified as
- a. raw material exporting economies
 - b. subsistence economies
 - c. emerging economies
 - d. industrial economies
22. An idea for a possible product that company will offer is classified as
- a. product idea
 - b. product image
 - c. customer management
 - d. customer satisfaction
23. Long-term social and economic changes on a highly large scale is classified as
- a. minor trends
 - b. mega trends
 - c. special followers
 - d. introductory products
24. An analysis of income distribution and person's savings is part of
- a. geographic environment analysis
 - b. economic environment analysis
 - c. demographic environment analysis
 - d. analysis of natural environment
25. Customers activity which is often unpredictable and short lived is best classified as
- a. marketing shade
 - b. short-term marketing wave
 - c. fad
 - d. fade
26. A persons feeling of pleasure which results in products performance that match expectations is called
- a. satisfaction
 - b. dissatisfaction
 - c. distinctive proposition
 - d. superior value
27. In marketing, 'relative employee satisfaction' is best classified as
- a. internal marketing metrics
 - b. perceived metrics
 - c. quality metrics
 - d. loyalty metrics
28. Consumer's satisfaction' is classified as
- a. unit metrics
 - b. procedural metrics

- c. marketing external metrics
 - d. sampling metrics
29. Record of satisfaction of company's employees, suppliers and distributors is part of
- a. stakeholder performance scorecard
 - b. marketing dashboards
 - c. customer performance scorecard
 - d. market performance record
30. If company provides products or services less than its cost then company will
- a. get more loss
 - b. get more profits
 - c. get more discounts
 - d. both a and b
31. Major pricing strategies does not includes
- a. competition based pricing
 - b. customer value based pricing
 - c. cost based pricing
 - d. discount and bonus pricing
32. Analysis of opportunities and threats includes
- a. internal environment
 - b. external environment
 - c. market environment
 - d. product environment
33. When a company agrees to promote product of other company, offers its best classified as
- a. product alliance
 - b. service alliances
 - c. promotional alliances
 - d. logistic alliances
34. When a firm offers logistical services for some other company's product, it is said to be
- a. logistic alliance
 - b. production alliances
 - c. raw materials alliance
 - d. employee alliances

Component III: Data Interpretation and Problem Solving

The proportion of male student and proportion of vegetarian in a school are given below. The school has a total of 800 students, 80% of whom are in the Secondary Section and rest equally divided between Class 11 and 12. (Question 35-37)

| | Male (M) | Vegetarian (V) |
|-------------------|----------|----------------|
| Class 12 | 0.60 | |
| Class 11 | 0.55 | 0.50 |
| Secondary section | | 0.55 |
| Total | 0.475 | 0.53 |

35. What is the percentage of vegetarian students in class 12?
- a. 40
 - b. 45

- c. 50
d. 55
36. In class 12, twenty 25% of the vegetarian are male. What is the difference between number of female vegetarian and male non-vegetarian?
a. 10
b. 12
c. 14
d. 16
37. What is the percentage of male students in Secondary Section?
a. 40
b. 45
c. 50
d. 55

Study the following table chart and answer the questions based on it. Expenditures of a Company (in Lakh Rupees) per Annum Over the given Years.

| Year | Salary | Fuel and Transport | Bonus | Interest on Loans | Taxes |
|------|--------|--------------------|-------|-------------------|-------|
| 1998 | 288 | 98 | 3.00 | 23.4 | 83 |
| 1999 | 342 | 112 | 2.52 | 32.5 | 108 |
| 2000 | 324 | 101 | 3.84 | 41.6 | 74 |
| 2001 | 336 | 133 | 3.68 | 36.4 | 88 |
| 2002 | 420 | 142 | 3.96 | 49.4 | |

38. What is the average amount of interest per year which the company had to pay during this period ?
a. Rs 36.66 Lakhs
b. Rs 36.36 Lakhs
c. Rs 36.26 Lakhs
d. Rs 36.06 Lakhs
39. The total amount of bonus paid by the company during the given period is approximately what percent of the total amount of salary paid during this period ?
a. 5%
b. 1%
c. 1.5%
d. 2%
40. Total expenditure on all these items in 1998 was approximately what percent of the total expenditure in 2002 ?
a. 61%
b. 47%
c. 59%
d. 69%
41. Calculate the total expenditure of the company over these items during the year 2000 from the table chart given.
a. Rs. 543.44 lakhs
b. Rs. 544.44 lakhs
c. Rs. 545.44 lakhs
d. Rs. 546.44 lakhs

42. The ratio between the total expenditure on Taxes for all the years and the total expenditure on Fuel and Transport for all the years respectively is approximately?
- 4:13
 - 7:13
 - 10:13
 - 11:13

Study the following table carefully and answer the questions given below. Number of workers in the given six shifts of various factories (Number in thousands)

| Shifts Factory | L | M | N | O | P |
|----------------|------|------|------|------|------|
| 7 A.M - 11 A.M | 7.5 | 8.0 | 7.8 | 7.59 | 8.32 |
| 11 A.M - 3 P.M | 6.38 | 7.0 | 7.16 | 6.5 | 7.5 |
| 3 P.M - 7 P.M | 6.5 | 7.28 | 6.35 | 6.15 | 7.24 |
| 7 P.M - 11 P.M | 7.8 | 5.25 | 6.0 | 6.0 | 6.5 |
| 11 P.M - 3 A.M | 5.5 | 5.0 | 5.10 | 5.5 | 5.7 |
| 3 A.M - 7 A.M | 4.2 | 3.0 | 4.12 | 3.5 | 2.1 |

43. The total number of workers from factory O are approximately what percent of the total number of workers from factory L?
- 89%
 - 80%
 - 96%
 - 93%
44. What is the average number of workers working in various shifts from factory P?
- 6045
 - 6200
 - 6235
 - 6150
45. What is the difference in the total number of workers in various shifts from factory M and total number of workers in various shifts from factory O?
- 290
 - 275
 - 295
 - 270
46. What is the ratio of the total number of workers from factories L and M working in the shift of 11 P.M to 3 A.M and the total number of workers working in the same shift from factories O and P?
- 13:14
 - 15:16
 - 13:15
 - 15:17
47. What is the total of the average number of workers working in the shift of 7 A.M to 11 A.M from all the factories and the average number of workers working in the shift of 7 P.M. to 11 P.M. from all the factories?
- 11502
 - 15142

- c. 14520
- d. 14152

A survey of TV watching habits of people living in 5 cities, 1, 2, 3, 4, and 5 is summarized below. The column(1) gives the percentage of T.V watchers in each city who see only one day in a week. The Column (2) gives the total number of T.V watchers who see more than one day in a week. Read the table and answer the questions.

| City | (1) | (2) |
|------|-----|------|
| 1 | 48 | 3400 |
| 2 | 30 | 3800 |
| 3 | 65 | 4500 |
| 4 | 15 | 5800 |
| 5 | 85 | 7500 |

48. How many watch T.V in city-3 only one time in a week?
- a. 3000
 - b. 2875
 - c. 8352
 - d. 2975
49. The city with the lowest number of T.V watchers is:
- a. 2
 - b. 5
 - c. 3
 - d. 1
50. The total number of all T.V-watchers in the five cities, who see only once in a week?
- a. 55646
 - b. 56646
 - c. 57666
 - d. 53987

Component IV: Numerical Ability

51. If a boat is moving in upstream with velocity of 14 km/hr and goes downstream with a velocity of 40 km/hr, then what is the speed of the stream ?
- a. 13 km/hr
 - b. 26 km/hr
 - c. 34 km/hr
 - d. 32 km/hr
52. Find the value of $(0.75 * 0.75 * 0.75 - 0.001) / (0.75 * 0.75 - 0.075 + 0.01)$
- a. 0.845
 - b. 1.908
 - c. 2.312
 - d. 0.001
53. A car travels a certain distance taking 7 hrs in forward journey, during the return journey increased speed 12km/hr takes the times 5 hrs.What is the distance travelled
- a. 210 kms
 - b. 30 kms

- c. 20 kms
 - d. 60 kms
54. Find $(7x + 4y) / (x-2y)$ if $x/2y = 3/2$?
- a. 6
 - b. 8
 - c. 7
 - d. 9
55. A cylinder is 6 cms in diameter and 6 cms in height. If spheres of the same size are made from the material obtained, what is the diameter of each sphere?
- a. 5 cm
 - b. 2 cm
 - c. 3 cm
 - d. 6 cm
56. What is the smallest number by which 2880 must be divided in order to make it into a perfect square ?
- a. 3
 - b. 4
 - c. 5
 - d. 6
57. A father is 30 years older than his son however he will be only thrice as old as the son after 5 years what is father's present age in years?
- a. 40
 - b. 50
 - c. 60
 - d. 30
58. An article sold at amount of 50% the net sale price is rs 425. What is the list price of the article?
- a. 500
 - b. 525
 - c. 540
 - d. 480
59. Nitin ranks 18th in a class of 49 students. What is rank from the last ?
- a. 31
 - b. 18
 - c. 19
 - d. 32
60. Three persons A, B and C are standing in a queue. There are five persons between A and B and eight persons between B and C. If there be three persons ahead of C and 21 persons behind A, what could be the minimum number of persons in the queue?
- 1. 41
 - 2. 40
 - 3. 28
 - 4. 27

Component V: Verbal Ability and Reasoning

61. Nurture : Neglect then Denigrate : ?
- a. Calumniate
 - b. Recognise
 - c. Reveal

d. Extol

62. EXPEL: SCHOOL ::

- a. export : factory
- b. study : school
- c. exile : nation
- d. lecture : college

63. Antonym of AMENABLE

- a. Uncooperative
- b. Persuadable
- c. Biddable
- d. Docile

64. The plants and vegetation of a certain region.

- a. Flora
- b. Fauna
- c. Forest
- d. Vegetation

65. One whose wife is dead.

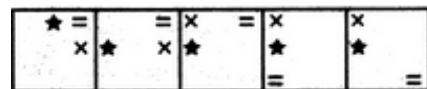
- a. Widow
- b. Celibate
- c. Widower
- d. Divorcee

66. Look at this series : 7, 10, 8, 11, 9, 12, _____. Fill in the blank.

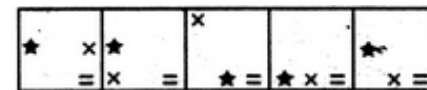
- a. 7
- b. 10
- c. 12
- d. 13

67. Select a figure from amongst the Answer Figures which will continue the same series as established by the five Problem Figures

Problem Figures:



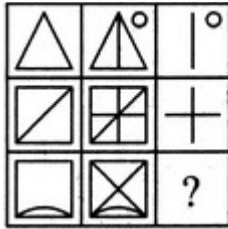
Answer Figures:



1 2 3 4 5

- (a) 2
- (b) 3
- (c) 4
- (d) 5

68. Select a suitable figure from the four alternatives that would complete the figure matrix.



(1) (2) (3) (4)

- a. (1)
- b. (2)
- c. (3)
- d. (4)

69. A man walks 5 km toward south and then turns to the right. After walking 3 km he turns to the left and walks 5 km. Now in which direction is he from the starting place?

- a. West
- b. South
- c. North-East
- d. South-West

70. One morning Udai and Vishal were talking to each other face to face at a crossing. If Vishal's shadow was exactly to the left of Udai, which direction was Udai facing?

- a. East
- b. West
- c. North
- d. South

VI: English comprehension

Read the following passage and answer the subsequent questions.

The Alaska pipeline starts at the frozen edge of the Arctic Ocean. It stretches southward across the largest and northernmost state in the United States, ending at a remote ice-free seaport village nearly 800 miles from where it begins. It is massive in size and extremely complicated to operate.

The steel pipe crosses windswept plains and endless miles of delicate tundra that tops the frozen ground. It weaves through crooked canyons, climbs sheer mountains, plunges over rocky crags, makes its way through thick forests, and passes over or under hundreds of rivers and streams. The pipe is 4 feet in diameter, and up to 2 million barrels (or 84 million gallons) of crude oil can be pumped through it daily.

Resting on H-shaped steel racks called "bents," long sections of

the pipeline follow a zigzag course high above the frozen earth. Other long sections drop out of sight beneath spongy or rocky ground and return to the surface later on. The pattern of the pipeline's up-and-down route is determined by the often harsh demands of the arctic and subarctic climate, the tortuous lay of the land, and the varied compositions of soil, rock, or permafrost (permanently frozen ground). A little more than half of the pipeline is elevated above the ground. The remainder is buried anywhere from 3 to 12 feet, depending largely upon the type of terrain and the properties of the soil.

One of the largest in the world, the pipeline cost approximately \$8 billion and is by far the biggest and most expensive construction project ever undertaken by private industry. In fact, no single business could raise that much money, so 8 major oil companies formed a consortium in order to share the costs. Each company controlled oil rights to particular shares of land in the oil fields and paid into the pipeline-construction fund according to the size of its holdings. Today, despite enormous problems of climate, supply shortages, equipment breakdowns, labor disagreements, treacherous terrain, a certain amount of mismanagement, and even theft, the Alaska pipeline has been completed and is operating.

Question based on the above reading

71. The passage primarily discusses the pipeline's
- operating costs
 - employees
 - consumers
 - construction
72. The word "it" in line 4 refers to
- pipeline
 - ocean
 - state
 - village
73. According to the passage, 84 million gallons of oil can travel through the pipeline each
- day
 - week
 - month
 - year
74. The phrase "Resting on" in line 13 is closest in meaning to
- Consisting of
 - Supported by
 - Passing under
 - Protected with
75. The author mentions all of the following as important in determining the pipeline's route EXCEPT the
- climate
 - lay of the land itself
 - local vegetation
 - kind of soil and rock
76. The word "undertaken" in line 26 is closest in meaning to

- a. removed
 - b. selected
 - c. transported
 - d. attempted
77. How many companies shared the costs of constructing the pipeline?
- a. 3
 - b. 4
 - c. 8
 - d. 12
78. The word "particular" in line 29 is closest in meaning to
- a. peculiar
 - b. specific
 - c. exceptional
 - d. equal
79. Which of the following determined what percentage of the construction costs each member of the consortium would pay?
- a. How much oil field land each company owned
 - b. How long each company had owned land in the oil fields
 - c. How many people worked for each company
 - d. How many oil wells were located on the company's land
80. Where in the passage does the author provide a term for an earth covering that always remains frozen?
- a. Line 3
 - b. Line 13
 - c. Line 19
 - d. Line 32

The railroad was not the first institution to impose regularity on society, or to draw attention to the importance of precise timekeeping. For as long as merchants have set out their wares at daybreak and communal festivities have been celebrated, people have been in rough agreement with their neighbors as to the time of day. The value of this tradition is today more apparent than ever. Were it not for public acceptance of a single yardstick of time, social life would be unbearably chaotic: the massive daily transfers of goods, services, and information would proceed in fits and starts; the very fabric of modern society would begin to unravel.

81. Choose the option that is closest in meaning to the phrase "precise timekeeping"
- a. Timely
 - b. Punctual
 - c. Untimely
 - d. Apt
82. In line 4, the phrase "this tradition" refers to
- a. the practice of starting the business day at dawn
 - b. friendly relations between neighbors
 - c. the railroad's reliance on time schedules
 - d. people's agreement on the measurement of time
83. What is the main idea of the passage?
- a. In modern society we must make more time for our neighbors.
 - b. The traditions of society are timeless.
 - c. An accepted way of measuring time is essential for the smooth functioning of society.
 - d. Society judges people by the times at which they conduct certain activities.

84. The “very fabric of modern society would begin to unravel” if
- a. People lost the sense of time
 - b. Social life became chaotic
 - c. daily transfers of goods, services, and information would proceed in fits and starts
 - d. people would not have accepted time as a universal concept
85. Which was the first institution to stress importance on the concept of time
- a. Railroads
 - b. Merchants
 - c. Post Offices
 - d. Schools

- A. Mean
C. Assumed mean
- B. Mode
D. Median
11. Total number of vitamins required by human body are:
A. Ten
C. Thirteen
- B. Fourteen
D. Twelve
12. 'Obesity is an excessive storage of energy in the form of fat'
A. False
C. Partially false
- B. True
D. Partially true
13. The ability to start, stops and move the body quickly in different directions is called:
A. Coordination
C. Balance
- B. Agility
D. Speed
14. The headquarter of World Health Organization is located in:
A. Paris
C. London
- B. Geneva
D. New York
15. Anemia is caused by the deficiency of
A. Blood platelets
C. Plasma
- B. Haemoglobin
D. Oxygen
16. Hypothalamus is associated with the control of
A. Thought process
C. Motor activity
- B. Emotional activity
D. Glandular activity
17. Which of the following exercises is said to be harmful to the body bio-mechanically?
A. Shoulder rotation
C. Hip rotation
- B. Knee rotation
D. Wrist rotation
18. 'Agoge' was in:
A. Rome
C. Greece
- B. Iran
D. China
19. Movement taking place in the frontal plane is about the:
A. Horizontal axis
C. Frontal horizontal axis
- B. Vertical axis
D. Sagittal horizontal axis
20. Which of the following muscles is not considered a posterior muscle of the shoulder girdle?
A. Latissimus dorsi
C. Trapezius
- B. Rhomboids
D. Levator scapulae

21. 'Plato' earned proficiency in the game of
A. Judo
B. Wrestling
C. Swimming
D. Golf
22. Who was the founder of school of gymnastics in Germany?
A. Per Henrik Ling
B. Franz Hechtegall
C. Adolph Spiess
D. Guts Muts
23. A muscle is stronger when it works
A. Isometrically
B. Eccentrically
C. Statically
D. Concentrically
24. How many countries participated in the first Modern Olympics in 1896?
A. 12
B. 13
C. 14
D. 15
25. An immediate follow-up to lecture is
A. Discussion
B. Explanation
C. Supervision
D. Recitation
26. Which of the following elements is contained only in proteins?
A. Carbon
B. Hydrogen
C. Nitrogen
D. Oxygen
27. Which Olympics were longest as per their duration in days?
A. 1906
B. 1908
C. 1952
D. 1956
28. 'Lady Ratan Tata' trophy is associated with which sport?
A. Football
B. Hockey
C. Basketball
D. Handball
29. 'Merdeka Cup' is associated with:
A. Hockey
B. Football
C. Volleyball
D. Cricket
30. Gluteus maximus muscle is situated in
A. Thigh
B. Hip
C. Hip
D. Lower Leg
31. 'Body Beautiful' was the ideal of
A. Indians
B. Romans
C. Greeks
D. Egyptians
32. A shuttle cock should have a maximum of
A. 20 feathers
B. 18 feathers

- C. 26 feathers
D. 16 feathers
33. 'Keenan Stadium' is in?
A. Jamshedpur
B. Kanpur
C. Cuttack
D. Friadabad
34. Research proposal is called?
A. Synopsis
B. Abstract
C. Methodology
D. Summary
35. The test of significance used for comparing two means is:
A. t-test
B. F-test
C. Chi-square
D. Correlation
36. Blue print of the competition plan is called:
A. Technique
B. Skill
C. Strategy
D. Tactics
37. The concept of Standard Deviation was introduced by:
A. Spearman
B. Fisher
C. Karl Pearson
D. Gauss
38. Anabolic steroids affect directly:
A. Muscles
B. Heart
C. Lungs
D. Brain
39. Blood gets deoxygenated in:
A. Lugs
B. Nerves
C. Heart
D. Muscles
40. Reaction time is a component of:
A. Physical fitness
B. Health related physical fitness
C. Cardio-respiratory fitness
D. Motor fitness
41. Theory of learning was given by:
A. Thorndike
B. Gestalt
C. H. C. Buck
D. Aristotle
42. Which of the training system has been considered best for body adaptation?
A. High altitude training
B. Circuit training
C. Interval training
D. Fartlek training
43. Circuit training is an effective method for developing:
A. Speed
B. Flexibility
C. Strength endurance
D. Agility

44. Goniometer measures:
- A. Flexibility
 - B. Endurance
 - C. Power
 - D. Strength
45. Hunger and thirst is a biological needs they are also known as:
- A. Organic need
 - B. Social need
 - C. Esteem need
 - D. High order need
46. 'Frostbite' is a medical problem occur in:
- A. Hot environment
 - B. high altitude
 - C. High pressure area
 - D. Cold environment
47. The term 'double fault' is used in:
- A. Tennis
 - B. Badminton
 - C. Table-Tennis
 - D. Volleyball
48. Kush Bhagat is associated with which sports?
- A. Badminton
 - B. Chess
 - C. Tennis
 - D. Wushu
49. Manpreet Kaur, who recently clinched Gold at the 2017 Asian Grand Prix Meet, is associated with which sports?
- A. Long jump
 - B. Javelin throw
 - C. Shot put
 - D. Sprint
50. Look at this series: 7, 10, 8, 11, 9, 12, ... What number should come next?
- A. 7
 - B. 10
 - C. 12
 - D. 13
51. The thrill of all sports lies in
- A. Participation
 - B. Competition
 - C. Winning
 - D. Performance
52. Checkmate is associated with the game of:
- A. Golf
 - B. Chess
 - C. Judo
 - D. Polo
53. CMM, EOO, GQQ, _____, KUU
- A. GRR
 - B. ISS
 - C. GSS
 - D. ITT
54. Word 'Kho' in the game of 'Kho-Kho' means
- A. Come and catch
 - B. Run
 - C. Jump
 - D. Go and chase

55. If RESULT is coded as 798206, LET will be coded as:
A. 680
B. 096
C. 092
D. 086
56. How many salivary glands are there in human mouth?
A. Two
B. Four
C. Six
D. Eight
57. Name of the artery that supplies blood to the head and neck:
A. Cranial
B. Carotid
C. Pulmonary
D. Coronary
58. In sport, the mental training is often concerned with the *process of learning to*
A. Understand
B. Learn
C. Motivate
D. Analyze
59. The first International Congress of Sport Psychology was held in Rome in:
A. 1963
B. 1965
C. 1960
D. 1967
60. Find the odd man out in the following:
A. Steffi Graf
B. Serena Williams
C. Pete Sampras
D. Martina Hingris
61. 'Rectus Femoris' muscle is located in:
A. Thigh
B. Calf
C. Lower leg
D. Lower back
62. W.H.O's concept of health focuses on:
A. Physical health
B. Freedom from disease
C. Health as a sense of total well being
D. Mental health
63. In a certain code, 'SPIDER' is written as 'PSDIRE', how will be 'COMMON'
Written in that code?
A. OCOMMO
B. OCMMNO
C. OCMOMN
D. OCMMON
64. The main function of WBC is to:
A. Remove dead cells
B. Carry oxygen
C. Supply energy to body
D. Fight against bacteria
65. SCD, TEF, UGH, _____, WKL
A. UJI
B. IJT

C. VIJ

D. CMN

66. When was the I.O.A. formed?

A. 1925

B. 1926

C. 1927

D. 1928

67. How much times does a drop of blood take to complete a circuit of the body:

A. 30 sec

B. 40 sec

C. 50 sec

D. 60 sec

68. Maria Sharapova, the female tennis player belongs to which country?

A. America

B. Switzerland

C. Spain

D. Russia

69. Low body temperature is related to:

A. Hypertrophy

B. Hypoxia

C. Hyperthermia

D. Hypothermia

70. Thomas Cup is associated with:

A. Badminton (men)

B. Table Tennis (men)

C. Badminton (women)

D. Table Tennis (women)

71. Vital capacity is the amount of air involved in:

A. Diffusion

B. Deepest inhalation

C. Ventilation

D. Full expiration

72. 'Carl Lewis' is related to:

A. High jump

B. Long jump

C. Pole vault

D. Shot put

73. The inaugural Modern Olympic Games in 1896 were organized at

A. Athens

B. London

C. Los Angeles

D. Paris

74. The instrument used for estimation of body fat is :

A. Skinfold Caliper

B. Flexiometer

C. Dynamometer

D. Goniometer

75. Which international organization has observed the 2017 World Day on Safety and Health at Work?

A. United Nations Security Council (UNSC)

B. International Court of Justice (ICJ)

C. World Health Organization (WHO)

D. International Labour Organisation (ILO)

B.P.Ed.

1. According to rules, the colour of football goal post is?
 - A. Light yellow
 - B. Green
 - C. Light blue
 - D. White

2. How much protein a working woman must intake every day?
 - A. 27gm
 - B. 46gm
 - C. 30gm
 - D. 37gm

3. 'Hunch back' is also known as
 - A. Back pain
 - B. Scoliosis
 - C. lordosis
 - D. kyphosis.

4. The path of an object projected into free air space is known as
 - A. Speed
 - B. Abnormal curve
 - C. Velocity
 - D. Parabola.

5. The organization of Olympic Games is given to.
 - A. City
 - B. Country
 - C. District
 - D. Capital

6. The width of javelin throw arc is
 - A. 5 cm
 - B. 7 cm
 - C. 8 cm
 - D. 3 cm

7. Panjab University Sports Tournament Committee was formed in.....
 - A.1896
 - B. 1900
 - C. 1920
 - D. 1931

8. The heel in High Jumper shall have a maximum thickness of

- A. 15mm.
- B. 16mm.
- C. 19mm.
- D. 17mm.

9. Teacher behaviour ought to be-

- A. Administrative
- B. Instructive
- C. Idealistic
- D. Directive

10. Which country's Olympic athletes sport the letters RSA on their vests?

- A. Russia
- B. South Africa
- C. South Korea
- D. South America

11. The Himalayan Mountaineering Institute'' is located at—

- A. Uttarkashi
- B. Dehradun
- C. Darjeeling
- D. Shillong

12. All teachers in school should be punctual because

- A. this will make students also punctual
- B. students will understand the importance of time
- C. this will inculcate good habit in students
- D. Students become carefree

13. Which one is not a Fencing term?

- A. Balestra
- B. Black Card
- C. Foil
- D. Bunting

14. Which is the largest capacity stadium in India?

- A. Salt Lake Stadium
- B. Eden Garden
- C. Jawaharlal Nehru Stadium
- D. National Stadium

15. Find out which is a Nautical sports:

- A. Rowing
- B. Trampoline
- C. Shooting
- D. Golf

16. Most limbs of the human body act as levers which are built for speed, and are:

- A. First class levers
- B. Second class levers
- C. Third class levers
- D. Fourth class levers

17. The terms 'anterior and posterior' are synonymous with

- A. Frontal and back
- B. Verbal and dorsal
- C. Lateral and medial

D. None of the above.

18. What was awarded to Olympic champions during ancient times?

- A. Silver medal
- B. Gold crown
- C. Crown of wild olives
- D. Gold medal

19. The host of the 2018 world cup football

- A. Japan
- B. Spain
- C. Brazil
- D. Russia

20. According to the Olympic charter, the duration of the competitions of the Olympic Games shall not exceed -

- A. 20 days
- B. 15 days
- C. 12 days
- D. 16 days

21. Most of the digestion of food occur in

- A. Mouth
- B. Small Intestine
- C. large Intestine
- D. Stomach

22. Athlete's foot is caused by:

- A. an increase in foot size during training
- B. a virus
- C. an injury associated with 100m runners
- D. a fungus

23. Rhythmic Gymnastics maximum score can be obtained.....

- A. 20 Points
- B. 30 Points
- C. 40 Points
- D. 10 Points

24. -Which type of joint is formed by the ATLAS and AXIS at the neck?

- A. Hinge
- B. Ball and socket
- C. Ball
- D. Pivot

25. The skin belongs to the _____ system.

- A. Nervous
- B. Muscular
- C. Circulatory
- D. Integumentary

26. Name the Indian tennis player who has turned Hollywood filmmaker?

- A. Leander Peas
- B. Mahesh Bhupathi
- C. Vijay Amritraj

D. Ashok Amritraj

27. Who of the following gymnasts was the first to be awarded a perfect score of 10 in an Olympic gymnastic event?

- A. Elena Mukhina
- B. Nellie Kim
- C. Nadia Comaneci
- D. Yelena Davydova

28. When was the first time the Olympic Games moved to Asia?

- A. 1960
- B. 1964
- C. 1956
- D. 1976

29. Which of the following is an example of a prebiotic?

- A. Yogurt
- B. Insulin
- C. Creatine
- D. Fish Oil

30. Out of the following which activity does not belong to Pranayama?

- A. Dhouti
- B. Purak
- C. Rechak
- D. Kumbhak

31. An ankle sprain is an example of which type of injury

- A. Skin
- B. soft tissue
- C. hard tissue
- D. none of the above

32. Which of the following years were both the summer and Winter Olympics held in the same country?

- A. 1944
- B. 1980
- C. 1952
- D. 1936

33. The French Tennis Open is played on what kind of surface?

- A. Turf
- B. Clay
- C. Grass
- D. Cement

34. The XVIII Pan American Games, is a major international multi-sport event that is scheduled to be held from July 26 to August 11, 2019

- A. Toronto, Canada
- B. Lima, Peru
- C. Guadalajara, Mexico
- D. Havana, Cuba

35. An exercise which stretches the ankles and lower calves is called the:

- A. Achilles stretch
- B. inversion stretch
- C. side lunge
- D. eversion stretch

36. Which symbol is used for Qualified by place in track events in Athletics?

- A. Q
- B. q
- C. qR
- D. qT

37. When kabaddi introduced in the Asian games:

- A. 1990 Beijing, China
- B. 1994 Hiroshima, Japan
- C. 1986 Seoul, South Korea
- D. Bangkok, Thailand

38. Which one of the following is a key process in physical education?

- A. Effort
- B. Competence
- C. Developing skills and techniques
- D. Performance

39. Which one of the following would be a good method of exercise to improve your stamina?

- A. yoga
- B. Pilates
- C. sprinting
- D. Aerobics

40. Citrus fruits are considered a rich source of which vitamin?

- A. Vitamin A
- B. Vitamin B
- C. Vitamin C
- D. Vitamin D

41. The first member of International Olympic Committee from India was

- A. G.D. Sondhi
- B. Raja Bhalinder Singh
- C. Sir Dorabji Tata
- D. P.M. Joseph

42. Which one of the following best describes the role of tendons?

- A. They attach muscle to bone
- B. They attach muscle to muscle
- C. They attach bone to bone
- D. They attach ligaments to bones

43. Identify the bone injury

- A. Strain
- B. Green stick
- C. Sprain
- D. Laceration

44. The following belong together except one.

- A. Trachea
- B. bronchi
- C. Esophagus
- D. larynx

45. Which is not a track and field official?

- A. Competition Director
- B. Technical Manager
- C. Director
- D. Stewards

46. If a match live commentary in Delhi commences at 10.00 am, at what time the viewer at London should tune into?

- A. 4.00 a.m.
- B. 4.30 a.m.
- C. 4.45 a.m.
- D. 4.50 a.m.

47. What does the Olympic Flame symbolize?

- A. Zeal to play sports
- B. Challenge
- C. Continuity
- D. Integrity

48. Which is not a Muscle in the rotator cuff?

- A. supraspinatus
- B. infraspinatus,
- C. teres major
- D. subscapularis

49. Hyperactive children

- A. needs special attention in the classroom
- B. needs a separate classroom
- C. needs special teachers
- D. needs a special curriculum

50. If a student alleges against you for showing favouritism in evaluation of scripts, how would you deal with him?
- A. Reject his allegations
 - B. Adopt punitive measure
 - C. Make efforts to reveal his position
 - D. Show his answer book and few more
51. Which of the following Cups/Trophies is associated with the game of Football?
- A. Wimbledon Cup B. Evert Cup
 - C. Agha Khan Cup D. Mardeka Cup
52. Which of the following terms is not associated with the game of Lawn Tennis?
- A. Smash B. Slice
 - C. Bouncer D. Deuce
53. Narain Karthikeyan is the sportsman in the field of—
- A. F.I Car Racing B. Shooting
 - C. Chess D. Golf
54. The term 'Beamer' is associated with—
- A. Football B. Hockey
 - C. Cricket D. Chess
55. Bishop is the sports term associated with
- A. Hockey B. Golf
 - C. Chess D. Polo
56. Teaching is also a learning activity for teachers as
- A. it develops an in depth understanding of a discipline
 - B. teachers need to do action research
 - C. teachers learn a lot from their students
 - D. teaching is a process, not a product
57. The longest track running event is _____.
- A. 3000m B. 5000m
 - C. 10000m D. 15000m
58. Who among the following sports personalities is known as the Payoli Express?
- A. Shiny Abraham
 - B. PT Usha
 - C. Jyotirmoyee Sikdar
 - D. KM Beenamol
59. An international day for yoga was declared unanimously by the United Nations General Assembly (UNGA) on
- A. 11 December 2014.
 - B. 11 September, 2015
 - C. 11 October, 2014
 - D. 11 November, 2015
60. How many steps should you take in between the 100/110m hurdles?
- A. 2 B. 3
 - C. 4 D. 5
61. Basketball was created by a man named:
- A. Jon Quincy B. Brad Johnson

C. Homer Basketball D. James Naismith

62. In Badminton When the score is odd, where does the player serve from the -----

- A. Right B. Back
- C. Left D. Centre

63. The heart is _____ to the lungs:

- A. superior
- B. dorsal
- C. medial
- D. lateral

64. Carbon dioxide: Extinguish:: Oxygen:?

- A. Isolate B. Foam
- C. Burn D. Cease

65. Pituitary: Brain:: Thyroid:?

- A. Liver B. Neck
- C. Mouth D. Stomach

66. The number of players in each side of water polo is:

- A. 5
- B. 6
- C. 7
- D. 9

67. The height and width of the handball goal post is

- A. 3.66m, 2.14m B. 2m, 4m
- C. 2m, 3m D. 2.50m, 3m

68. Which of the following is not performed by muscles?

- A. Motion
- B. excretion
- C. maintenance of posture
- D. heat production

69. Which of the following sporting injuries would not be treated using R.I.C.E.?

- A. strain B. sprain
- C. dislocation D. deep bruising

70. Your relations with other teacher should be?

- A. Friendly
- B. Cordial
- C. Only official communication
- D. Maintain distance.

71. Which of the following statement is correct?

- A. Pulmonary artery carries pure blood
- B. Pulmonary veins carry impure blood
- C. Pulmonary veins carry pure blood
- D. Arteries carry impure blood

72. The full form of WADA is:

- A. World Anti Doping Association
- B. World Anti Doping Agency
- C. World Anti Drug Association
- D. World Anti Drug Agency

73. Natural Motivation is known as:

- A. Self Esteem
- B. Self actualization
- C. Extrinsic
- D. Intrinsic

74. Immediate outcome of teaching is—

- A. Changes in the behaviour of students in desirable direction
- B. Development of total personality of students
- C. Building characters of the students
- D. Getting selected for a suitable job

75. Educational technology is useful because—

- A. it is the need of the hour
- B. it is adopted by famous institutions
- C. it makes teaching effective and efficient
- D. it attracts students towards teaching and learning activities

CET-PG-BIOCHEMISTRY 2017

1. The molarity of a 15 % of NaCl solution in water is -----.

- (A). 2.56
- (B). 0.256
- (C). 25.6
- (D). 0.025

2. A 29 % H_2SO_4 solution having a molarity of 3.60, would have a density (g.ml^{-1}) of ----- (MW of H_2SO_4 is 98)

- (A). 1.22
- (B). 1.45
- (C). 1.64
- (D). 1.88

3. The pH of blood is 7.4 when the ratio between H_2CO_3 and HCO_3^{-1} is

- (A) 1 : 10
- (B) 1 : 20
- (C) 1 : 25
- (D) 1 : 30

4. What is the isoelectric point for phenylalanine given the pKa for the COOH group is 1.83 and the NH^{3+} group is 9.13?

- (A). 4.83
- (B). 5.48
- (C). 9.13
- (D). 10.96

5. If a radioactive element weighing one Kg. has a half-life of 100 years, it will weigh _____ grams in 300 years.

- (A). 500
- (B). 300
- (C). 125
- (D). 250

6. Which one is the heaviest particulate component of the cell?

- (A). Mitochondria
- (B). Nucleus
- (C). Cytoplasm
- (D). Golgi apparatus

7. LDL binds with cell surface receptor and gets internalized via clathrin-mediated endocytosis. This process helps in maintaining the cholesterol-LDL level in the plasma. However, in a disease known as familial hypercholesterolemia (FH), very high levels of plasma cholesterol is found. This could be due to mutation in which one of the following genes in FH patients?

- (A). Clathrin
- (B). LDL
- (C). LDL receptor
- (D). Adaptor

8. The immediate products of C3 and C4 photosynthesis are, respectively:

- (A). Ribulose 1,5-bisphosphate; malic acid
- (B). Malate; carbon dioxide
- (C). 3-Phosphoglycerate; oxaloacetic acid
- (D). Glyceraldehyde 3-phosphate; phospho-enol-pyruvate (PEP)

9. High iodine value of a lipid indicates

- (A). Polymerization
- (B). Carboxyl groups
- (C). Hydroxyl groups
- (D). Unsaturation

10. Which of the following phospholipids is localized to a greater extent in the outer leaflet of the membrane lipid bilayer?

- (A). Phosphatidyl Choline
- (B). Phosphatidyl Ethanolamine
- (C). Phosphatidyl Inositol phosphoglycerides
- (D). Phosphatidyl Serine

11. A drug which prevents uric acid synthesis by inhibiting the enzyme xanthine oxidase is

- (A). Aspirin
- (B). Allopurinol
- (C). Colchicine
- (D). Probenecid

12. On exposure to light rhodopsin forms

- (A). All trans-retinal
- (B). Cis-retinal
- (C). Retinol
- (D). Retinoic acid

13. The most potent Vitamin D metabolite is

- (A). 25-Hydroxycholecalciferol
- (B). 1,25-Dihydroxycholecalciferol
- (C). 24, 25-Dihydroxycholecalciferol
- (D). 7-Dehydrocholesterol

14. The number of isomers of glucose is

- (A). 2
- (B). 4
- (C). 8
- (D). 16

15. A disaccharide linked by α -1-4 Glycosidic linkages is

- (A). Lactose
- (B). Sucrose
- (C). Cellulose
- (D). Maltose

16. Barfoed's solution is not reduced by

- (A). Glucose
- (B). Mannose
- (C). Sucrose
- (D). Ribose

17. Fluoride inhibits _____ and arrests glycolysis.

- (A). Glyceraldehyde-3-phosphate dehydrogenase
- (B). Aconitase
- (C). Enolase
- (D). Succinate dehydrogenase

18. An uncoupler of oxidative phosphorylation such as dinitrophenol

- (A). Inhibits electron transport and ATP synthesis

- (B). Allow electron transport to proceed without ATP synthesis
- (C). Inhibits electron transport without impairment of ATP synthesis
- (D). Specially inhibits cytochrome b

19. Energy required to produce 3 ATP from 3 ADP and 3 Pi is

- (A). -21,900 cal
- (B). 29,900 cal
- (C). 31,900 cal
- (D). 39,900 cal

20. Substrate level phosphorylation in TCA cycle is in step:

- (A). Isocitrate dehydrogenase
- (B). Malate dehydrogenase
- (C). Aconitase
- (D). Succinate thiokinase

21. Assuming that the sequence of CDRs of an antibody are heavily enriched with Tyrosine and Serine, what is likely to be the driving force stabilizing its interaction with the antigen?

- (A). Hydrophobic interaction
- (B). Hydrogen bonding
- (C). Van-der Waals interaction
- (D). Covalent interactions

22. Which one of the following side chains of an amino acid is responsible for fluorescence in proteins?

- (A). Indole ring
- (B). Guanidino group
- (C). Phenolic group
- (D). Imidazole group

23. A pigment isolated from marine red algae that finds application in flow cytometry is

- (A). Xanthophyll
- (B). Phycoerythrin
- (C). Chlorophyll
- (D). Fluorescamine

24. If a neuron is tyrosine hydroxylase positive, it could be either:

- (A). Noradrenergic or Histaminergic
- (B). Dopaminergic or Serotonergic
- (C). Noradrenergic or Dopaminergic
- (D). Serotonergic or Noradrenergic

25. Which one of the following reactions is performed by Cytochrome-P450 to detoxify the xenobiotics?

- (A). Hydroxylation
- (B). Ligation
- (C). Hydrolysis
- (D). Group transfer

26. In Electrophoresis if the buffer pH is above the isoelectric point of the protein, the protein will

- (A). Migrate towards the anode
- (B). Migrate towards the cathode
- (C). Not migrate at all
- (D). Migrate partly to anode and partly to cathode

27. Which one of the following can convert glucose to vitamin C?

- (A). Humans
- (B). Monkeys

- (C). Guinea pigs
- (D). Albino rats

28. Omega 3 fats are good for health and play an important role in prevention of heart disease. If you have to formulate a food product rich in omega 3 fats which one of the following options would you choose?

- (A). Rice bran oil because it contains C 18:2 Δ 9c, 12c
- (B). Flax seed oil because it contains C 18:3 Δ 9c, 12c, 15c
- (C). Olive oil because it contains C 18:1 Δ 9c
- (D). Black- currant seed oil because it contains C 18:3 Δ 6c, 9c, 12c

29. Inosine in the tRNA anticodon will base pair with all except which one of the following bases in the codon of mRNA?

- (A). Adenine
- (B). Uracil
- (C). Cytosine
- (D). Guanine

30. The integration of T-DNA in the plant nuclear genome is most likely due to

- (A). homologous recombination
- (B). non-homologous recombination
- (C). non-homologous end joining
- (D). single-stranded recombination during transcription

31. Statins are very effective against hypercholesterolemia, a major cause of atherosclerosis. These drugs reduce plasma cholesterol levels by

- (A). Preventing absorption of cholesterol from the intestine.
- (B). Increasing the excretion of cholesterol from the body via conversion to bile acids.
- (C). Inhibiting the conversion of 3-hydroxy-3-methylglutaryl-CoA to mevalonate in the pathway for cholesterol biosynthesis.
- (D). Increasing the rate of degradation of 3-hydroxy-3-methylglutaryl CoA reductase.

32. The cell-free extract prepared from E. coli cells over-expressing enzyme β - glucosidase showed the activity of 1.5 units per ml (protein concentration 2 mg per ml). The Ni-NTA purified preparation showed the activity of 75 units per ml (protein concentration 100 μ g per ml). Calculate the fold purification of the enzyme achieved?

- (A). 0.001
- (B). 0.02
- (C). 50
- (D). 1000

33. DNA molecules labelled with ^{15}N and ^{14}N can be separated by

- (A). Pulse field gel electrophoresis
- (B). Density gradient ultracentrifugation
- (C). Capillary electrophoresis
- (D). Differential centrifugation

34. A 25-year old man undertakes a prolonged fast for religious reasons. Which one of the following metabolites will be elevated in his blood plasma after 24 hours?

- (A). Lactic acid
- (B). Glycogen
- (C). Ketone bodies
- (D). Non-esterified fatty acids

35. Succinate dehydrogenase converts succinate to fumarate. Which one of the following is TRUE when the competitive inhibitor malonate is added in the reaction mixture?

- (A). Both K_m and V_{max} increase.
- (B). Both K_m and V_{max} decrease.

- (C). K_m increases and V_{max} remains the same.
- (D). K_m increases and V_{max} decreases.

36. Digestion of a 5Kb linear DNA fragment with EcoRI generates two fragments of 2 Kb and 3 Kb, while digestion of the same molecule with HindIII yields three fragments of 0.7 Kb, 3.5 Kb and 0.8 Kb. When the same DNA is digested with both the enzymes, it yields fragments of 0.7 Kb, 1.3 Kb, 2.2 Kb and 0.8 Kb. The right sequence of restriction sites in the DNA fragment is

- (A). One EcoRI site in between two HindIII sites
- (B). One HindIII site in between two EcoRI sites
- (C). Two HindIII sites followed by only one EcoRI site
- (D). One EcoRI site followed by two HindIII sites.

37. Which metabolite of TCA cycle is used in detoxification of ammonia in brain?

- (A). Alpha ketoglutarate
- (B). Ornithine
- (C). Oxaloacetate
- (D). Glycine

38. A ketogenic amino acid is

- (A). Valine
- (B). Cysteine
- (C). Leucine
- (D). Threonine

39. Which of the following statements about the enzymes, glucokinase and/or hexokinase is correct?

- (A). Glucokinase has a high affinity for glucose.
- (B). Hexokinase has a high affinity for glucose.
- (C). Hexokinase has a higher K_m for glucose than has glucokinase.
- (D). Glucokinase has a lower K_m for glucose than has hexokinase

40. Biuret reaction is specific for

- (A). -CONH-linkages
- (B). -CSNH₂ group
- (C). -(NH)NH₂ group
- (D). -CH₂SSCH₂-group

41. Globular proteins have completely folded, coiled polypeptide chain and the axial ratio (ratio of length to breadth) is

- (A). Less than 10 and generally not greater than 3-4
- (B). Generally 10
- (C). Greater than 10 and generally 20
- (D). Greater than 10

42. Which of the following statements about transamination reactions is correct?

- (A). Transamination reactions involve ATP hydrolysis.
- (B). Transamination reactions are irreversible.
- (C). Transamination reactions require NAD⁺ or NADP⁺.
- (D). Transamination reactions require pyridoxal-5'-phosphate.

43. Each turn of α -helix contains the amino acid residues (number):

- (A). 3.6
- (B). 3.0
- (C). 4.2
- (D). 4.5

44. The enzymes of urea synthesis are found in

- (A). Mitochondria only
- (B). Cytosol only
- (C). Both mitochondria and cytosol
- (D). Nucleus

45. Sanger's reagent contains

- (A). Phenylisothiocyanate
- (B). Dansyl chloride
- (C). 1-Fluoro-2, 4-dinitrobenzene
- (D). Ninhydrin

46. The deadly 'death cap' mushroom, *Amanita pallioides*, produces a toxin called α -amanitin. Which cellular process is inhibited by this toxin?

- (A). DNA synthesis
- (B). Cell division
- (C). RNA synthesis
- (D). RNA splicing

47. In bacterial promoters, which of the following describes the 'Pribnow box'?

- (A). The 5' untranslated region
- (B). The -10 box
- (C). The -35 box
- (D). The termination sequence

48. Maple syrup urine diseases is an inborn error of metabolism of

- (A). Sulphur-containing amino acids
- (B). Aromatic amino acids
- (C). Branched chain amino acids
- (D). Dicarboxylic amino acids

49. The half-life of IgG is

- (A). 2–3 days
- (B). 5–6 days
- (C). 8–10 days
- (D). 20–25 days

50. The components of complement system are activated by

- (A). Microsomal hydroxylation
- (B). Phosphorylation
- (C). Glycosylation
- (D). Proteolysis

51. What is the normal immunological role of the CD8+ve T-cell

- (A). Helps B-lymphocytes to develop into plasma cells.
- (B). Kills virus infected cells.
- (C) Secretes antibodies.
- (D) Rejects transplanted tissue.

52. A cation exchange resin linked to cellulose backbone is

- (A). CM-cellulose
- (B). DEAE cellulose
- (C). Starch
- (D). Biogel

53. CD 4 is a transmembrane glycoprotein present in

- (A). Helper T cells

- (B). Suppressor T cells
- (C). Memory T cells
- (D). Cytotoxic T cells

54. Calcitonin is synthesised in

- (A). Parathyroid glands
- (B). Thyroid gland
- (C). Pars intermedia of pituitary
- (D). Adrenal cortex

55. Insulin is made up of

- (A). A single polypeptide chain having 51 amino acid residues
- (B). A single polypeptide chain having 84 amino acid residues
- (C). A-chain having 21 and B-chain having 30 amino acid residues
- (D). A-chain having 30 and B-chain having 21 amino acid residues

56. Normal range of serum urea is

- (A). 0.6–1.5 mg/dl
- (B). 9–11 mg/dl
- (C). 20–45 mg/dl
- (D). 60–100 mg/dl

57. Collagen is very rich in

- (A). Glycine
- (B). Serine
- (C). Aspartic acid
- (D). Glutamic acid

58. Cephalin consists of

- (A). Glycerol, fatty acids, phosphoric acid and choline
- (B). Glycerol, fatty acids, phosphoric acid and ethanolamine
- (C). Glycerol, fatty acids, phosphoric acid and inositol
- (D). Glycerol, fatty acids, phosphoric acid and serine

59. Arachidonic acid contains the number of double bonds:

- (A). 2
- (B). 3
- (C). 4
- (D). 5

60. Fatty acids with odd number of carbon atoms yield acetyl-CoA and a molecule of

- (A). Succinyl-CoA
- (B). Propionyl-CoA
- (C). Malonyl-CoA
- (D). Acetoacetyl-CoA

61. Dideoxynucleoside triphosphates (ddNTPs) are used in sequencing DNA because:

- (A). ddNTPs are fluorescent.
- (B). ddNTPs are incorporated very efficiently into DNA by DNA polymerase.
- (C). ddNTPs cannot be incorporated into DNA by DNA polymerase.
- (D) ddNTPs prevent further DNA synthesis once they are incorporated into the DNA sequence.

62. A mitochondrial marker enzyme is

- (A). Aldolase
- (B). Amylase

- (C). Succinic dehydrogenase
- (D). Pyruvate dehydrogenase

63. Heme is synthesized from:

- (A). Succinyl-CoA and glycine
- (B). Active acetate and glycine
- (C). Active succinate and alanine
- (D). Active acetate and alanine

64. Ramachandran plot:

- (A). Gives the frequency of occurrence of amino acids in β -sheet structure.
- (B). Represents the sterically allowed conformations of a polypeptide back bone
- (C). Predicts α -helical structure from the given amino acid sequences
- (D). Shows the X-ray diffraction pattern of a position.

65. At which cell cycle checkpoint is the cell cycle halted if the cell's DNA is damaged?

- (A). G1 - S
- (B). S - G2
- (C). G2 - M
- (D). G0 - G1

66. The tyrosine residues per molecule of thyroglobulin is

- (A). 85
- (B). 95
- (C). 115
- (D). 135

67. In cholera, there is uncontrolled secretion of sodium ions and water into the intestinal lumen because of the action of cholera toxin on a G protein coupled receptor system. How does the toxin act?

- (A). Cholera toxin activates a G_i (inhibitory) protein.
- (B). Cholera toxin inhibits phosphodiesterase so that the signal is not switched off.
- (C). Cholera toxin inhibits the binding of vasoactive intestinal polypeptide to the receptor.
- (D). Cholera toxin inhibits the GTPase activity of the G protein alpha subunit.

68. Which of the following antibiotic resembles the 3' end of charged t-RNA molecule?

- (A). Streptomycin
- (C). Tetracyclin
- (D). Kanamycin
- (D). Puromycin

69. The catabolite repression is mediated by a catabolite gene activator protein (CAP) in conjunction with

- (A). AMP
- (B). GMP
- (C). cAMP
- (D). cGMP

70. DNA fragments upto 45 kilobases in size can be cloned in

- (A). Bacterial plasmids
- (B). Lambda phage
- (C). Cosmids
- (D). Yeast artificial chromosomes

71. Chloride shift is

- (A). H ions leaving the RBC in exchange of Cl^-
- (B). Cl^- leaving the RBC in exchange of bicarbonate

- (C). Bicarbonate ion returns to plasma and exchanged with chloride which shifts into the cell
- (D). Carbonic acid to the plasma

72. Aspartate transcarbamoylase is inhibited by

- (A). CTP
- (B). PRPP
- (C). ATP
- (D). TMP

73. Which reaction in photosynthesis is carried out by 'Rubisco' or ribulose 1- 5 bisphosphate carboxylase?

- (A). Conversion of 3 phosphoglycerate into glyceraldehyde 3 phosphate.
- (B). Utilisation of CO₂ to produce 3 phosphoglycerate.
- (C). Conversion of glyceraldehyde 3 phosphate into ribulose 5 phosphate.
- (D). Carboxylation of phosphoenol pyruvate to oxaloacetate.

74. Which of the following signalling molecules binds to a receptor situated in the cytosol, rather than the outer membrane of the cell?

- (A). Progesterone
- (B). Adrenaline (Epinephrine)
- (C). Epidermal growth factor
- (D). Interferon

75. What is largely responsible for the negative resting membrane potential (around -70 mV) in a neuron?

- (A). Axonal insulation by Schwann cells.
- (B). Voltage-gated sodium channels opening.
- (C). The action potential.
- (D). Potassium leak currents

MSc(HS)(Computer Science)

1. Reusable optical storage will typically have the acronym

 - A. CD
 - B. DVD
 - C. ROM
 - D. RW

2. IC chips used in computers are made of

 - A. Silicon
 - B. Chromium
 - C. Lead
 - D. Silver

3. Blue tooth technology allows:

 - A. Landline phone to mobile phone communication
 - B. Wireless communication between equipments
 - C. Signal transmission on mobile phones only
 - D. Satellite television communication

4. Which of the following is not an example of Operating System?

 - A. Microsoft Office
 - B. Windows Vista
 - C. Unix
 - D. Ubuntu Linux

5. '.MPG' extension refers to:

 - A. Word file
 - B. Text file
 - C. Image file
 - D. Movie file

6. Round robin scheduling is essentially the pre-emptive version of _____ ?

 - A. FIFO
 - B. Shortest job first
 - C. Shortest remaining
 - D. Longest time first

7. What is a shell ?

 - A. It is a hardware component
 - B. It is a command interpreter
 - C. It is a part in compiler
 - D. It is a tool in CPU scheduling

8. In the blocked state _____?

 - A. the processes waiting for I/O are found
 - B. the process which is running is found
 - C. the processes waiting for the processor are found
 - D. none of the above

9. Identify which is not the state of the process?

- A. Blocked
- B. Running
- C. Ready
- D. Privileged

10. The number of processes completed per unit time is known as _____ ?

- A. Output
- B. Throughput
- C. Efficiency
- D. Capacity

11. The term used to describe the intangible instructions that tell the computer what to do is:

- A. hardware
- B. software
- C. storage
- D. input/output

12. Which of the following has the smallest storage capacity?

- A. zip disk
- B. hard disk
- C. floppy disk
- D. data cartridge

13. The level of data abstraction which describes how the data is actually stored is?

- A. Physical level
- B. Conceptual level
- C. Storage Level
- D. File level

14. The overall logical structure of data base can be expressed graphically by?

- A. Data flow chart
- B. Flow chart
- C. Directed Graph
- D. Entity relationship diagram

15. In an object oriented model, one object can access data of another object by passing?

- A. Instance variable
- B. Variable
- C. Message
- D. Function

17. The SQL, DDL, CREATE commands are _____ .

- A. Schema, Base and Table
- B. Key, Base and Table
- C. Base, Table and Schema
- D. Schema, Table and View

18. POP3 and IMAP are e-mail accounts in which

- A. One automatically gets one's mail everyday
- B. One has to be connected to the server to read or write one's mail
- C. One only has to be connected to the server to send and receive email
- D. One does not need any telephone lines

19. The octal number system consists of the following symbols:

- A. 0 – 7
- B. 0 – 9
- C. 0 – 9, A – F
- D. None of the above

20. If $(y)_x$ represents a number y in base x , then which of the following numbers is smallest of all ?

- A. $(1111)_2$
- B. $(1111)_8$
- C. $(1111)_{10}$
- D. $(1111)_{16}$

21. High level programming language can be converted to machine language using which of the following?

- A. Oracle
- B. Compiler
- C. Mat lab
- D. Assembler

22. The binary equivalent of $(-15)_{10}$ is (2's complement system is used)

- A. 11110001
- B. 11110000
- C. 10001111
- D. None of these

23. 1 GB is equal to

- A. 230 bits
- B. 230 bytes
- C. 220 bits
- D. 220 bytes

24. The PSTN is an example of a network.

- A. packet switched
- B. circuit switched
- C. message switched
- D. None of these

25. Each packet is routed independently in.....

- A. virtual circuit subnet
- B. short circuit subnet
- C. datagram subnet
- D. ATM subnet

26. For a connection oriented service, we need a.....

- A. virtual circuit subnet
- B. short circuit subnet
- C. datagram subnet
- D. wireless subnet

27. Which type of switching uses the entire capacity of a dedicated link?

- A. circuit switching
- B. datagram packet switching
- C. virtual circuit packet switching
- D. message switching

28. Representation of data structure in memory is known as:

- A. Recursive
- B. Abstract data type
- C. Storage structure
- D. File structure

29. An ADT is defined to be a mathematical model of a user-defined type along with the collection of all _____ operations on that model

- A. Cardinality
- B. Assignment
- C. Primitive
- D. Structured

30. Correct hierarchical relationship among context- free, right-linear, and context-sensitive language is

- A. context-free \subset right-linear \subset context-sensitive
- B. context-free \subset context-sensitive \subset right-linear
- C. context-sensitive \subset right-linear \subset context-free
- D. right-linear \subset context-free \subset context-sensitive

31. In the following grammar :

$$x ::= x \oplus y \mid 4$$

$$y ::= z * y \mid 2$$

$$z ::= \text{id}$$

Which of the following is true ?

- A. \oplus is left associative while $*$ is right associative
- B. Both \oplus and $*$ are left associative
- C. \oplus is right associative while $*$ is left associative
- D. None of these

32. In multicast routing with spanning tree method, a network with n groups, each with an average of m members requires for each group

- A. n pruned spanning trees must be stored for a total of mn trees
- B. m pruned spanning trees must be stored for a total of m trees
- C. n pruned spanning trees must be stored for a total of n trees
- D. m pruned spanning trees must be stored for a total of mn trees

33. To do multicast routing, each router computes a.....
- Binary tree
 - AVL tree
 - Spanning tree
 - None of these
34. Well -defined groups that are numerically large in size but small compared to the network as a whole are used in.....
- Unicast routing
 - Multicast routing
 - Broadcast routing
 - Telecast routing
35. The processes that keep track of hosts whose home is in the area, but who currently visiting another area is.....
- Home agent
 - Mobile agent
 - Foreign agent
 - User agent
36. ADG is said to be in Chomsky Form (CNF), if all the productions are of the form $A \rightarrow BC$ or $A \rightarrow a$. Let G be a CFG in CNF. To derive a string of terminals of length x , the number of productions to be used is
- $2x - 1$
 - $2x$
 - $2x + 1$
 - None of these
37. In software cost estimation, base estimation is related to:
- Cost of similar projects already completed.
 - Cost of the base model of the present project.
 - Cost of the project with the base minimum profit.
 - Cost of the project under ideal situations.
38. Amdahl's law states that the maximum speedup S achievable by a parallel computer with 'p' processors is given by:
- $S \leq f + (1-f)/p$
 - $S \leq f/p + (1-f)$
 - $S \leq 1/[f + (1-f)/p]$
 - $S \leq 1/[1-f+f/p]$
39. With reference to cluster analysis in data mining, a distance measure that is NOT used is:
- Euclidean distance.
 - Manhattan distance.
 - Chebychev's distance.
 - Lee distance.
40. In a mobile communication system, a geographic region is divided into cells. For each frequency set, there is a buffer wide where that frequency is not used.

- A. one-cell
- B. two-cells
- C. three-cells
- D. four-cells

41. Identify the incorrect statement:

- A. The overall strategy drives the e-commerce data warehousing strategy.
- B. Data warehousing in an e-commerce environment should be done in a classical manner.
- C. E-commerce opens up an entirely new world of web servers.
- D. E-commerce security threats can be grouped into three major categories.

42. Water fall model for software development is:

- A. A top down approach.
- B. A bottom up approach.
- C. A sequential approach.
- D. A consequential approach.

43. In software development, value adjustment factors include the following among others:

- A. The criticality of the performance and reusability of the code.
- B. Number of lines of code in the software.
- C. Number of technical manpower and hardware costs.
- D. Time period available and the level of user friendliness.

44. If x is an array of interger, then the value of &x[i] is same as

- A. &x[i-1] + sizeof (int)
- B. x + sizeof (int) * i
- C. x+i
- D. none of these

45. Which of the following is incorrect statement about packages?

- A. Package defines a namespace in which classes are stored.
- B. A package can contain other package within it.
- C. Java uses file system directories to store packages.
- D. A package can be renamed without renaming the directory in which the classes are stored.

46. What is the output of this program?

```
Package pkg;
class output {
public static void main(String args[])
{
StringBuffer s1 = new StringBuffer("Hello");
s1.setCharAt(1, x);
System.out.println(s1);
}
}
```

- A. xello
- B. xxxxx
- C. Hxlllo
- D. Hexlo

47. Which method can be defined only once in a program?

- A. main method
- B. finalize method
- C. static method
- D. private method

48. Arrays in Java are implemented as?

- A. class
- B. object
- C. variable
- D. None of the mentioned

49. Which of the following statements are incorrect?

- A. Static methods can call other static methods only.
- B. Static methods must only access static data.
- C. Static methods can not refer to this or super in any way.
- D. When object of class is declared, each object contains its own copy of static variables.

50. Database _____, which is the logical design of the database, and the database _____, which is a snapshot of the data in the database at a given instant in time.

- A. Instance, Schema
- B. Relation, Schema
- C. Relation, Domain
- D. Schema, Instance.

51. Course(course_id, sec_id, semester)

Here the course_id, sec_id and semester are _____ and course is a _____.

- A. Relations, Attribute
- B. Attributes, Relation
- C. Tuple, Relation
- D. Tuple, Attributes

52. A domain is atomic if elements of the domain are considered to be _____ units.

- A. Different
- B. Indivisible
- C. Constant
- D. Divisible

53. The percentage of times a page number is found in the Table Look aside Buffer is known as :

- A. miss ratio
- B. hit ratio
- C. miss percent
- D. None of these

54. Which one of the following is the deadlock avoidance algorithm?

- A. banker's algorithm
- B. round-robin algorithm
- C. elevator algorithm

D. karn's algorithm

55. In Segmentation the segment base contains the :

- A. starting logical address of the process
- B. starting physical address of the segment in memory
- C. segment length
- D. None of these

56. Time quantum is defined in

- A. shortest job scheduling algorithm
- B. round robin scheduling algorithm
- C. priority scheduling algorithm
- D. multilevel queue scheduling algorithm

57. Inter process communication :

- A. allows processes to communicate and synchronize their actions when using the same address space.
- B. allows processes to communicate and synchronize their actions without using the same address space.
- C. allows the processes to only synchronize their actions without communication.
- D. None of these

58. _____ is used to store data in registers .

- A. D flip flop
- B. JK flip flop
- C. RS flip flop
- D. none of these

59. What is the output of this program?

```
#include <iostream>
using namespace std;
int main()
{
int a;
    a = 5 + 3 * 5;
cout<< a;
return 0;
}
```

- A. 35
- B. 20
- C. 25
- D. 40

60. What is the output of this program?

```
#include <iostream>
using namespace std;
int main()
{
int a = 5, b = 6, c;
    c = (a > b) ? a : b;
```

```
cout<< c;  
return 0;  
}
```

- A. 6
- B. 5
- C. 4
- D. 7

61. What is meaning of following declaration?

```
int(*p[5])();
```

- A. p is pointer to function.
- B. p is array of pointer to function.
- C. p is pointer to such function which return type is array.
- D. p is pointer to array of function.

62. What is size of generic pointer in C++ (in 32-bit platform) ?

- A. 2
- B. 4
- C. 8
- D. 0

63. How many successors are generated in backtracking search?

- A. 1
- B. 2
- C. 3
- D. 4

64. What is the space complexity of Depth-first search?

- A. $O(b)$
- B. $O(bl)$
- C. $O(m)$
- D. $O(bm)$

65. DFS is _____ efficient and BFS is _____ efficient.

- A. Space, Time
- B. Time, Space
- C. Time, Time
- D. Space, Space

66. General algorithm applied on game tree for making decision of win/lose is _____

- A. DFS/BFS Search Algorithms
- B. Heuristic Search Algorithms
- C. Greedy Search Algorithms
- D. MIN/MAX Algorithms

67. In case of, Zero-address instruction method the operands are stored in _____ .

- A. Registers
- B. Accumulators
- C. Push down stack

D. Cache

68. The addressing mode which makes use of in-direction pointers is _____ .

- A. Indirect addressing mode
- B. Index addressing mode
- C. Relative addressing mode
- D. Offset addressing mode

69. The effective address of the following instruction is , MUL 5(R1,R2)

- A. $5+R1+R2$
- B. $5+(R1 * R2)$
- C. $5+[R1]+[R2]$
- D. $5*([R1]+[R2])$

70. The instruction, MOV AX, 1234H is an example of

- A. register addressing mode
- B. direct addressing mode
- C. immediate addressing mode
- D. based indexed addressing mode

71. The addressing mode that is used in unconditional branch instructions is

- A. Intrasegment direct addressing mode
- B. Intrasegment indirect addressing mode
- C. Intrasegment direct and indirect addressing mode
- D. Intersegment direct addressing mode

72. The set O of odd positive integers less than 10 can be expressed by _____ .

- A. {1, 2, 3}
- B. {1, 3, 5, 7, 9}
- C. {1, 2, 5, 9}
- D. {1, 5, 7, 9, 11}

73. Power set of empty set has exactly _____ subset.

- A. One
- B. Two
- C. Zero
- D. Three

74. What is the Cartesian product of $A = \{1, 2\}$ and $B = \{a, b\}$?

- A. $\{(1, a), (1, b), (2, a), (b, b)\}$
- B. $\{(1, 1), (2, 2), (a, a), (b, b)\}$
- C. $\{(1, a), (2, a), (1, b), (2, b)\}$
- D. $\{(1, 1), (a, a), (2, a), (1, b)\}$

75. In SQL, the statement select * from R, S is equivalent to

- A. Select * from R natural join S
- B. Select * from R cross join S
- C. Select * from R union join S
- D. Select * from R inner join S

MSc(2Yr)(Bioinformatics/System Bio. & Bio.Informatics)

- How structurally Histidine is differing from Phenylalanine?
 - NH
 - OH
 - NH₂
 - SH
- Which of these amino acids is “structurally” classified as being neutral polar?
 - Phe
 - Arg
 - Ala
 - Asn
- What makes FASTA faster than NEEDLEMAN WUNSCH algorithm?
 - The processor speed of the computer
 - Hash table lookup
 - Dynamic programming
 - The scoring matrix used
- How many edges meet at every branch node in a phylogenetic tree?
 - 1
 - 2
 - 3
 - 4
- What is the difference between RefSeq and GenBank?
 - RefSeq includes publicly available DNA sequences
 - GenBank includes non redundant curated data
 - GenBank sequences are derived from RefSeq
 - RefSeq sequences are derived from GenBank
- The sugar pucker observed generally in A-DNA structures is
 - C3'-Exo
 - C3'-Endo
 - O4'-Exo
 - C4'-Endo
- The Pitch/turn of helix observed generally in B-DNA structures is
 - 24.6
 - 33.2
 - 24.8
 - 33.4
- The major groove of in A-DNA structures is
 - narrow
 - Shallow
 - deep, narrow
 - wide, shallow
- The approach that can be used to predict the 3D structure of a protein which has no detectable sequence similarity with the available templates is
 - homology modeling
 - comparative modeling
 - fold recognition
 - ab initio* modeling
- The Ramachandran plot is a
 - Phi-Psi scatter diagram.
 - Phi-Psi correlation diagram.
 - Phi-Psi steric contour diagram.
 - Phi-Psi energy diagram.
- Which of the following can be determined using molecular mechanics?
 - Molecular orbital energies
 - Minimum energy conformation
 - Electrostatic potentials
 - Transition-state geometries
- Which factor distinguish between specificity in BLAST
 - H

- B. K
C. H and K
D. H or K
13. How Sequence filtering in BLAST help in fast database searching
A. Searches for LCR
B. Searches for Repeats
C. Both A & B
D. None of the above
14. What does this E value mean mostly dependent on
A. Database size
B. Database type
C. Database diversity
D. Do not depend on database
15. SEG and PSEG are used for Low complexity region in BLAST
A. Amino acid sequence
B. Nucleic acid sequence
C. Both
D. None of the above
16. Many genes involved in pathogenicity are located in defined continuous regions (“islands”) of the genome and have different GC content from other portions of the genome, suggesting that they have arisen through
A. horizontal gene transfer
B. gene duplication and subsequent mutation
C. protection from methylation
D. increase in the rate of mutation of successive GC pairs
17. Polycistronic mRNA refers to
A. mRNA which is transcribed by multiple RNA polymerases
B. mRNAs that are simultaneously translated
C. mRNA that is translated by many ribosomes simultaneously
D. mRNA with multiple open reading frames
18. Mention the type of the following reaction

$$\text{C}_{12}\text{H}_{22}\text{O}_{11} + \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{C}_6\text{H}_{12}\text{O}_6$$
A. Synthesis
B. Hydrolysis
C. Dehydration
D. Hydrogenation
19. Value of coefficient of kurtosis for a Normal distribution is
A. positive
B. negative
C. equal to one
D. equal to three
20. How SRAM and DRAM differentiated?
A. SRAM require less power than DRAM
B. SRAM less expensive than DRAM
C. SRAM is volatile than DRAM
D. Both A & B
21. 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
22. Which of the following is NOT a characteristic of all Object Oriented Programming Languages?
A. Inheritance
B. Garbage collection
C. Abstraction
D. Data hiding
23. Which protocol is used by browsers to communicate between two machines?
A. ftp
B. ssl
C. tcp
D. http

24. 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
25. 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
26. Which one is correct?
 - A. 8 bit = 1 byte
 - B. 1024 KB = 1MB
 - C. 1024GB = 1 Terabyte
 - D. All the above
27. Kernel is the heart of Unix/Linux and wrapped by
 - A. shell
 - B. shell command
 - C. shell disk
 - D. none of the above
28. What is the major advantage of DOT PLOT analysis?
 - A. Identify all possible match
 - B. Identify all possible mismatch
 - C. Identify all ungapped match
 - D. All the above
29. 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
30. Repeat and inverted repeats in DNA sequences are significantly identify by DOT PLOT
 - A. Agree
 - B. May be
 - C. Strongly agree
 - D. Not possible
31. 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
32. Entropy of the matrix1 & 2 are +0.36 & +0.70. Which matrix is significantly distinguished between real vs. chance alignment.
 - A. Matrix 1
 - B. Matrix 2
 - C. Data is no significant
 - D. Both A & B
33. Significant of pair sequence alignment is not possible without scoring matrix.
 - A. Statement is correct
 - B. Statement is incomplete
 - C. Statement is no universal
 - D. Statement is justified
34. Which matrices significantly identify distant homologues?
 - A. PAM
 - B. BLOSUM
 - C. Both
 - D. None of the above
35. If the clustering in a matrices increased from 40% to 60%. Then information content would increased from
 - A. 0.3 to 0.5 per residue
 - B. 0.4 to 0.7 per residue
 - C. Do not change
 - D. None of the above
36. Three dimension protein structure is stabilized with

- A. Non covalent bonding
 - B. Covalent bonding
 - C. Manly non covalent bonding
 - D. Both A & B
37. Three dimension protein structure is stabilized with
- A. Non covalent bonding
 - B. Covalent bonding
 - C. Manly non covalent bonding
 - D. Both A & B
38. In semi-empirical methods
- A. Nuclei & electrons are distinguished
 - B. Nuclei & electron are no distinguish
 - C. Nuclei are only considered
 - D. Electron are only considered
39. 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
40. Globin fold consist of
- A. All alpha helices
 - B. Eight alpha helices
 - C. Four alpha & four beta helices
 - D. None of the above
41. Statistical thermodynamics deals with
- A. pressure
 - B. entropy
 - C. free energy
 - D. all of the above
42. Plasmid DNA is
- A. Positively supercoiled
 - B. Negatively supercoiled
 - C. Early supercoiled
 - D. supercoiled
43. Topology of DNA could be described by
- A. Linking number
 - B. Twisting number
 - C. Writhing number
 - D. All of the above
44. PHYLIP program of phylogenetic analysis based on
- A. Parsimony method
 - B. Distance method
 - C. Partly on distance method
 - D. None 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. CHARMM family
- A. Program for molecular minimization
 - B. It is a force feild
 - C. Force field parameter
 - D. None of the above
48. Supercoiling has a significant role in controlling gene expression
- A. Statement is correct
 - B. State is incomplete

- C. Statement is not justify
 - D. None of the above
49. Global minimum energy conformation is always an active conformation of the model
- A. Statement is correct
 - B. State is incomplete
 - C. Statement is not justify
 - D. None of the above
50. Molecular descriptor
- A. Log p
 - B. Clog p
 - C. HUMO
 - D. All of the above
51. Which of the following is a subset of {b, c, d}?
- A. { }
 - B. {a}
 - C. {1, 2, 3}
 - D. {a, b, c}
52. Two sequences are said to be homologous if:
- A. They have diverged from a common ancestor.
 - B. Their alignments share 30% identity or more.
 - C. They belong to the same fold family.
 - D. They have converged to share similar functional properties.
53. Hydropathy plots are usually used to predict:
- A. beta secondary structures
 - B. transmembrane domains
 - C. alpha secondary structures
 - D. tertiary structure
54. zinc finger is a small
- A. conserved structural
 - B. super secondary structures
 - C. transcription factor shape
 - D. variations in structure
55. Should one use several gene prediction packages, and why?
- A. no, each is 100% accurate
 - B. yes, it's useful to see what is/isn't predicted by each package and, consensus is useful
 - C. yes as none of them work reliably
 - D. no, as the use of several packages complicates the analysis
56. Which of the following is NOT a prime number?
- A. 11
 - B. 21
 - C. 31
 - D. 41
57. SRS is:
- A. a Website for sequence similarity searches
 - B. a Website specializing in mapping mutations related to human disease
 - C. a Website that indexes many biological databases and is searchable by keywords
 - D. a Website for protein family database searches
58. In heme synthesis in mammalian cells:
- A. Succinyl CoA and alanine are the immediate substrates for formation of delta-aminolevulinic acid.
 - B. Ferric iron is inserted into protoporphyrin IX.
 - C. Coproporphyrin IV is an intermediate.
 - D. Porphobilinogen is formed by the condensation of two molecules of delta-aminolevulinic acid.
59. Why are color schemes important in creating and analyzing sequence alignments?
- A. They look pretty
 - B. To make clearer printouts and presentations
 - C. To allow you to distinguish conserved residues and residue groups more easily
 - D. To allow you to detect active sites of proteins

60. The Myeloid cells include
- monocytes,
 - macrophages,
 - neutrophils,
 - ALL
61. Systems biology include
- modeling of complex biological systems
 - Application of static systems theory to molecular biology.
 - Identify different sub structures.
 - functional genomics
62. Rotation is permitted about
- N-C α and C α -C bonds.
 - N-C α or C α -C bonds.
 - N-C α not C α -C bonds.
 - N-C α , C α -C bonds.
63. Twilight zone of protein sequence alignments
- The signal gets blurred near about 20-35% sequence identity
 - IT is described by an explosion of false negatives
 - 95% of all pairs detected had different structures.
 - all of the above
64. molecular orbital theory is
- bonds between atoms, are moving under the influence of the nuclei in the whole molecule
 - bonds between atoms, are not moving under the influence of the nuclei in the whole molecule
 - atoms between bonds, are moving under the influence of the nuclei in the whole molecule
 - toms between bonds, are not moving under the influence of the nuclei in the whole molecule
65. What is a theoretical biologist?
- Mathematical biology
 - Evolutionary biology
 - BOTH
 - None of the above
66. Identify which of the following terms refers to the arrangement of different protein subunits in a multiprotein complex.
- primary structure
 - secondary structure
 - tertiary structure
 - quaternary structure
67. which BLOSUM matrices used for distantly related proteins
- BLOSUM 62
 - BLOSUM 80
 - BLOSUM 45
 - BLOSUM 50
68. Microcanonical ensemble is
- equal probability each possible state with constant energy and composition
 - un equal probability each possible state with constant energy and composition
 - equal probability each possible energy state
 - un equal probability each possible energy state
69. DNA supercoiling can be described numerically by changes
- linking number
 - twist number
 - writhe number
 - all
70. Identify the strongest form of intermolecular bonding that could be formed involving the residue of the amino acid serine.
- ionic bond
 - hydrogen bond
 - van der Waals interactions
 - none of the above

71. Well-conserved regions in multiple sequence alignments:
- A. Reflect areas of structural importance.
 - B. Reflect areas of functional importance.
 - C. Reflect areas of both functional and structural importance.
 - D. Reflect areas likely to be of functional and/or structural importance.
72. Triad tools in molecular modeling do not 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
73. AMBER family
- A. Program for molecular minimization
 - B. It is a force feild
 - C. Force field parameter
 - D. None of the above
74. Which matrices pairs has comparable results
- A. PAM50 BLOSUM90
 - B. PAM20 BLOSUM60
 - C. PAM160 BLOSUM60
 - D. PAM200 BLOSUM30
75. What is Phonemics?
- A. variation in phenotype & genotype as it changes during its life span
 - B. variation in genotype as it changes during its life span
 - C. Variation in phenotype as it changes during its life span.
 - D. none

MSc(2Yr)(Human Genomics)

1. In a DNA molecule, adjacent nucleotides are joined by
 - a) Covalent bond
 - b) Ionic bond
 - c) Phosphodiester bond
 - d) Peptide bond
2. A nucleoside is composed of
 - a) a base + a sugar
 - b) a base + a sugar + a phosphate
 - c) a base + a phosphate
 - d) None of the above
3. Which of the following types of RNA participate in RNA processing?
 - a) t-RNA
 - b) r-RNA
 - c) Small nuclear RNA (snRNA)
 - d) Small interfering RNA (siRNA)
4. An endonuclease is an enzyme that hydrolyzes
 - a) A nucleotide from only the 3' end of an oligonucleotide
 - b) A nucleotide from either terminal of an oligonucleotide
 - c) A phosphodiester bond located in the interior of a polynucleotide
 - d) A nucleotide from only the 5' end of an oligonucleotide
5. The accepted hypothesis for DNA replication is
 - a) Conservative theory
 - b) Dispersive theory
 - c) Semi-conservative theory
 - d) Evolutionary theory
6. The iodine used in gram staining serves as
 - a) Chelator
 - b) Catalyst
 - c) Co-factor
 - d) Mordant
7. Extra chromosomal, circular, double stranded, self-replicating DNA molecule in bacteria is called
 - a) Cosmid
 - b) Plasmid
 - c) Phagemid
 - d) Phasmid
8. The transfer of genetic material from one bacterium to another via virus is called
 - a) Transformation
 - b) Conjugation
 - c) Recombination
 - d) Transduction
9. The genetic material of viruses consists of either
 - a) DNA

- b) RNA
- c) DNA or RNA
- d) ssDNA or ssRNA

10. Conversion of NO_2^- to NO_3^- is carried out by

- a) *Nitrosomonas*
- b) *Nitrososoccus*
- c) *Nitrobacter*
- d) *Clostridium*

11. X-chromosome inactivation

- a) Normally takes place in males but not females
- b) Is the cause of Y chromosome being genetically inactive
- c) Takes place in humans so that the same X chromosome is inactive in all the cells of a female
- d) Results in genetically turning off one of the two X chromosomes in female mammals

12. Which of the following conditions is caused by trinucleotide (triplet) repeat expansion?

- a) Cystic fibrosis
- b) Duchenne muscular dystrophy
- c) Huntington disease
- d) Osteogenesis imperfect

13. Griffith's transformation experiment was carried out using

- a) *Escherichia coli*
- b) *Bacillus subtilis*
- c) *Diplococcus pneumonia*
- d) *Salmonella typhimurium*

14. A heritable feature is a _____ and may have two or more variants called _____.

- a) Trait/Characteristics
- b) Character/Traits
- c) Character/Factors
- d) Trait/Factors

15. Which of the following is correct with regard to aneuploidy?

- a) Inversion
- b) $2n + 1$
- c) All aneuploid individuals die before birth
- d) $4n$

16. Proteins that assist the binding of RNA polymerase to the promoter region on DNA strand are called

- a) Transcription factors
- b) SSB proteins
- c) Sigma factor
- d) All of the above

17. Which of the following descriptions of chromosomes is not correctly matched?

- a) Metacentric — chromosome arms are almost equal in size
- b) Submetacentric — chromosome arms are slightly different in size
- c) Acrocentric — chromosome arms are identical in size
- d) Telocentric — there is only one chromosome arm

18. Those mutations that arise in the absence of known mutagen are known as
- Induced mutations
 - Fused mutations
 - Spontaneous mutations
 - potent mutations
19. The enzyme which builds mRNA strand complimentary to the DNA transcription unit is called
- DNA polymerase
 - RNA polymerase
 - Helicase
 - DNA ligase
20. Proto-oncogene in normal cells
- Code for proteins involved in the stimulus of cell division
 - Suppresses progression through the cell cycle in response to DNA damage
 - Initiates apoptosis
 - Initiates cell death
21. During cell division there are three types of check points one of them (M checkpoint) to ensure
- Chromosomes are attached to the spindle
 - Complete DNA replication
 - DNA not damage or broken
 - RNA is not damaged
22. Those cancers that derived from ectoderm or endoderm of epithelial cell are called
- Carcinoma
 - Sarcoma
 - Leukaemia
 - Myeloid
23. The association of endotoxin in gram-negative bacteria is a result of the presence of
- Peptidoglycan
 - Lipopolysaccharides
 - Polypeptide
 - Steroids
24. Which of the following describes prokaryotic cell membrane?
- Selectively permeable
 - Regulates passage of materials into and out of the cell
 - Contains proteins and phospholipids
 - Contains metabolic enzymes
25. Chloroplasts are organelle that actively carries out photosynthesis. Which of the following is NOT a characteristic of them?
- Are found in plant and algal cells
 - Contain the pigment chlorophyll
 - Are membrane enclosed
 - Are found in photosynthetic prokaryotic cells

26. Proline is an
- Amino acid
 - Peptide
 - Imino acid
 - Peptoid
27. The basic repeating units of a DNA molecule is
- Nucleoside
 - Nucleotide
 - Histones
 - Amino acids
28. The length of DNA having 23 base pairs is
- 78 Å
 - 78.4 Å
 - 78.2 Å
 - 74.8 Å
29. RNA molecules differ from DNA molecules in all but which one of the following respects?
- Kind of pyrimidines
 - Kind of purines
 - Type of sugar
 - Number of strands per molecule
30. Solution with pH = 5 is _____ than a solution with pH = 7.
- 2 times more basic
 - 10 times more basic
 - 10 times more acidic
 - 100 times more acidic
31. Stereo chemical configuration of all α -amino acids derived from proteins is
- L
 - D
 - L and D
 - R and S
32. DNA replication takes place in which direction?
- 3' to 5'
 - 5' to 3'
 - Randomly
 - Vary from organism to organism
33. Molecules in which the atoms are held together by _____ bonds have the strongest chemical linkages.
- Non-covalent
 - Covalent
 - Ionic
 - Hydrogen
34. Rh factor of the blood was discovered by scientist
- Louis Pasteur

- b) Landsteiner and Weiner
- c) Janskey
- d) Moss

35. Enhancement of virulence is known as

- a) Exaltation
- b) Attenuation
- c) Both a and b
- d) Stimulation

36. The ability of the immune system to recognize self antigens versus non-self antigen is an example of

- a) Specific immunity
- b) Tolerance
- c) Cell mediated immunity
- d) Antigenic immunity

37. Cell mediated immunity is carried out by..... while humoral immunity is mainly carried out by.....

- a) B cells/T cells
- b) Epitopes/Antigens
- c) T cells/B cells
- d) Antibodies/Antigens

38. Monoclonal antibodies recognize a single

- a) Antigen
- b) Bacterium
- c) Epitope
- d) B cell

39. B Cells are activated by

- a) Complement
- b) Antibody
- c) Interferon
- d) Antigen

40. The specificity of an antibody is due to

- a) Its valence
- b) Heavy chains
- c) Fc portion of the molecule
- d) Variable portion of the heavy and light chain

41. C3b

- a) Is chemotactic
- b) Is an anaphylatoxin
- c) Opsonizes bacteria
- d) Directly injures bacteria

42. B cell are distinguished from T cells by the presence of

- a) CD4
- b) Surface Ig
- c) CD8

d) CD3

43. B cell don't express

- a) CD2
- b) MHC- I molecule
- c) MHC- II molecule
- d) CR2

44. Molecules directly involved in NK cell mediated killing include

- a) Muramyl dipeptide
- b) Granzyme
- c) Complement
- d) IFN-gamma

45. Dendritic cells are characterized by

- a) The presence of TCR
- b) Expression of CD3
- c) Expression of IgM molecules
- d) Their ability to release histamine

46. Cytokines always act

- a) By binding to specific receptors
- b) In an autocrine fashion
- c) At long range
- d) Antagonistically with other cytokines.

47. The source of illumination in Fluorescent microscope is

- a) Electron beam
- b) Light rays
- c) UV rays
- d) Infrared rays

48. DNA Finger printing requires only a minute quantity of DNA sample such as WBC of blood stain because

- a) Large quantity of DNA is available in WBC
- b) DNA contains nitrogen bases
- c) DNA can be amplified through PCR
- d) DNA determines the heredity

49. ELISA is used to detect HIV but the confirmation of HIV infection is done through

- a) Southern blotting
- b) Western blotting
- c) Eastern blotting
- d) DNA finger printing

50. Which one of the following enzymes is obtained from *Thermophilus aquaticus* bacterium which is heat stable and used in PCR at high temperature

- a) DNA polymerase III
- b) Endonuclease
- c) Taq polymerase
- d) DNA gyrase

51. In enzyme action, sometimes a substance blocks a site other than the active site and inhibits the action of enzyme. This is

- a) Allosteric inhibition
- b) Feed back inhibition
- c) Competitive inhibition
- d) Non competitive inhibition

52. The most accepted theory of origin of life is

- a) Special creation theory
- b) Theory of abiogenesis
- c) Oparin- Haldane theory
- d) Theory of spontaneous generation

53. In Man, I_A allele produces A antigen and I_B allele produce B antigen. i allele is incapable of producing any antigen. In which of the following person, the genotype is homozygous for the alleles

- a) A group
- b) B group
- c) O group
- d) AB group

54. Most common example of fermented cereal product is

- a) Pickles
- b) Bread
- c) Yogurt
- d) Cheese

55. Model which states that specific shapes are possessed by substrate and enzyme is known as

- a) Deduction model
- b) Induction model
- c) Lock and key model
- d) Arrow and shield model

56. If proteins are separated according to their molecular mass then the type of electrophoresis is

- a) SDS page
- b) Free flow electrophoresis
- c) Electro focusing
- d) Affinity electrophoresis

57. Agarose is composed of long unbranched chains of uncharged

- a) Proteins
- b) Vitamins
- c) Carbohydrates
- d) RNA

58. If you performed a laboratory analysis of DNA, you would find that the amount of adenine is _____ the amount of thymine.

- a) Much greater than
- b) Much less than
- c) About the same as
- d) Shows no relationship to

59. Which of the following may not contribute to causing cancer?

- a) A mutation in a gene that slows the cell cycle
- b) Faulty DNA repair
- c) Loss of control over telomere length
- d) Balanced diet

60. The triplet code of CAT in DNA is represented as _____ in mRNA and _____ in tRNA.

- a) GAA, CAT
- b) CAT, CAT
- c) GUA, CAU
- d) GTA, CAU

61. Monohybrid test cross ratio is

- a) 3:1
- b) 2:1
- c) 1:1
- d) 9:3:3:1

62. ABO blood group system is due to

- (a) Multifactor inheritance
- (b) Incomplete dominance
- (c) Multiple allelism
- (d) Epistasis

63. Direct DNA uptake by protoplasts can be stimulated by

- a) Polyethylene glycol (PEG)
- b) Decanal
- c) Luciferin
- d) Amino acids

64. Which technique is used to introduce genes into dicots?

- a) Electroporation
- b) Particle acceleration
- c) Microinjection
- d) Ti plasmid infection

65. *Agrobacterium tumefaciens* is a

- a) gram (+) bacteria
- b) gram (-) bacteria
- c) A fungi
- d) A yeast

66. In the Hardy–Weinberg equation, the heterozygous individuals in a population are represented by

- a) p^2
- b) $2pq$
- c) q^2
- d) p

67. At certain pH environments isoelectric point affects the

- a) Solubility of molecule
- b) Solubility of solvent

- c) Temperature
- d) Density of molecule

68. pH at which amino acids does not migrate in an electric field

- a) Isoelectric
- b) Electric point
- c) Field point
- d) All of the above

69. Histones are rich in

- a) Lysine
- b) Arginine
- c) Histidine
- d) Lysine and Arginine

70. Which of the following amino acid is sweet in taste?

- a) Glycine
- b) Alanine
- c) Glutamic acid
- d) None of these

71. Margaret Dayhoff developed the first protein sequence database called

- a) SWISS PROT
- b) PDB
- c) Atlas of protein sequence and structure
- d) Protein sequence databank

72. Each record in a database is called

- a) Entry
- b) File
- c) Record
- d) Ticket

73. Which of the following is a protein sequence database

- a) DDBJ
- b) EMBL
- c) GenBank
- d) PIR

74. An example of Homology & similarity tool

- a) PROSPECT
- b) EMBOSS
- c) RASMOL
- d) BLAST

75. Human genome contains about

- a) 2 billion base pairs
- b) 3 billion base pairs
- c) 4 billion base pairs
- d) 5 billion base pairs

MSc(2Yr)(NuclearMedicine)

1. Rate of transfer of energy by radiation can be increased by
 - A. increasing surface temperature
 - B. decreasing surface area
 - C. using shiny white surfaces instead of dull and black surfaces
 - D. decreasing atmospheric pressure

2. A vertical plane through the body dividing it into right and left is termed:
 - A. Sagittal
 - B. Lateral
 - C. transverse
 - D. frontal

3. The walls of hollow organs and some blood vessels contain this muscle tissue:
 - A. Striated
 - B. Skeletal
 - C. cardiac
 - D. smooth

4. The major regulatory proteins in muscle tissue are:
 - A. myosin and tropomyosin
 - B. myosin and actin
 - C. actin and troponin
 - D. troponin and tropomyosin

5. The visceral pleura:
 - A. is the membrane lining surface of the lungs
 - B. is the membrane lining the wall of the thoracic cavity
 - C. is the fluid around the lungs
 - D. is the thinnest portion of the peritoneum

6. A homeostatic imbalance:
 - A. must be restored by negative feedback mechanisms
 - B. is considered the cause of most diseases
 - C. is when the internal conditions of the body become more stable
 - D. only occur when positive feedback mechanisms are overwhelmed

7. Which of the following can be found in cartilage but not bone tissue:
 - A. lacunae
 - B. protein fibers
 - C. blood vessels
 - D. chondroitin

8. The most common type of exocrine gland is this type:
 - A. apocrine
 - B. merocrine
 - C. endocrine
 - D. holocrine

9. Which of the following heals the quickest after injury:
 - A. Bone

- B. Epithelium
 - C. cartilage
 - D. muscle
10. Which of the following suffixes implies "growth" or "formation":
- A. -blast
 - B. -lemma
 - C. -stasis
 - D. -cyte
11. IF the concentration of glucose in the water outside of a cell is higher than the concentration inside:
- A. Water will tend to enter the cell by osmosis
 - B. Water will tend to leave the cell by osmosis
 - C. Glucose will tend to enter the cell by osmosis
 - D. Glucose will tend to leave the cell by osmosis
12. Times a proton is heavier than an electron is
- A. 1827
 - B. 1876
 - C. 1836
 - D. 1789
13. In fission, mass of products is
- A. less than original nucleus
 - B. more than original nucleus
 - C. equal to original nucleus
 - D. both B and C
14. Cosmic radiation consists of
- A. protons and electrons
 - B. alpha particles
 - C. larger nuclei
 - D. all of above
15. Greatest ionization power is possessed by
- A. beta particles
 - B. gamma particles
 - C. neutrons
 - D. alpha particles
16. Half-life of Carbon-14 is
- A. 23 years
 - B. 1000 years
 - C. 1200 years
 - D. 5730 years
17. Antibiotics are
- A. carbohydrate in nature
 - B. protein in nature
 - C. fats

- D. vitamins in nature
18. A chromosome aberration leads to change in the order of genes in a genetic map but does not alter its linkage group. This is due to
- A. Translocation
 - B. Recombination
 - C. Transposition
 - D. Inversion
19. Most common type of phospholipids in the cell membrane of nerve cells is
- A. Phosphatidylcholine
 - B. Phosphatidylinositol
 - C. Phosphatidylserine
 - D. Sphingomyelin
20. Which of the cyclins have essential functions in S phase of the cell cycle?
- A. A type
 - B. B type
 - C. D type
 - D. Both B and D type
21. What is the resting membrane potential of a neuron?
- A. -70 mV
 - B. -65mV
 - C. -80 mV
 - D. -55mV
22. Which one of the following functions is not served by the plasma proteins?
- A. Blood clotting
 - B. Oxygen transport
 - C. Hormone binding and transport
 - D. Buffering capacity of blood
23. The S wave form of normal human ECG originates due to:
- A. Septal and left ventricular depolarization
 - B. Late depolarization of the ventricular walls moving back towards the AV junction
 - C. Left to right septal depolarization
 - D. Repolarization of atrium
24. The number of layers in Retina are
- A. 6
 - B. 12
 - C. 8
 - D. 10
25. The physiological process through which new Blood vessel form from pre-existing vessels is known as
- A. Metastasis
 - B. Angiogenesis
 - C. Diapedesis

- D. Differentiation
26. The most radiosensitive phase of a cell cycle is
- S phase
 - M phase
 - G1 phase
 - G⁰ Phase
27. Which of the following is not a chemical radiosensitizer?
- Nucleotide analogues
 - Electronic affinic compounds
 - Nitroimidazoles
 - Aminothiols
28. Photographic film badge monitoring devices are unable to detect:
- Neutrons
 - Beta particle
 - Gamma rays
 - x-rays
29. The neutrino hypothesis was put forward by
- Einstein
 - Rutherford
 - Pauli
 - Fermi
30. 1 Fermi is equal to
- 10^{-13} m
 - 10^{-14} m
 - 10^{-15} m
 - 10^{-16} m
31. Which is not a beta emitter?
- ^{32}P
 - ^{131}I
 - $^{99\text{m}}\text{Tc}$
 - ^{89}Sr
32. Which spectroscopy is used to detect -SH group and disulphide linkages in proteins
- CD spectroscopy
 - Fluorescence spectroscopy
 - NMR spectroscopy
 - FTIR spectroscopy
33. Which of the following can be detected in a magnetic field
- Gamma rays
 - Beta rays
 - Radio waves
 - Ultra-violet rays
34. Bremsstrahlung radiation are called
- X-rays with fixed energy
 - Gamma rays with fixed energy
 - X-rays with variable energy
 - Gamma rays with variable energy
35. Which one of the following is not the process of energy transfer from neutrons?

- A. Elastic scatter
 - B. Spallation
 - C. Compton scattering
 - D. Inelastic scatter
36. 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
37. 1 Roentgen is equal to
- A. 2×10^{12} ionisations/gm of tissue
 - B. 2×10^{11} ionisations/gm of tissue
 - C. 2×10^{10} ionisations/gm of tissue
 - D. 2×10^8 ionisations/gm of tissue
38. Energy liberated when one atom of U-235 undergoes fission reaction is
- A. 200MeV
 - B. 100Mev
 - C. 40Mev
 - D. 20Mev
39. During fission process a large amount of
- A. heat energy is released
 - B. nuclear energy is released
 - C. chemical energy is released
 - D. light energy is released
40. Half life of any radioactive material is 50 days. How many half life it will take to become 12.5% of the original amount?
- A. 1
 - B. 2
 - C. 3
 - D. 4
41. According to the Beer-Lambert Law, on which of the following does absorbance *not* depend?
- A. Distance that the light has travelled through the sample.
 - B. Extinction coefficient of the sample.
 - C. Solution concentration.
 - D. Colour of the solution.
42. The wavelength of an absorption is 495 nm. In what part of the electromagnetic spectrum does this lie?
- A. Radiowave
 - B. Ultraviolet-visible.
 - C. Microwave.
 - D. Infrared.
43. Enriched uranium means
- A. Uranium that is very pure

- B. Uranium in which the concentration of U-238 is more than in the natural occurring uranium
 - C. Uranium in which the concentration of U-235 is more than in the natural occurring uranium
 - D. Uranium in which the concentration of U-236 is more than in the natural occurring uranium
44. The material used for absorbing excess neutrons in a nuclear reactor is
- A. Cadmium
 - B. Neodymium
 - C. Vanadium
 - D. Indium
45. Energy of thermal neutrons is
- A. 0.50 ev
 - B. 0.05 ev
 - C. 0.25 ev
 - D. 0.025 ev
46. The isoelectric point of a protein is
- A. pH where its net charge is zero
 - B. pH where its net charge is +1
 - C. pH where the net charge is -1
 - D. pH where its net charge is +2
47. Anaerobic respiration in animals produces
- A. CO₂
 - B. Lactic acid and H₂O
 - C. Glucose and oxygen
 - D. C₂H₂O₅ and CO₂
48. 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
49. The matrix of blood is known as
- A. Plasma
 - B. Serum
 - C. Platelets
 - D. Pleura
50. Goitre is caused by
- A. Excessive secretion of thyroxine
 - B. Deficiency of iodine
 - C. Defective growth hormone
 - D. Excessive secretion of tri iodo thyronine
51. The protective covering of brain is called
- A. Meninges
 - B. Peritoneum
 - C. Pleura
 - D. Pericardium
52. What is the fate of glucose in mitochondrial matrix after glycolysis?

- A. Hydrolysis
 - B. Oxidative decarboxylation
 - C. Reduction
 - D. Oxidation
53. When the Half Life increases:
- A. the Decay Constant increases
 - B. the Decay Constant decreases
 - C. the Decay Constant remains unchanged
 - D. the Decay Constant first increases and then decreases
54. A linear relationship is obtained between the number of radioactive nuclei and time when it is plotted:
- A. on a log-log graph
 - B. on a linear-linear graph
 - C. on a log-linear graph
 - D. on a square-linear graph
55. The number of nuclei which decay between t and $t+dt$ is proportional to:
- A. the number of nuclei only
 - B. the time interval only
 - C. the quotient of the number of nuclei and the time interval
 - D. the product of the number of nuclei and the time interval
56. The Radioactive Decay Law is expressed by:
- A. an exponential function
 - B. a logarithmic function
 - C. a sinusoidal function
 - D. a linear function
57. Which of the following is measured in millimetres?
- A. Energy resolution
 - B. Spatial resolution
 - C. Field uniformity
 - D. Temporal resolution
58. The Z component of the signal in PMT tube will
- A. Be processed by pulse height analyser
 - B. Be recorded on CRT
 - C. Not be processed by pulse height analyser
 - D. Be removed by PMT
59. Which photon processes are dominant in the context of diagnostic radiology?
- A. Compton scattering and photoelectric effect
 - B. Photoelectric effect and pair production
 - C. Compton scattering and pair production
 - D. Compton scattering and Rayleigh scattering
60. Vibration property of molecules is checked by
- A. Infra red Spectroscopy
 - B. HPLC
 - C. Electron Microscopy

D. SDS-PAGE

61. Proton NMR is useful for investigating the structure of organic compounds because
- A. organic compounds contain carbon atoms
 - B. organic compounds are mostly covalent
 - C. hydrogen atoms are found in nearly all organic compounds
 - D. organic compounds have low boiling points
62. **You want to know if a culture of cells is in the process of DNA synthesis. You incubate your cells in the presence of radioactive thymidine to see if it is being incorporated into the DNA. What is the best technique to detect the labeled deoxynucleotide in nuclear DNA?**
- A. Autoradiography
 - B. polyacrylamide gel electrophoresis
 - C. agarose gel electrophoresis
 - D. two-dimensional gel electrophoresis
63. Radius of nucleus ranges from
- A. 10^{-15} m
 - B. 10^{-15} m to 10^{-14} m
 - C. 10^{-10} m
 - D. 10^{-10} m to 10^{-6} m
64. In a nuclear process, quantity conserved is
- A. mass-energy
 - B. momentum
 - C. mass only
 - D. energy only
65. In β^+ decay, nucleon number is
- A. Conserved
 - B. not conserved
 - C. unstable
 - D. stable
66. Phenomena of radioactivity was discovered by Henri Becquerel in
- A. 1893
 - B. 1894
 - C. 1895
 - D. 1896
67. Heavy nuclei have
- A. more protons than neutrons
 - B. more electrons than neutrons
 - C. more neutrons than electrons
 - D. more neutrons than protons
68. Strong nuclear force acts over distance
- A. 10^{-13} m
 - B. 10^{-14} m
 - C. 10^{-15} m
 - D. 10^{-16} m

69. Mass of alpha particle is
- A. 50 times mass of electron
 - B. 100 times mass of electron
 - C. 500 times mass of electron
 - D. 1000 times mass of electron
70. A measure of radiation that takes into account the possible biological damage produced by different types of radiation is called a
- A. Rem
 - B. Rad
 - C. Roentgen
 - D. Curie
71. The radioactive isotope Z has a half-life of 12 hours. After 2 days, the fraction of the original amount remaining is
- A. $1/2$
 - B. $1/4$
 - C. $1/8$
 - D. $1/16$
72. The rate of radioactive decay is increased by
- A. increased heat
 - B. increased pressure
 - C. the use of a nuclear catalyst
 - D. none of the above
73. The mass of a given nucleus is always _____ the sum of the masses of the individual particles of which it is made.
- A. Less than
 - B. More than
 - C. the Same as
 - D. sometimes less, sometimes more, but never the same as
74. A Geiger counter is able to provide an indirect measure of radioactivity because radiation has a property of
- A. Ionization
 - B. making matter glow in the dark
 - C. fogging photographic film
 - D. attracting electrons.
75. The normal life span of red blood cells is _____ days, following which it is removed from the circulation by _____.
- a. 60 days, spleen
 - b. 120 days, spleen
 - c. 60 days, bone marrow
 - d. 120 days, bone marrow

M.Com. (Honours)

- Which of the following is not included in the definition of management?
(A) Achieving organisational objectives (B) Balancing efficiency against effectiveness
(C) Working with and through people (D) Obtaining the most from limited resources
- The first Income-tax Act was enacted in India in
(A) 1960 (B) 1860
(C) 1760 (D) 1660
- According to Section 197(1) of the Companies Act, 2013, the maximum managerial remuneration payable by a public company, to its directors, including managing director and whole-time director, and its manager in respect of any financial year (FY) shall not exceed
(A) 10% of the net profits of that company for that FY (B) 11% of the net profits of that company for that FY
(C) 12% of the net profits of that company for that FY (D) 15% of the net profits of that company for that FY
- The Union Budget 2017 was presented on the
(A) first day of February (B) last day of February
(C) first day of March (D) last day of March
- Which of the following term refers to meeting the needs of the present without compromising the ability of future generations to meet their own needs?
(A) Green economics (B) Corporate social responsibility
(C) Sustainability (D) Convergence
- Which stage of the product life cycle is characterized by little competition and slowly increasing sales?
(A) Introduction (B) Growth
(C) Maturity (D) Decline
- An application for refund of duty for export of goods exported out of India under

Section 26(2) of the Custom Act, 1962 has to be made before the expiry of how many months from the date on which the proper officer makes an order for the clearance of the goods

- (A) 3 months (B) 6 months
(C) 9 months (D) 12 months

8. Who gave his name to a bar chart widely used to plan event sequences?

- (A) Max Weber (B) Frank Gilberth
(C) Henri Fayol (D) Henry Gantt

9. Which of the following is used for the measurement of distribution of income?

- (A) Laffer Curve (B) Engel's Law
(C) Gini-Lorenz Curve (D) Philip Curve

10. What does SUUTI stands for

- (A) Specified Underwriting of the Unit Trust of India (B) Special Union of the Unit Trust of India
(C) Special Undertaking of the Unit Trust of India (D) Specified Undertaking of the Unit Trust of India

11. In which stage of the total life cycle of a product is kaizen costing most applicable?

- (A) Research and Development Stage (B) Designing Stage
(C) Production Stage (D) Scrapping Stage

12. Dividend received by a shareholder from a company whose entire income is agricultural income is taxable as

- (A) Agricultural income (B) Partly agricultural income
(C) Business income (D) Income from other sources

13. The evaluation method that requires the supervisors to keep a written record of positive and negative work-related actions of the employees is called

- (A) Critical incident method (B) Essay method
(C) Field review method (D) Work standard method

14. Goods and Services Tax (GST), a single system of indirect taxation was introduced in India as the
- (A) Constitution (One Hundred Amendment) Act, 2015 (B) Constitution (One Hundred and First Amendment) Act, 2016
- (C) Constitution (One Hundred and Twenty Second Amendment) Act, 2016 (D) Constitution (One Hundred and Twenty Third Amendment) Act, 2017
15. This type of risk is avoidable through proper diversification
- (A) Portfolio risk (B) Systematic risk
- (C) *Idiosyncratic* risk (D) Total risk
16. One year forward P/E ratio for a company is 10. If the expected growth rate in earnings for the future is 20%, calculate Price Earnings to Growth (PEG) ratio
- (A) 5 (B) 2
- (C) 0.5 (D) 0.2
17. Active portfolio managers try to construct a risky portfolio with
- (A) a higher Sharpe measure than a passive strategy (B) a lower Sharpe measure than a passive strategy
- (C) the same Sharpe measure as a passive strategy (D) very few securities
18. Payment received by employee in respect of encashment of earned leave during service is
- (A) taxable as salary (B) taxable as income from other sources
- (C) 50% is exempt and balance taxable as salary (D) fully exempt under section 10
19. In 2016, the Indian government decided to demonetize the 500- and 1,000- rupee notes. These notes accounted for what percentage of the country's circulating cash?
- (A) 60% (B) 74%
- (C) 86% (D) 92%
20. Retained earnings for the 'base year' equals 100 percent. You must be looking at
- (A) a common-size balance sheet (B) a common-size income statement
- (C) an indexed balance sheet (D) an indexed income statement

21. Holding all other factors constant, the break-even point will decrease by
- (A) increasing the fixed costs (B) decreasing the contribution margin
(C) increasing the selling price (D) increasing the variable cost per unit
22. A cluster of complementary goods and services across diverse set of industries is called as
- (A) market place (B) meta market
(C) market space (D) resource market
23. Under the Payment and Settlement Systems Act, 2007, a 'payment system' includes all but one of the following systems enabling
- (A) credit card operations (B) debit card operations
(C) smart card operations (D) operations of clearing corporations
24. Who structured the **Fifth Five Year Plan (1974-1979)** with its basic objectives being removal of poverty (Garibi Hatao) and self-dependence?
- (A) D.D. Dhar (B) P.C. Mahalanobis
(C) J.P. Narayan (D) M. Visvesvaraya
25. Which of the following would be considered a use of funds?
- (A) a decrease in accounts receivable (B) a decrease in cash
(C) an increase in account payable (D) an increase in cash
26. Establishing a high entry price so that a firm can maximize its revenue early is
- (A) price penetration (B) price skimming
(C) price fixing (D) price elasticity
27. Service tax is not payable on any service provided to
- (A) an undertaking in a free trade zone (B) an undertaking in a software technological park
(C) an undertaking in a special economic zone (D) a developer or unit in a special economic zone
28. Which of the following is not one of the categories of research design?

- (A) exploratory research (B) descriptive research
(C) causal research (D) desk research
29. Railway Budget in India was separated from general budget in
(A) 1924 (B) 1941
(C) 1947 (D) 1951
30. Marketable securities are primarily
(A) short-term debt instruments (B) short-term equity securities
(C) long-term debt instruments (D) long-term equity securities
31. Microeconomics is concerned with
(A) the economy as a whole (B) the electronics industry
(C) the study of individual economic behaviour (D) the interactions within the entire economy
32. Expenditure incurred towards Corporate Social Responsibility in accordance with Section 135 of the Companies Act, 2013 is
(A) Expenditure deductible at 100% (B) Expenditure deductible at 150%
(C) Inadmissible expenditure (D) Expenditure deductible in five annual instalments
33. Machine down time is an example of which type of quality cost?
(A) Prevention (B) Appraisal
(C) Internal-failure (D) External-failure
34. The 'founding father' of the theory of monopolistic competition is
(A) Joan Robinson (B) Adam Smith
(C) Alfred Marshall (D) Edward Hastings Chamberlin
35. If $EOQ = 360$ units, order costs are Rs. 5 per order, and carrying costs are Rs. 0.20 per unit, what is the usage in units?
(A) 129,600 units (B) 2,592 units
(C) 25,920 units (D) 18,720 unit
36. In Nash equilibrium each player chooses the best strategy

- (A) assuming other players move first (B) dominated by the other players
(C) given the strategies of other players (D) that is a credible threat
37. Which of the following transaction is not regarded as transfer chargeable to income tax under the head 'Capital Gains'?
- (A) Conversion of asset into stock in trade (B) Maturity of a Zero Coupon Bond
(C) Any distribution of capital asset of a HUF among its member at the time of partition (D) Exchange of land for gold
38. Which of the following is considered the first step of the strategic brand management process?
- (A) Building brand mission (B) Building brand vision
(C) Building brand objectives (D) Building brand picture
39. In monetary terminology, what is called the 'monetary base' or 'high powered money'?
- (A) the total assets of RBI (B) the total liability of RBI
(C) the total debt of the government (D) the total foreign exchange of RBI
40. If two projects are completely independent (or unrelated), the measure of correlation between them is
- (A) 0 (B) 1
(C) -1 (D) 0.5
41. The most important source of wage differentials are
- (A) regional variation (B) unionization
(C) relative danger (D) skills
42. The exchange rate equivalency model excludes which of the following?
- (A) Expectations Theory (B) International Fletcher Effect
(C) International Fisher Effect (D) Interest Rate Parity Theory
43. The first asset reconstruction company set up under the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act, 2002 was
- (A) Asset Reconstruction Company (B) Asset Care and Reconstruction

(India) Ltd.

Enterprise Ltd.

(C) ASREC(India) Ltd.

(D) Alchemist Asset Reconstruction Company Ltd.

44. Which one of the following is the sole national re-insurer in India?
(A) General Insurance Corporation of India
(B) Life Insurance Corporation of India
(C) New India Assurance
(D) Tata AIG General Insurance
45. To compute the required rate of return for equity in a company using the CAPM, it is necessary to know all of the following except
(A) the risk-free rate
(B) the beta for the firm
(C) the earnings for the next time period
(D) the expected market return
46. Nominal GNP measures income
(A) at the present time
(B) corrected for tax changes
(C) corrected for changes in interest rates
(D) at current prices
47. Financial risk management includes hedging techniques which do not include
(A) foreign exchange swaptions
(B) forward interest rate agreements (FRAs)
(C) foreign exchange fixed forward contracts
(D) foreign exchange option forward contracts
48. The Right to Information (RTI) Rules, 2012 mandate that the RTI application (excluding any annexure and addresses of the public information officer) should not contain more than
(A) 250 words
(B) 500 words
(C) 750 words
(D) 1,000 words
49. The Basel III capital regulation for the banking sector has been implemented in India in phases from April 1, 2013 and is proposed to be fully implemented as on
(A) March 31, 2018
(B) March 31, 2019
(C) March 31, 2020
(D) March 31, 2021
50. The public sale of common stock in a subsidiary in which the parent usually retains majority control is called

- (A) a pure play (B) a spin-off
(C) a partial sell-off (D) an equity carve-out

51. The Phillips curve shows the trade-off between

- (A) the inflation rate and interest rates (B) the inflation rate and the unemployment rate
(C) interest rates and output (D) output and employment

52. Services differ from manufactured products in four ways, viz., intangibility, inseparability, perishability, and

- (A) homogeneity (B) heterogeneity
(C) intractability (D) invisibility

53. Joining a queue and then leaving after some time before being served is called

- (A) Balking (B) Reneging
(C) Rejecting (D) Refusing

54. Mr. X sells his car to Mr. Y. The right of Mr. X to recover the price of the car from Mr. Y is a

- (A) right in rem (B) right in personam
(C) right in rem as well as right in personam (D) moral right

55. An investor buys an IPO at the offering price and then sells the stock after it starts trading on the open market. This is known as

- (A) flipping (B) after market
(C) safety net (D) fixing

56. A current account deficit means that a country may

- (A) reduce its stock of foreign assets (B) increase its stock of foreign assets
(C) increase its savings (D) increase its foreign currency reserves

57. ACORN, a segmentation analysis technique, stands for which of the following?

- (A) A Countrywide Official Resources Navigation (B) A Classification of Residential Neighbourhoods

(C) A Corresponding Official Residential Notation (D) A Classification of Reported Nationals

58. Which of the following theory states that the employees work hard in the job only when they are sure of positive outcomes from that job?
- (A) Expectancy theory (B) Agency theory
(C) Contingency theory (D) Equity theory
59. Under Section 138 of the Negotiable Instruments Act, 1881, if a cheque is dishonoured for insufficiency of funds, the penalty can be up to
- (A) two years imprisonment or fine up to twice the amount of cheque or both (B) no imprisonment but fine up to twice the amount of cheque
(C) three years imprisonment or fine up to twice the amount of cheque or both (D) two years imprisonment or fine up to five times the amount of cheque or both
60. EBIT is usually the same thing as
- (A) funds provided by operations (B) earnings before taxes
(C) net income (D) operating profit
61. If goods are exported for less than society's marginal production cost and the marginal benefit to domestic consumers, it is likely that they benefit from
- (A) an import subsidy (B) a quota
(C) comparative advantage (D) an export subsidy
62. **Due to small change in customer demands, inventory oscillations become progressively larger as one moves further up the supply chain. This is known as**
- (A) Bullwhip effect (B) Net chain analysis
(C) Reverse logistics (D) Reverse supply chain
63. Concurrent audit is a part of
- (A) Internal check system (B) Continuous audit
(C) Internal audit system (D) External check system
64. Under the Factories Act, 1948, the definition of 'week' is a period of seven days

beginning at midnight on

- (A) Sunday night
- (B) Monday night
- (C) Saturday night
- (D) Friday night

65. The type of lease that includes a third party, a lender, is called a(n)
- (A) sale and leaseback
 - (B) direct leasing arrangement
 - (C) leveraged lease
 - (D) operating lease
66. Which of the following is not an element of Porter's 5 Forces Model?
- (A) The bargaining power of suppliers
 - (B) The potential competition from new entrants
 - (C) The firm's existing competition
 - (D) The firm's macroeconomic environment
67. Events which cannot happen at the same time are called
- (A) independent
 - (B) mutually exclusive
 - (C) a Bayes' relationship
 - (D) non-mutually exclusive
68. How many credit rating agencies are registered with the Securities and Exchange Board of India (SEBI) as on February 1, 2017?
- (A) 3
 - (B) 5
 - (C) 7
 - (D) 10
69. Which of the following is not a concept propounded by Sargent Florence for the measurement of the degree and incidence of location?
- (A) Location Quotient
 - (B) Material Index
 - (C) Co-efficient of Localisation
 - (D) Coefficient of Linkage
70. The cost of monitoring management is considered to be a(n)
- (A) transaction cost
 - (B) agency cost
 - (C) bankruptcy cost
 - (D) institutional cost
71. The Union Government of India announced the formation of NITI Aayog to replace the Planning Commission on

- (A) May 29, 2014 (B) August 13, 2014
(C) January 1, 2015 (D) February 8, 2015

72. Which ethical approach is guided by what will result in the greatest good for the greatest number of people?

- (A) Moral-Rights approach (B) Virtue approach
(C) Utilitarian approach (D) Justice approach

73. Who said that the job of the entrepreneur is 'creative destruction'?

- (A) Peter Drucker (B) Pierre Trudeau
(C) Joseph Schumpeter (D) Brian Mulroney

74. What is the full form of ASBA?

- (A) Allotment supported by Blocked Amount (B) Application supported by Blocked Amount
(C) Application supported by Bank Amount (D) Allotment supported by Bank Account

75. When the market's required rate of return for a particular bond is much less than its coupon rate, the bond is selling at

- (A) a premium (B) a discount
(C) face value (D) a deep discount

76. The 'Make in India' initiative is based on four pillars, which have been identified to give boost to entrepreneurship in India. The four pillars are

- (A) New Processes, New Infrastructure, New Sectors, New Mindset (B) New Processes, New Infrastructure, New Sectors, New Initiatives
(C) New Processes, New Investments, New Sectors, New Mindset (D) New Processes, New Infrastructure, New Businesses, New Initiatives

77. According to the Companies Act, 2013, how many hours before a general meeting can a member appoint his proxy to attend on his behalf?

- (A) 60 hours (B) 48 hours
(C) 36 hours (D) 24 hours

78. In context of global sourcing and logistics, the 'P' in the acronym EPOS stands for

- (A) Process (B) Product

(C) Point

(D) Position

79. The admission of 'class action suits', as envisaged under Section 245 of the Companies Act 2013, can be taken up by the

(A) National Company Law Tribunal

(B) Company Law Board

(C) Board for Industrial and Financial Reconstruction

(D) Appellate Authority for Industrial and Financial Reconstruction

80. The four principal qualitative characteristics of useful financial statements are

(A) Understandability, relevance, reliability, comparability

(B) Timeliness, relevance, reliability, comparability

(C) Understandability, relevance, accuracy, comparability

(D) Understandability, relevance, reliability, simplicity

81. On the recommendation of which committee was the Serious Fraud Investigation Office (SFIO) set up by the Government of India on August 21, 2002?

(A) Naresh Chandra Committee

(B) N.R. Narayana Murthy Committee

(C) Kumar Mangalam Birla Committee

(D) Narasimhan Committee

82. Hawthorne studies were a series of early experiments that focused on

(A) Behaviour in the workplace

(B) Ethics in the workplace

(C) Group norms

(D) Interpersonal dynamics

83. The values, attitudes, and other behaviours already acquired by the new employees before their entry into the firm is called

(A) anticipatory socialization

(B) organisational socialization

(C) tournament-oriented socialization

(D) disjunctive socialization

84. The limit on maximum number of directors in a company is

(A) 10

(B) 12

(C) 15

(D) 18

85. The recognition of intangible assets allows their amortization over the period during which economic benefits are derived. Which principle is put into practice in this statement?

(A) Going concern principle

(B) Matching principle

(C) Prudence principle

(D) Accrual principle

M.Com.(Business Innovation)

1. Amnesty International is a :
 - A. Human Rights Group
 - B. UN agency to fight global terrorism
 - C. Refugee camp in Croatia
 - D. Wing of the World Bank

2. What is the total membership of Commonwealth?
 - A. 42
 - B. 44
 - C. 54
 - D. 52

3. Pandit Shiv Kumar Sharma is well known as an exponent of :
 - A. Santoor
 - B. Sitar
 - C. Tabla
 - D. Violin

4. Azlan Shah Cup is associated with:
 - A. Badminton
 - B. Cricket
 - C. Football
 - D. Hockey

5. Along with the highest sex ratio, Kerla also has the dubious distinction of highest :
 - A. Transgenders
 - B. Greying population
 - C. Handicapped population
 - D. Child marriage

6. Which of the following is correct?
 - A. National Voters Day: January 25
 - B. World Population Day: June 11
 - C. World Heritage Day: May 18
 - D. National Technology day : August 12

7. In the context of which one of the following is 'Doha Round' mentioned frequently in news?
 - A. Global climate change
 - B. Global economic recession
 - C. Global traders
 - D. Global terrorism

- 8.** Dr C. Rangarajan Committee is associated with which one of the following?
- A. Pricing and taxation of petroleum products
 - B. Estimation of national income
 - C. Tax structure
 - D. Estimation of money supply
- 9.** Deficit financing means the government borrows money from the :
- A. IMF
 - B. Ministry of Finance
 - C. RBI
 - D. WTO
- 10.** The 'Father of Economics' is :
- A. Max Muller
 - B. Karl Marx
 - C. Adam Smith
 - D. Paul
- 11.** National Sample Survey (NSS) was established in :
- A. 1950,
 - B. 1951
 - C. 1952
 - D. 1943
- 12.** The period of 12th Five year plan is ?
- A. 2007-12
 - B. 2012-17
 - C. 2009-14
 - D. 2010-15
- 13.** Government has issued an ordinance announcing ULIP as 'Insurance Product'. Who is now the regulator of ULIPs?
- A. SEBI
 - B. IRDA
 - C. Both 'A' & 'B'
 - D. Government of India
- 14.** Two principal departmentally run commercial undertakings of the Indian Government are :
- A. Airports and Ports
 - B. Railway and Airport
 - C. Railway and Ports
 - D. Airports and Docks
- 15.** Most important source of capital formation in India has been :
- A. Household savings

- B. Public Sector savings
- C. Government revenue surpluses
- D. Corporate savings

Directions for Q. 16 to 23

In an organisation, Labour and amenities cost budget is of Rs. 300.4 lacs and percentages of various allocations are given as under:

(a) Canteen Expenses : 40% (b) Entertainment: 18% (c) Health: 9% (d) Social Security and Insurance: 25% (e) Contingencies : 8%

Answer question nos. 16 to 23 on the basis of above given information:

- 16.** How much money is ear-marked for entertainment expenses?
- A. Rs. 5.4 lac
 - B. Rs. 54 lac
 - C. Rs. 45 lac
 - D. Rs.40.5 lacs
- 17.** How much money is ear-marked for health and social security?
- A. Rs. 120 lac
 - B. Rs. 102 lac
 - C. Rs. 125 lac
 - D. Rs. 75 lac
- 18.** If there is a 10% inflation during the year, how much money would have been spent on canteen expenses?
- A. Rs. 330 lac
 - B. Rs. 120 lac
 - C. Rs. 132 lac
 - D. Rs. 300 lac
- 19.** If 50% of contingencies funds are used towards social security and health, what will be the expenditure in rupees under this head, keeping the total budget unchanged?
- A. Rs. 39 lac
 - B. Rs 150 lac
 - C. Rs. 174 lacs
 - D. Rs. 51 lac
- 20.** From the total budget, if the canteen and social security heads are reduced by 25% and 10% respectively, what saving could be achieved :
- A. Rs. 170 lac
 - B. Rs. 157.71 lac
 - C. Rs. 37.55 lac
 - D. Rs. 35 lac
- 21.** How much amount is saved if contingency fund is not utilized, and 11.25% of entertainment budget is over-spent ?
- A. Rs. 25 lac
 - B. Rs. 84 lac

- C. Rs. 18 lac
- D. Rs. 50 lac

22. If insurance premiums during the year amount to 6.8% of the social security and insurance budget, how much amount is left for spending on social security?

- A. Rs. 54 lac
- B. Rs. 55 lac
- C. Rs. 75 lac
- D. Rs. 20 lac

23. By increasing the total budget 3 times, how much amount will be increased on canteen expenses?

- A. Rs. 360 lac
- B. Rs. 361 lac
- C. Rs. 240 lac
- D. Rs. 359 lac

24. The ages of two persons differ by 16 years, 6 years ago, the elder one was 3 times as old as the younger one. What is the present age of the elder person?

- A. 15 years
- B. 20 years
- C. 25 years
- D. 30 years

25. Find the number, when 15 is subtracted from 7 times the number the result is 10 more than twice of the number .

- A. 5
- B. 15
- C. 7.5
- D. 4

26. Average of all prime numbers between 30 to 50 is :

- A. 37
- B. 37.8
- C. 39
- D. 39.8

27. Simplify : $(212 \times 212 + 312 \times 312)$

- A. 132288
- B. 142088
- C. 142188
- D. 142288

28. How many terms are there in 2, 4, 8, 16,....., 1024 :

- A. 7
- B. 8
- C. 9
- D. 10

29. 2.09 can be expressed in terms of percentage as :
- A. 2.09%
 - B. 20.9%
 - C. 209%
 - D. 0.209%
30. A man buys an item for Rs. 1200 and sells it at the loss of 20 percent. What is the selling price of that item?
- A. Rs.660
 - B. Rs. 760
 - C. Rs.860
 - D. Rs. 960
31. If $A:B=2:3$, $B:C=4:5$ and $C:D=6:7$, then find the $A:B:C:D$?
- A. 15:24:30:35
 - B. 16:24:30:35
 - C. 17:24:30:35
 - D. 18:24:30:35
32. 36 men can complete a piece of work in 18 days. In how many days will 27 men complete the same work?
- A. 24 days
 - B. 28 days
 - C. 34 days
 - D. 35 days
33. The length of a rectangle, which is 25 cms, is equal to the length of square and the area of the rectangle is 125 sq. cms., less than the area of the square. What is the breadth of the rectangle ?
- A. 15 cms
 - B. 20 cms
 - C. 12 cms
 - D. 12 cms
34. How many rotations will the hour hand of a clock complete in 72 hours?
- A. 3
 - B. 6
 - C. 9
 - D. 12
35. Car 'X' covers a distance of 385 kms in 7 hours and car 'Y' covers a distance of 715 kms. in 13 hours. What is the difference in the speed two cars.
- A. 10 kms/hrs
 - B. Zero
 - C. 3 kms/hr
 - D. 5 kms/hr

36. What should come next in the letter series: A D F I K N P S U ?

- A. W
- B. X
- C. Y
- D. Z

37. The positions of the first and second digits of the number 45739862 are interchanged. Similarly, the positions of the third and the fourth digits are interchanged and so on. Which of the following will be the sixth digit from the left end after the rearrangement?

- A. 6
- B. 8
- C. 9
- D. 2

Directions for Q. Nos. 38 to 40:

Following questions are based on the five three digits numbers given below:

562 871 438 753 384

38. What will be the product of the first and the second digits of the highest number?

- A. 56
- B. 50
- C. 45
- D. 38

39. If '2' is subtracted from the first digit in each number and 1 is added to the third digit in each number and then if the positions of the first and third digits in each number are interchanged, then which of the following number will be the second lowest?

- A. 562
- B. 871
- C. 753
- D. 438

40. If the positions of the first and the third digits of each of the numbers are interchanged, which of the following will be the sum of the first and the second digits of the third highest number?

- A. 9
- B. 7
- C. 6
- D. 8

41. 'Mango' is related to 'fruit' in the same way as 'Potato' is related to ____?

- A. Fruit
- B. Stem.
- C. Flower .
- D. Root.

42. Navin walked 20 meters towards East, took a left turn and walked 10 metres and again took a left turn and walked 20 metres. How far, he is from his starting position?

- A. 10 metres
- B. 50 metres

- C. 40 metres
- D. 30 metres

43. If each of the odd digits in the number 54638 is decreased by '1' and each of the even digits is increased by '1' which of the following will be the sum of the digits of the new numbers?

- A. 26
- B. 27
- C. 25
- D. 28

44. Three of the following four are alike in a certain way and so form a group. Which is the one that does not belong to that group :

- A. 17
- B. 23
- C. 37
- D. 13

45. In a column of 20 boys, D is fourteenth from the front and F is ninth from the bottom. How many boys are there between D and F ?

- A. 2
- B. 3
- C. 4
- D. 1

46. If the following four are alike in a certain way and so form a group. Which is of the one that does not belong to that group?

- A. 93
- B. 57
- C. 69
- D. 65

47. What comes next in: 18 20 44 138 560 2810 ?

- A. 16818
- B. 16836
- C. 16854
- D. 16872

48. **Statements:**

Some beads are chairs
All chairs are trucks
Some trucks are bricks
All bricks are cars.

Conclusion:

- i) Some cars are chairs
- ii) Some cars are trucks
- iii) Some trucks are beads

Which of the given conclusions logically follow from the given statements?

- A. Only I and II follow

- B. Only I and III follow
- C. Only II and III follow
- D. All I, II and III follow

Directions for Q. Nos. 49 to 52

Read the following information carefully and answer the questions, which follow:

'A-B' means 'A' is father of 'B'

'A+B' means 'A' is daughter of 'B'

'A÷B' means 'A' is son of 'B'.

'A x B' means 'A' is wife of 'B'

- 49.** How is P related to 'T' in the expression 'P+S-T' ?
- A. Sister
 - B. wife
 - C. son
 - D. daughter
- 50.** In the expression 'PxQ' –'T' how is T related to P?
- A. Daughter
 - B. Sister
 - C. mother
 - D. cannot be decided.
- 51.** Which of the following means P is grandson of S?
- A. P+ Q - S
 - B. P÷Q x S
 - C. P÷Q + S
 - D. P x Q÷S
- 52.** In the expression 'P + Q x T" how is 'T' related to P?
- A. Mother
 - B. Father
 - C. Son
 - D. Brother
- 53.** "Great Britain' is related to "Rose" in the same way as "France" is related to :
- A. Tamarind
 - B. Chrysanthemum
 - C. Flower
 - D. Jasmine
- 54.** "Abduct' is related to "Kidnap" in the same way as "Presage" is related to :
- A. Prepare
 - B. Mend
 - C. Predict
 - D. Stage

55. 'Spade' is related to 'dig' in the same way as 'shove' is related to :
- A. Carve
 - B. Scoop
 - C. Grip
 - D. Grind
56. Which ratio is used to analyse the capital structure of a company?
- A. G.P. Ratio
 - B. Capital Gearing Ratio
 - C. N. P. Ratio
 - D. EOQ
57. Which is a bond?
- A. Debenture
 - B. Loan
 - C. Share
 - D. Stock
58. Shares held for _____ then _____ months are treated as long-term capital assets.
- A. More, 14
 - B. More, 12
 - C. More, 18
 - D. More, 314
59. Watered Capital means :
- A. Excessive capital
 - B. Part of the capital not represented by assets
 - C. Over-capitalisation
 - D. Under-capitalisation
60. Exim Bank can be described as a :
- A. Non-banking non-financial company
 - B. Schedule bank
 - C. Non-banking financial capital company
 - D. Commercial bank
61. In Taylor's functional organization, gang boss :
- A. inspects quality of work done
 - B. issues instructions to workers
 - C. sets up tools and machines for work
 - D. compiles cost of production
62. A decreasing current ratio indicates:
- A. a stable liquidity
 - B. an increasing liquidity
 - C. a strained liquidity
 - D. satisfactory current solvency
63. What do you understand by 'Para Banking' services :

- A. Eligible financial services rendered by banks
- B. Utility services provided by banks
- C. Services provided through business correspondents
- D. Services provided to armed force personnel

64. In ADR, D stands for _____.

- A. Domestic
- B. Demand
- C. Depository
- D. Dockets

65. The basic goals, aims or end results which an organisation aims at achieving are known as :

- A. Programmes
- B. Methods
- C. Policies
- D. Objectives

66. Job evaluation is carried on mainly for :

- A. simplifying wage administration
- B. meeting competition effectively
- C. identifying geographical locational factors of business enterprise
- D. promoting job satisfaction

67. PLR is related to _____.

- A. bank
- B. credit
- C. export
- D. import

68. Which one of the following is the latest and most reliable form of communication ?

- A. Speed post
- B. Telex
- C. Fax
- D. Email

69. Actuary is a person who _____

- A. Acts as an insurance agent
- B. Certifies the loss incurred by the insured
- C. Audits claims relating to insurance claims
- D. Computes the net liability of an insurance business

70. Name the first PSU insurer to tap capital market to manage its initial public officer:

- A. LIC

- B. GIC
- C. New India Insurance
- D. United India Insurance Co.

71. Which bank has launched a unique credit card 'Unnati' targeted at including Jan Dhan account holders across the country :

- A. Punjab National Bank
- B. State Bank of India
- C. Canara Bank
- D. Oriental Bank of Commerce

72. Which Bank has collaborated with SBI card to launch co-branded credit cards for customers?

- A. Syndicate Bank
- B. Bank of Maharashtra
- C. Karnatka Bank
- D. Allahabad Bank

73. What is current Repo rate as per Monetary Policy Committee (MPC) held after budget 2017?

- A. 6.25%
- B. 6.00%
- C. 6.50%
- D. 6.75%

74. Which regulatory body has allowed celebrities to endorse Mutual Fund products at industry level?

- A. RBI
- B. IRDAI
- C. SEBI
- D. NABARD

75. Which among the following banks has been merged with State Bank of India :

- A. Bhartiya Mahila Bank
- B. Dena Bank
- C. Bank of Baroda
- D. Bank of India

Remote Sensing & GIS

1. Kind of geography which focuses on how people living on Earth interact with nature is classified as
 - A. Atmospheric geography
 - B. Physical geography
 - C. Environmental geography
 - D. Human geography

2. In geography, study of land of Earth is classified as
 - A. Physical geography
 - B. Human geography
 - C. Environmental geography
 - D. Atmospheric geography

3. Consider the following statements. Identify the right ones.
 - I. The most popular argument regarding the origin of the universe is the Big Bang Theory.
 - II. It is also called expanding universe hypothesis because universe is expanding by accelerating speed.
 - A. I only
 - B. II only
 - C. Both
 - D. None

4. Which one of the following scholars suggested the Earth's origin from gases and dust particles?
 - A. James Jeans
 - B. H. Alfven
 - C. F. Hoyle
 - D. O. Schmidt

5. Propounder of Continental Drift Theory is
 - A. Jolly
 - B. Wegner
 - C. Holmes
 - D. Prat

6. The idea of Geosynclinal theory of mountain building was given by
 - A. Emanuel Kant
 - B. F. Hoyle
 - C. James Hall

D. O. Schmidt

7. Tremendous compressional forces exerted on rock layers by geological movements causes rock layers to
 - A. Crack
 - B. Bend
 - C. Heat up
 - D. Vibrate

8. Normal fault is caused by
 - A. Compression
 - B. Tension
 - C. Expansion
 - D. Collision

9. Rocks that are formed through solidification and cooling of lava are classified as
 - A. Allotropic rocks
 - B. Metamorphic rocks
 - C. Igneous rocks
 - D. Sedimentary rocks

10. Rocks that are formed at surface of Crust due to melting of rocks are classified as
 - A. Fabric of igneous rocks
 - B. Extrusive igneous rocks
 - C. Intrusive igneous rocks
 - D. Igneous sediments

11. Which of the following is not an example of a volcanic mountain?
 - A. Mt. Vesuvius
 - B. Mt. Kanchenjanga
 - C. Mt. Kalimanjaro
 - D. Mt. Fujiyama

12. Number of mountains in Tibetan Plateau whose height are more than 8,000 meters are
 - A. 20
 - B. 18

- C. 14
 - D. 16
13. Maximum height of hills is usually
- A. 950 meters
 - B. 800 meters
 - C. 750 meters
 - D. 600 meters
14. Residual hill in the desert
- A. Inlier
 - B. Inselberg
 - C. Playa
 - D. Pediment
15. The instrument used for recording earthquake waves is
- A. Barograph
 - B. Hydrograph
 - C. Pantograph
 - D. Seismograph
16. Average weather condition of specific area over many years is called
- A. Atmosphere
 - B. Climate
 - C. Weather
 - D. Relief
17. Which of the following factors is not associated with insolation at the surface of the earth?
- A. Rotation of earth on its axis
 - B. Angle of inclination of the sun's rays
 - C. Transparency of the atmosphere
 - D. None of the above
18. Arrange the following gases present in atmosphere in the decreasing order of volume:
- (I) Helium

- (II) Oxygen
- (III) Nitrogen
- (IV) Argon

- A. (I), (II), (III), (IV)
- B. (II), (III), (IV), (I)
- C. (III), (II), (IV), (I)
- D. (IV), (III), (I), (II)

19. Heating of earth unevenly gives rise to formation of

- A. Meridian line
- B. Pressure belts
- C. Longitudinal lines
- D. Hemispheres

20. Circular patterns through which air moves is called

- A. Pressure belts
- B. Convection cells
- C. Latitude
- D. Longitude

21. As compared to cold air, warm air is

- A. Unsaturated
- B. Lighter
- C. Heavier
- D. Saturated

22. Form of summer precipitation in cool temperate climate is

- A. Convective rain
- B. Refraction rain
- C. Cirrus rain
- D. Cumulus rain

23. The contact of two air masses differing sharply in humidity originates:

- A. Stratospheric instability
- B. Tropical cyclones
- C. Inter tropical convergence
- D. Temperate cyclones

24. What is the most important factor in thunderstorms development?

- A. Atmospheric stability
- B. Atmospheric pressure
- C. Atmospheric instability
- D. Temperature inversion

25. Which factors influence ocean currents?

- (i) Density of the water
- (ii) Convection currents
- (iii) Coriolis force (Earth's rotation)
- (iv) Winds across the ocean

- A. (i), (ii) & (iii)
- B. (ii), (iii) & (iv)
- C. (i), (ii) & (iv)
- D. (i), (ii), (iii) & (iv)

26. Which of the following influence the oceanic salinity?

- A. Land
- B. Wind
- C. River
- D. Ash from volcanoes

27. In which of the following the direction of Ocean currents are reversed with season?

- A. Pacific Ocean
- B. Atlantic Ocean
- C. Indian Ocean
- D. Arctic Ocean

28. Which of the following ocean current is not found in northern hemisphere?

- A. Oyashio Current
- B. West wind drift
- C. Gulf stream
- D. Canaries current

29. Which of the following is incorrect about tides?

- A. Neap tide has maximum range of tide.
- B. Spring tide occurs when sun, moon and earth are in a straight line.
- C. Neap tide occurs when moon and sun are perpendicular to each other.
- D. Time between the high tide and low tide, when the water level is falling is called ebb.

30. In sea, plants are restricted upto the depth of

- A. 2000 m
- B. 1000 m
- C. 200 m
- D. 20 m

31. Maps that shows individual countries and each country is separated by national boundary are called

- A. Airlines maps
- B. Political maps
- C. Thematic maps
- D. Resource maps

32. Two cities that are 2 1/2 inches apart on a map are actually 750 miles apart. Therefore, one inch on the map is equal to how many miles?

- A. 250
- B. 300
- C. 350
- D. 400

33. Maps with minute details are drawn on _____ scale:

- A. Small
- B. Large
- C. Medium
- D. None of these

34. The unit of Representative Fraction (R.F.) is

- A. Centimeter
- B. Square centimeter
- C. Cubic centimeter
- D. None of these

35. A compass indicates direction by detecting

- A. Pressure differences
- B. Variations in gravity
- C. Solar wind directions
- D. Magnetic lines of force

36. In which direction could one travel from the North Pole?

- A. South
- B. East
- C. West

D. Any direction

37. A compass bearing of 165 degrees describes a
- A. Northwesterly direction
 - B. Southeasterly direction
 - C. Southwesterly direction
 - D. northeasterly direction
38. Proportional compass used for enlargement and reduction of maps belongs to which method
- A. Geometrical
 - B. Mechanical
 - C. Projectional
 - D. Photographic
39. Contour interval is
- A. Inversely proportional to the scale of the map
 - B. Directly proportional to the flatness of ground
 - C. Larger for accurate works
 - D. Larger if the time available is more
40. When you observe contour lines with hachure's on a topographic map, this indicates that
- A. The elevation of this area is increasing
 - B. You are entering a mountainous area
 - C. You have crossed a stream
 - D. A depression is located in this part of the map
41. How would you determine if a feature is a hill or a valley by observing the contours?
- A. A valley would have close together contour lines with hachure's
 - B. A hill would have contour lines that are close together and form ovals or circles
 - C. A valley would have contour lines that are close together and form ovals or circles
 - D. A hill would have v shaped contour lines which are close together
42. Considering weather forecast, PM stands for
- A. Afternoon

- B. Midnight
 - C. Morning
 - D. Dawn
43. Comparative ratio between humidity of certain area with maximum limit is called
- A. Absolute humidity
 - B. Relative humidity
 - C. Ultra humidity
 - D. Mild humidity
44. Weather map showing isobars is an example of
- A. Isopleth maps
 - B. Choropleth maps
 - C. Chorochromatic maps
 - D. Topographic maps
45. Which one of the following is a point symbol?
- A. Isopleths
 - B. Hachures
 - C. Graduated circle
 - D. Chorisorgrams
46. The changes in the population data over a decade are best shown by
- A. Choroschematic map
 - B. Choropleth map
 - C. Chorochrematic map
 - D. Chorographical map
47. The most appropriate symbol for representing urban centres on proportion maps is
- A. Dots
 - B. Spheres
 - C. Circles
 - D. Lines
48. The maps in which distribution of population is shown by putting dots of uniform size are called
- A. Isopleth maps

- B. Choropleth maps
 - C. Bonitative maps
 - D. Dot maps
49. Which method uses light and shade for representation of relief?
- A. Hill shading
 - B. Hachure
 - C. Spot heights
 - D. Benchmarks
50. Topographical maps are produced in India by
- A. NATMO
 - B. Survey of India
 - C. NRSC
 - D. DRDO
51. To represent Earth's features, topographic maps use
- A. Solid lines
 - B. Dotted lines
 - C. Colors
 - D. Shades
52. A star diagram is used to represent
- A. Duration of winds only
 - B. Flows between central places and dependent places
 - C. Direction of winds only
 - D. Wind direction and duration
53. When we plot the profiles on a single frame to compare and correlate. These type of profiles are known as
- A. Serial profiles
 - B. Superimposed profiles
 - C. Composite profiles
 - D. Projected profiles
54. Linear features like roads, railway or river are represented by
- A. Serial profile
 - B. Reconstructed profile

- C. Longitudinal profile
 - D. Projected profiles
55. For drawing the map of the world, Ptolemy apparently used a modified form of
- A. Conical projection
 - B. Azimuthal equidistant projection
 - C. Mercator's projection
 - D. Cylindrical equal area projection
56. In which of the following projections, scale is correct along 45° latitude?
- A. Equal area cylindrical projection
 - B. Gall's projection
 - C. Mercator's projection
 - D. Mollweide's projection
57. Rhumb line is a
- A. Line on the Earth's surface which cuts all meridians at the same angle
 - B. Technical name for the international date line
 - C. Line which give correct distance on Mercator's projection
 - D. Line connecting the Greenwich meridian with the international date line.
58. Which one of the following map projections look like a photograph of the Earth grid taken from a considerable height?
- A. Gnomonic
 - B. Orthomorphic
 - C. Stereographic
 - D. Orthographic
59. A survey which is specifically concerned with landed property I known as
- A. Geodetic survey
 - B. Cadastral survey
 - C. Thematic survey
 - D. Triangulation survey
60. Global Positioning System (GPS) is a
- A. Satellite Station
 - B. Satellite Signal

- C. Satellite System
- D. Satellite Solution

61. NAVSTAR Global Positioning Service (GPS) uses 24 satellites in

- A. 9 Orbits
- B. 8 Orbits
- C. 7 Orbits
- D. 6 Orbits

62. Airplane and boat pilots use GPS for

- A. Mapping
- B. Limit setting in air or water
- C. Navigation
- D. Bearing

63. GIS is used to

- A. Store geographic information
- B. Use geographic information
- C. View geographic information
- D. Store, use and view geographic information

64. GIS stands for

- A. Geographic Information System
- B. Generic Information System
- C. Geological Information System
- D. Geographic Information Sharing

65. GIS deals with which kind of data

- A. Numeric data
- B. Binary data
- C. Spatial data
- D. Complex data

66. Rasters are _____.

- A. Thematic maps
- B. Features
- C. Pictures of the ocean
- D. Graphic blocks or cells

67. Vector and raster data are used in

- A. Global Positioning System
 - B. Remote Sensing
 - C. Geographic Information System
 - D. Topographic sheets
68. The acquisition of data about Earth's surface from a satellite orbiting the planet
- A. Conformal map projection
 - B. Selection & elimination
 - C. Remote Sensing
 - D. Map projections
69. When was the first aerial photograph taken from an aeroplane?
- A. 1909
 - B. 1915
 - C. 1918
 - D. 1938
70. When was the LANDSAT-1 placed in orbit
- A. 1966
 - B. 1962
 - C. 1985
 - D. 1975
71. Indian Institute of Remote Sensing (IIRS) was earlier known as
- A. NATMO
 - B. ISRO
 - C. IIRPI
 - D. RRSC
72. Satellite Remote Sensing is done by
- A. Geostationary satellites
 - B. Polar sun synchronous satellites
 - C. Space Shuttles
 - D. All of above
73. WWW stands for
- A. World Whole Web
 - B. Wide World Web
 - C. Web World Wide
 - D. World Wide Web

74. Where is RAM located?

- A. Expansion board
- B. External drive
- C. Mother board
- D. Internal hard disk

75. If a computer provides database services to other, then it will be known as?

- A. Web server
- B. Application server
- C. Database server
- D. FTP server

Disaster Management

- Global temperatures are likely to rise because of:
 - Fossil fuel burning
 - Soil pollution
 - Soil erosion
 - None of the above
- Which of the following can help to control air pollution?
 - Strict regulations and standards
 - Efficient transport planning
 - Plantation of trees
 - All of the above
- The term 'Biome' refers to a group of:
 - Plants
 - Ecosystems
 - Animals
 - Micro-organisms
- Which of the following is an in-situ conservation measure taken by India?
 - Project Elephant
 - Project Lion
 - Project Rhino
 - All of the above
- Lion-Tailed Macaque is found in?
 - Western Ghats
 - Eastern Himalayas
 - Punjab Plains
 - Siwalik Hills
- Increasing accumulation of 'e-waste' in recent years is due to:
 - Technology becoming rapidly obsolete
 - Lack of proper recycling technologies
 - Non-implementation of strict regulation,
 - All of the above.
- Nitrogen constitutes nearly ____% of the total atmosphere:
 - 79
 - 21
 - 17
 - 32
- The term 'CBD' stands for:
 - Convention on Biological Diversity
 - Convention on Biotechnology
 - Convention on Biota
 - Convention on Biomes
- Which of the following is the lowermost layer of earth's atmosphere:

- A. Troposphere
 - B. Magnetosphere
 - C. Biosphere
 - D. Hydrosphere
10. The famous 'Harike wetland' is facing the problem of which weed?
- A. Congress Grass
 - B. Water Hyacinth
 - C. Lantana
 - D. Ageratum
11. What 'Indian cheetah' and 'Dodo bird' represents:
- A. Threatened species
 - B. Extinct species
 - C. Rare species
 - D. Vulnerable species
12. Montreal Protocol represents a treaty on which of the following:
- A. Treaty on Sustainable development
 - B. Ozone treaty
 - C. Stockholm Declaration
 - D. Climate Convention
13. The land destroyed because of mining activity is known as:
- A. Marshy land
 - B. Derelict land
 - C. Saline land
 - D. Productive land
14. pH value of safe and potable water ranges from:
- A. 9.0-11.0
 - B. 6.5-8.0
 - C. 3.5-5.0
 - D. 11.0-12.0
15. In social forestry which trees are usually grown for commercial purpose?
- A. Apple and Jamun
 - B. Sal and Mango
 - C. Poplar and Safeda
 - D. Mango and Jamun
16. Which of the following element is found in Tobacco:
- A. Methane
 - B. Nicotine
 - C. Ethene
 - D. Caffeine
17. Which one of the following is not a pollutant of air?
- A. SO₂
 - B. NO₂
 - C. Surface run-off
 - D. Noise
18. Chilka Lake is situated in which state of India:
- A. Himachal Pradesh

- B. Punjab
 - C. Orissa
 - D. Rajasthan
19. Which of the following is not a water borne disease?
- A. Cholera
 - B. Osteoporosis
 - C. Typhoid
 - D. Gastroenteritis
20. The discovery of 'Greenhouse effect' was made by
- A. R K Pachauri
 - B. Joseph Fourier
 - C. John Tyndall
 - D. Charles Darwin
21. Chlorofluorocarbon (CFC's) is mainly produced by:
- A. Burning of plants and wood
 - B. Open dumping of garbage
 - C. Refrigeration system
 - D. Burning of agricultural waste
22. What does the term 'Savanna' represents?
- A. A variety of wheat
 - B. A type of Grasslands
 - C. Name of an animal species
 - D. None of the above
23. In India, the 'Forest Research Institute' (FRI) is situated in which city?
- A. Bhopal
 - B. Varanasi
 - C. Dehradun
 - D. Hyderabad
24. The largest desert of the world is?
- A. Sahara Desert
 - B. Taklamakan Desert
 - C. Atacama Desert
 - D. Mojave Desert
25. Ozone hole was seen for the first time over Antarctica in:
- A. 1931
 - B. 1951
 - C. 1994
 - D. 1985
26. In which state of India, the Harike wetland is located?
- A. Tamilnadu
 - B. West Bengal

- C. Punjab
 - D. Maharashtra
27. Which of the following desert is located in western parts of India?
- A. Sahara Desert
 - B. Atacama Desert
 - C. Kala Hari Desert
 - D. Thar Desert
28. When is the 'World Environment day' celebrated:
- A. 25th December
 - B. 2nd October
 - C. 15th August
 - D. 5th June
29. Which gas protects living organisms from harmful UV radiation?
- A. Methane
 - B. Ozone
 - C. Carbon dioxide
 - D. Nitrogen
30. Which of the following resources is renewable resource of energy?
- A. Wind
 - B. Crude Oil
 - C. Petroleum
 - D. Coal
31. 'Kyoto Protocol' is associated with controlling which of the following problem:
- A. Global Warming
 - B. Depletion of Ozone
 - C. Extinction of Plant Species
 - D. Soil Pollution
32. What is the main disadvantage of most of the renewable energy sources
- A. These are highly polluting
 - B. They have high waste disposal cost
 - C. Their supply is unreliable
 - D. These have high running cost
33. Geothermal energy refers to a form of energy from:
- A. Crude Oil
 - B. Petroleum
 - C. Coal
 - D. Natural heat produced in the earth
34. The 'Output Device' of a computer system is:
- A. Printer
 - B. Keyboard
 - C. Monitor
 - D. Mouse
35. The term GPS stand for:
- A. General Policy System
 - B. Global Political System
 - C. Global Positioning System
 - D. General Police System

36. Which of the following rivers does not flow from Punjab?
- A. Beas
 - B. Narmada
 - C. Satluj
 - D. Ravi
37. Chandigarh is also known as
- A. Pink City
 - B. The City of Lakes
 - C. The City of Gardens
 - D. The City Beautiful
38. As per the norms, the minimum forest cover required to sustain ecological balance is:
- A. 53% of the total land area
 - B. 43% of the total land area
 - C. 33% of the total land area
 - D. 23% of the total land area
39. Which of the following Indian state has dense coniferous forests?
- A. Tamilnadu
 - B. Telangana
 - C. Rajasthan
 - D. Himachal Pradesh
40. The term 'Biosphere' refers to:
- A. The solid shell of inorganic materials on the Earth surface
 - B. Thin cover of organic matter comprising of all living things on earth
 - C. The sphere which occupies the maximum volume of all of the spheres
 - D. All of the above
41. An infamous place 'Bermuda Triangle' is located in the northeast direction of which American state:
- A. North Dakota
 - B. Alaska
 - C. Florida
 - D. Illinois
42. The term 'First Aid' aims:
- A. To preserve life
 - B. To prevent the victims condition from worsening
 - C. To promote recovery
 - D. All the above
43. Bhopal Gas Tragedy was occurred in?
- A. 2004
 - B. 1994
 - C. 1944
 - D. 1984
44. Which of the following is the prime source of energy on planet Earth?
- A. Sun
 - B. Wood
 - C. Coal
 - D. Petroleum

45. Which one of the following is 'fossil fuel'?
- A. Wind energy
 - B. Coal and petroleum
 - C. Solar Energy
 - D. Tidal energy
46. Which of the following is not a 'greenhouse gas'?
- A. Methane
 - B. Carbon-dioxide
 - C. Oxygen
 - D. Sulfur-dioxide
47. The green colour of plants is due to the presence of:
- A. Methane
 - B. Iron
 - C. Chlorophyll
 - D. Oxygen
48. The 'Sorrow of China' is a name given to:
- A. Hwang Ho River
 - B. Mekong River
 - C. Yangtze Kiang River
 - D. Si Kiang River
49. The islands of Andaman and Nicobar are an extension of:
- A. Alps Mountain range
 - B. Arakan Yoma mountain range
 - C. Himalayan mountain ranges
 - D. Sahyadri Mountain range
50. The famous artificial archipelago 'Palm Islands' are located in:
- A. Italy
 - B. New Zealand
 - C. Maldives
 - D. Dubai
51. 'Cartography' is a part of:
- A. Cosmology
 - B. Literacy
 - C. Graphicacy
 - D. None of these
52. San Andreas fault is located in:
- A. USA
 - B. England
 - C. India
 - D. Russia
53. Which of the following rivers is believed to older than the Himalayas:
- A. River Chenab
 - B. River Indus
 - C. River Gomati
 - D. River Tungabhadra

54. Which one is not the objectives of a multipurpose hydel-project:
- A. Production of Atomic Power
 - B. Development of Fisheries
 - C. Control of floods
 - D. Drinking water supply
55. The term 'Pedology' refers to the study of:
- A. Soil
 - B. Glaciers
 - C. Air Pollution
 - D. Animal Behaviour
56. 'Kaziranga' National Park is famous for:
- A. Indian Gaur
 - B. One-horned Rhino
 - C. Musk Deer
 - D. Black buck
57. In the year 1973, the 'Chipko Movement' in India was initiated by:
- A. Mrs. Indira Gandhi
 - B. Shri Narendra Modi
 - C. Shri Sunder Lal Bahuguna
 - D. Shri Jawaharlal Nehru
58. In the light of accelerating global warming it is expected that:
- A. Sea level will decline
 - B. Sea level will remain at constant level
 - C. Sea level will rise
 - D. None of the above
59. The concept of growing more trees in 'City/Urban areas' is called as:
- A. Urban forestry
 - B. Agro forestry
 - C. Commercial Plantation
 - D. Social forestry
60. The 'Valley of Flowers' is located in which Indian state?
- A. Haryana
 - B. Uttarakhand
 - C. Gujarat
 - D. Maharashtra
61. The process of 'Data Collection' involves:
- A. Editing of data
 - B. Analysis of data
 - C. Data Coding
 - D. Interview
62. In a computer system the Input Device is:
- A. Keyboard

- B. Plotter
 - C. Head-phone
 - D. Monitor
63. Smog is:
- A. is colorless
 - B. A natural phenomenon
 - C. a combination of smoke and fog
 - D. all of the above
64. Any survey that specifically deals with the landed property is known as:
- A. Cadastral Survey
 - B. Geographical Survey
 - C. Geodetic Survey
 - D. Field Survey
65. Which civilization is the oldest known civilization of the world?
- A. Mayan Civilization
 - B. Indus Valley Civilization
 - C. Inca Civilization
 - D. Sumerian Civilization
66. The book 'Origin of the Species' was written by:
- A. Charles Darwin
 - B. A.P.J. Kalam
 - C. A.R. Wallace
 - D. J.K. Rowling
67. Which one of the following is not an aquatic ecosystem?
- A. Lake
 - B. Shallow Ocean
 - C. Estuary
 - D. Grassland
68. The majority of flood in India, occur in:
- A. January-February
 - B. June-September
 - C. April-June
 - D. December-January
69. Tehri Dam is located in the state of:
- A. Himachal Pradesh
 - B. Punjab
 - C. Sikkim
 - D. Uttarakhand
70. The 'Great Barrier Reef' is located at the:
- A. East Australian Coast
 - B. Bay of Bengal
 - C. Arabian Sea
 - D. Gulf of Cambay

71. Which of the following takes maximum time to degenerate?
- A. Glass material
 - B. Wood and plants
 - C. Paper
 - D. Iron
72. Species which have a key impact on an ecosystem are known as the:
- A. Pioneer species
 - B. Frontier species
 - C. Crown species
 - D. Keystone species
73. The National Disaster Management Authority of India is chaired by?
- A. The Home Minister of India
 - B. The Prime Minister of India
 - C. Vice President of India
 - D. Human Resource Development (HRD) Minister
74. The term 'Cyclone' is derived from?
- A. Greek Word
 - B. German Word
 - C. Tibetan Word
 - D. Chinese Word
75. The full form of NDMA is:
- A. National Disaster Management Authority
 - B. Natural Disaster Management Authority
 - C. Natural Disaster Management Act
 - D. National Disaster Management Area

LL.M.

1. Article 16 (4A) which gives power to State to make laws regarding reservation in favour of Scheduled Caste and Scheduled Tribes was added by
 - A) 75th Amendment
 - B) 77th Amendment
 - C) 78th Amendment
 - D) 79th Amendment

2. The minimum number of judges who are to sit for the purpose of giving its advisory opinion on the reference made by the President shall be
 - A) Five
 - B) Nine
 - C) Seven
 - D) One Half of the total strength of Supreme Court

3. Place the following landmark decisions relating to Article 15 in chronological order:
 - i. Indra Sawhney v. Union of India
 - ii. M.R. Balaji v. State of Mysore
 - iii. State of Madras v. Champakam Dorairajan
 - iv. Ashok Kumar Thakur v. Union of India

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

4. Who hold the office during the pleasure of President?
 - A) Attorney General
 - B) Comptroller and Auditor General of India
 - C) Member of Union Public Service Commission
 - D) Speaker of Lok Sabha

5. Chief Election Commissioner shall be removed from his office on the grounds of
 - A) Misbehavior or incapacity
 - B) Corrupt or illegal practice
 - C) Non residence
 - D) Violation of constitution

6. National Capital Territory of Delhi has been constituted by
 - A) 71st Amendment
 - B) 69th Amendment
 - C) 68th Amendment
 - D) 70th Amendment

7. A reasonable restriction in the interest of 'sovereignty and integrity' of India cannot be imposed on the right to
 - A) Freedom of Speech and Expression
 - B) Assemble peaceably and without arms
 - C) Form association or unions
 - D) Move freely throughout the territory of India

8. When the Proclamation of Emergency is threatened on the ground of 'armed rebellion', the Fundamental Right under Article 19
 - A) Shall be suspended
 - B) Shall not be suspended
 - C) May be suspended if security of India and national interest demands
 - D) May be suspended by Presidential order

9. In the occurrence of vacancy in office of President and vice-President, who among the following shall discharge the functions till new President or vice-President is elected?

- A) Prime Minister
- B) Chairman of UPSC
- C) Speaker of Lok Sabha
- D) Chief Justice of India

10. Match the following

- | | |
|-----------------------------------|-------------------------------|
| i. ADM Jabalpur v. Shukla | (a) Searchlight Case |
| ii. R.K. Garg v. Union of India | (b) Habeas Corpus Case |
| iii. M.S.M Sharma v. S.K. Sinha | (c) Bank Nationalisation Case |
| iv. R.C. Cooper v. Union of India | (d) Bearer Bonds Case |
-
- | | |
|---------------------------|---------------------------|
| A) i-b, ii-a, iii-d, iv-c | B) i-c, ii-a, iii-d, iv-b |
| C) i-b, ii-d, iii-a, iv-c | D) i-c, ii-d, iii-a, iv-b |

11. The words “Nothing in Article 13 shall apply to any amendment of this Constitution made under Article 368” was inserted by

- | | |
|-------------------------------|-------------------------------|
| A) 42 nd Amendment | B) 44 th Amendment |
| C) 24 th Amendment | D) 22 nd Amendment |

12. The Constitution (One Hundredth Amendment) Act 2015 was enacted to give effect for:

- A) The transfer of certain territories by India to Bangladesh and transfer of certain territories from Bangladesh to India.
- B) The acquiring of territories by India from Bangladesh.
- C) National Judicial Appointments Commission.
- D) Transfer of certain territories by India to Bangladesh.

13. The Judge of High Court may be transferred from one High Court to another by

- A) President
- B) Judge of Supreme Court
- C) President in consultation with Chief Justice of India
- D) President in consultation with Chief Justice of respective High Courts

14. ‘Anti Defection Law’ was added by

- | | |
|-------------------------------|-------------------------------|
| A) 51 st Amendment | B) 52 nd Amendment |
| C) 53 rd Amendment | D) 54 th Amendment |

15. Which of the following judgment is responsible for Parliament to pass 24th Amendment Act 1971?

- | | |
|--|-------------------------------------|
| A) Sajjan Singh v. State of Rajasthan | B) Golak Nath v. State of Punjab |
| C) Kesavananda Bharti v. State of Kerala | D) Ramesh Thapar v. State of Madras |

16. Seats in Gram Panchayat are filled by

- | | |
|----------------------|--------------------|
| A) Indirect election | B) Direct election |
| C) State Legislature | D) Parliament |

17. Match the following

- | | |
|--|---------------|
| i. Provision regarding trade, commerce and intercourse | (a) Germany |
| ii. Method of election of President | (b) Ireland |
| iii. Removal of Supreme Court and High Court Judge | (c) Australia |

- iv. Emergency Provisions (d) U.S.A
- A) i-c, ii-b, iii-d, iv-a B) i-c, ii-d, iii-b, iv-a
- C) i-b, ii-d, iii-a, iv-c D) i-d, ii-b, iii-c, iv-a

18. Member of Joint Public Service Commission shall hold office for a term of

- A) 6 years
B) 6 years or 65 years of his age, whichever is earlier
C) 6 years or 62 years of his age, whichever is earlier
D) During the pleasure of President

19. “Directive Principles of State Policy is the conscience of the Constitution which embody the social philosophy of the Constitution” was said by

- A) Granville Austin
B) K.C. Wheare
C) A.V. Dicey
D) B.R. Ambedkar

20. The Comptroller and Auditor General of India is _____ either under Government of India or Government of State after he ceased to hold office.

- A) Eligible for further office
B) Ineligible for further office
C) Eligible for further office only after the recommendation made by the President
D) None of the above

21. Quorum to constitute the meeting of House of State Legislature shall be

- A) 1/10th of total number of members
B) 10 members
C) 10 members or 1/10th of total number of members, whichever is greater
D) 10 members or 1/10th of total number of members, whichever is smaller

22. Which of the following writ is an exception to the Rule of Res Judicata?

- A) Habeas Corpus B) Certiorari
C) Mandamus D) Quo Warranto

23. Find the correct statement

- A) Member of Public Service Commission can be removed by order of President on reference being made to it by Supreme Court
B) Member of Public Service Commission can be removed by order of President on reference being made to it by Chief Justice of India
C) Member of Public Service Commission can be removed by order of Supreme Court on reference being made to it by President
D) Member of Public Service Commission can be removed by order of Chief Justice of India on reference being made to it by President

24. The word ‘internal disturbance’ was substituted by ‘armed rebellion’ under Article 352 by

- A) 42nd Amendment B) 44th Amendment
C) 38th Amendment D) 64th Amendment

25. Match the following provisions with respect Legislative Relation between Centre and State

- i. Power of Parliament to legislate if Proclamation of emergency in operation a. Article 254
- ii. Power of Parliament to legislate in national interest b. Article 251
- iii. Inconsistency between laws made under Article 249 and 250 c. Article 250
- iv. Inconsistency between laws made Parliament and State Legislature on Concurrent List d. Article 249
- A) i-d, ii-c, iii-b, iv-a B) i-a, ii-b, iii-c, iv-d
C) i-c, ii-d, iii-b, iv-a D) i-d, ii-c, iii-a, iv-b
- 26.** The Air (Prevention and Control of Pollution) Act 1981 and The Environment (Protection) Act 1986 was passed by Parliament under:
- A) Article 252 of Constitution of India B) Article 253 of Constitution of India
C) Article 250 of Constitution of India D) Article 251 of Constitution of India
- 27.** Which of the following Judge is famously known as “Green Judge”?
- A) Justice B.N. Kirpal B) Justice P.N. Bhagwati
C) Justice V.R. Krishna Iyer D) Justice Kuldeep Singh
- 28.** When did National Green Tribunal Act came into force?
- A) 18 October 2010 B) 26 September 2010
C) 3 June 2010 D) 12 August 2010
- 29.** Polluter Pays Principle has been incorporated in
- A) Principle 16 of Rio Declaration B) Principle 3 of Rio Declaration
C) Principle 15 of Stockholm Declaration D) Principle 27 of Earth Summit
- 30.** In which case, it was held that there is no reason to compel non smoker to be helpless victim of air pollution?
- A) M.C. Mehta v. Union of India B) K.M. Chinappa v. Union of India
C) Murli Deora v. Union of India D) Sheela Barse v. Union of India
- 31.** In which case, Supreme Court held that the State as trustee of all natural resources is under legal duty to protect natural resources thereby applying the ‘Public Trust Doctrine’?
- A) M.C. Mehta v. Kamal Nath & others
B) M.C. Mehta v. Union of India (Ganga water pollution case)
C) M.C. Mehta v. Union of India (Replacing diesel vehicles by CNG vehicles)
D) Rural Litigation & Entitlement Kendra v. State of U.P.
- 32.** Match the following as per Environment (Protection) Act, 1986
- a) Environmental pollutant i) Section 22
b) Environment pollution ii) Section 2(b)
c) Cognizance of offence iii) Section 19

d) Bar of jurisdiction

iv) Section 2(c)

A) a-ii, b-iv, c-i, d-iii

B) a-iv, b-ii, c-iii, d-i

C) a-iv, b-ii, c-i, d-iii

D) a-ii, b-iv, c-iii, d-i

33. When is Human Rights Day observed every year

A) 10th October

B) 11th October

C) 10th December

D) 11th December

34. Who is the present Chairperson of National Human Rights Commission?

A) Justice K.G. Balakrishnan

B) Justice T.S. Thakur

C) Justice A.S. Anand

D) Justice H.L. Dattu

35. Find the correct statement with respect to definition of 'Human Rights' as per Section 2(1) (d) of the Protection of Human Rights Act, 1993.

A) Human Rights means the right relating to life, liberty, equality, dignity, fraternity and opportunity of the individual guaranteed by the Constitution or embodied in the International Covenants and enforceable by courts in India

B) Human Rights means the right relating to life, liberty, equality and dignity of the individual guaranteed by the Constitution or embodied in the International Covenants and enforceable by courts in India

C) Human Rights mean the right relating to life, liberty, equality and dignity of the individual guaranteed by the Constitution

D) Human Rights means the right relating to life, liberty, equality, dignity, fraternity and opportunity of the individual embodied in the International Covenants and enforceable by courts in India

36. Match the following provisions of Constitution of India with Universal Declaration of Human Rights

i. Freedom of peaceful assembly and association under Article 19 of Constitution a) Article 17 of Universal Declaration of Human Rights

ii. Freedom of Religion under Article 25 of Constitution b) Article 26 of Universal Declaration of Human Rights

iii. Right to Education under Article 21A of Constitution c) Article 18 of Universal Declaration of Human Rights

iv. Right to Property under Article 300A of Constitution d) Article 20 of Universal Declaration of Human Rights

A) i-d, ii-c, iii-b, iv-a

B) i-c, ii-b, iii-a, iv-d

C) i-b, ii-a, iii-d, iv-c

D) i-a, ii-b, iii-c, iv-d

37. Which of the following is not covered under the "Third Generation Human Rights"?

A) Right to intergenerational equity and sustainability

B) Civil, political, economic, social and cultural rights

- C) Right to self determination
D) Right to healthy environment
38. Which one of the following principles was laid down in A.K. Kraipak v. Union of India
- A) Post decisional hearing would be enough for observing the principles of natural justice.
B) Rule of law is embedded under Article 14 of Constitution of India
C) All tribunals may review their decisions.
D) Principles of Natural Justice are applicable to administrative proceedings
39. “Administrative law is the law concerning the powers and procedures of administrative agencies, including especially the law governing judicial review of administrative actions”. This definition was given by:
- A) K.C. Davis B) Ivor Jennings C) A.V. Dicey D) Garner
40. Against whom writ of Mandamus cannot be issued?
- A) Tribunals B) Governor C) Courts D) Both A and B
41. If principles of natural justice are violated while deciding an administrative action, its effect will be _____.
- A) Voidable B) Null and void
C) Illegality D) Mere irregularity
42. Find the correct statement:
- A) Administrative law is a part of private law
B) Administrative law is a part of public law
C) Administrative law controls Constitutional law
D) None of the above
43. Which is incorrect statement with respect to Lokpal and Lokayukta Act 2013?
- A) It extends to whole of India except Jammu and Kashmir
B) It shall apply to public servants in and outside India
C) It shall have all the powers of Civil Court under Code of Civil Procedure, 1908
D) Whosoever makes false and vexatious complaint shall be punished for a term which may extend to 1 year and with fine which may extend to Rs.1 lakh
44. Rule of Law as proposed by Dicey is _____
- A) Principle of Administrative law
B) Consists of 3 main principles i.e. supremacy of law, equality before law and constitution is result of ordinary law of land
C) Derived from phrase “*la principe de legality*”
D) All of the above
45. Communication of acceptance is complete as against the proposer
- A) When acceptance is communicated to the proposer
B) When it comes to the knowledge of proposer
C) When the communication is made by the acceptor that he has accepted
D) When it is put in the course of transmission to proposer so as to be out of power of acceptor

46. There is a power to set aside the contract under Section 19A of Indian Contract Act 1872, when the contract is formed by

- A) Coercion
- B) Undue influence
- C) Fraud
- D) Misrepresentation

47. In Contract for sale of immovable property the presumption is “the time is

- A) The essence of the contract
- B) Not the essence of the contract
- C) The essence of the contract but failure does not make the contract voidable
- D) Not the essence of the contract but makes the contract voidable at the instance of the other party

48. A gratuitous bailment is terminated

- A) On the death of bailee
- B) On the death of bailor
- C) On the insanity of bailee or bailor
- D) Either A or B

49. Which of the following statement is correct with respect to Bailment and Pledge

- A) In bailment and pledge, the bailor and pawnor has the right to sell the goods
- B) Bailment is defined under Section 149 of Contract Act whereas Pledge is defined under Section 170 of Contract Act
- C) In bailment and pledge, there is change of possession
- D) The party who delivers the goods is known as bailee/pawnee and to whom the goods are delivered is known as bailor/pawnor

50. Which of the following is not the duty of ‘Works Committee’ under Section 3 of the Industrial Dispute Act?

- A) To promote measures for securing and preserving amity and good relations between employer and workman.
- B) To form groups among workman and strengthen relations between employer and workman.
- C) To comment upon matters of their common interest on concern.
- D) To endeavour to resolve any material difference of opinion.

51. **Assertion:** Strike is recognized as a weapon in the hands of workman to settle their differences with management.

Reason: Illegal strike is prima facie unjustified and hence irrelevant.

- A) Both A and R are true
- B) Both A and R are false
- C) A is true and R is false
- D) A is false and R is true

52. Find the incorrect statement:

- A) Doctrine of Ultra Vires protects the outsider for the acts of the company not mentioned in the object clause
- B) Doctrine of Constructive Notice implies that person’s dealing with company have knowledge about Articles of Association and Memorandum of Association of company
- C) Doctrine of Indoor Management is an exception to Doctrine of Constructive Notice

- D) Doctrine of Lifting the corporate veil, the law does not go behind the mask or veil of corporation in order to determine the real person behind the mask of company
- 53.** Section 135 of the Companies Act 2013 provides for Corporate Social Responsibility:
- A) Company with net worth of Rs. 5 crores or more.
 - B) Company with net profit of Rs. 500 crores or more
 - C) Company with turnover of Rs. 1000 crores or more
 - D) All of the above
- 54.** “Tort means a civil wrong for which remedy is a common law action for unliquidated damages and which is not exclusively the breach of contract or the breach of trust or other merely equitable obligation”. This definition is given by
- A) Salmond
 - B) Winfield
 - C) Fraser
 - D) Section 2(m) of Limitation Act 1963
- 55.** Gloucester Grammar School case explain:
- A) Injuria sine damno
 - B) Damno sine injuria
 - C) Respondents superior
 - D) Remoteness of damages
- 56.** Which one the following is not an exception to the Rule of Strict Liability?
- A) Statutory Authority
 - B) Consent of Plaintiff
 - C) Act of 3rd party
 - D) Necessity
- 57.** Find the incorrect statement
- A) Libel is in visible form whereas slander is in transient form
 - B) Libel is not actionable per se whereas slander is actionable in itself
 - C) Libel and slander is not merely a tort but also a criminal offence
 - D) Justification of truth can be pleaded as a defence in case of libel as well as slander
- 58.** Which one of the following is not an essential ingredient of “Malicious Prosecution”?
- A) Prosecution in criminal court
 - B) Commencement of prosecution without reasonable cause
 - C) Conclusion of proceedings against plaintiff
 - D) Conclusion of proceedings in favour of plaintiff
- 59.** Which one of the following sources of International Law is not mentioned under Article 38 of the Statute of International Court of Justice?
- A) International Customs
 - B) General Principles of law recognized by civilized state
 - C) Decisions of judicial/arbitral tribunals
 - D) Decisions of organs of international institutions
- 60.** The Secretary General of United Nations is appointed by _____
- A) General Assembly
 - B) Security Council
 - C) General Assembly on the recommendation of Security Council
 - D) Secretariat
- 61.** Which one of the following is correctly matched?
- A) Chorzaw Factory Case – Res Judicata
 - B) Paquete Habana Case – Justice, Equity and Good Conscience

- C) North Continental Shelf Case – Estoppel
- D) Barcelona Traction Case – International Customs

62. The principle of Rebus sic stantibus means:

- A) A state cannot use force
- B) There is not a crime without law
- C) Fundamental change of circumstances
- D) A treaty must be adhered to faithfully

63. Who is the father of International Law?

- A) Hugo Grotious
- B) Oppenheim
- C) Schwarzenberger
- D) Holland

64. Previous Conviction of a person is relevant under _____

- A) Explanation I of Section 14 of Indian Evidence Act 1872
- B) Explanation II of Section 14 of Indian Evidence Act 1872
- C) Explanation I of Section 8 of Indian Evidence Act 1872
- D) Explanation II of Section 8 of Indian Evidence Act 1872

65. Cross Examination of Witness _____

- A) Must relate to relevant facts but need not to be confined to the facts which witness testified in chief examination.
- B) Must relate to relevant facts and needs to be confined to the facts which witness testified in chief examination
- C) Must not relate to relevant facts and need not to be confined to the facts which witness testified in chief examination
- D) Must not relate to relevant facts but needs to be confined to the facts which witness testified in chief examination

66. Match the following:

- | | |
|--------------------------|--|
| i. Oral Evidence | a. Electronic Record |
| ii. Documentary Evidence | b. Must be direct |
| iii. Primary Evidence | c. Photocopy of document |
| iv. Secondary Evidence | d. evidence of the person who had seen/heard |
-
- | | |
|---------------------------|---------------------------|
| A) i-c, ii-d, iii-a, iv-b | B) i-d, ii-c, iii-b, iv-a |
| C) i-a, ii-b, iii-c, iv-d | D) i-b, ii-a, iii-d, iv-c |

67. Match the following case laws with the provisions of Hindu Marriage Act, 1955

- | | |
|-----------------------|----------------------------------|
| i. Section 9 | a. Seema v. Ashwani Kumar |
| ii. Section 13(1)(ia) | b. Saroj Rani v. Sudershan Kuamr |
| iii. Section 8 | c. Sureshta Devi v. Om Prakash |
| iv. Section 13B | d. Dastane v. Dastane |

- A) i-a, ii-c, iii-d, iv-b
 B) i-c, ii-a, iii-b, iv-d
 C) i-b, ii-d, iii-a, iv-c
 D) i-a, ii-d, iii-b, iv-c
68. A, a Hindu has two wives, W1 and W2 and one Son, S by wife W1 and four Sons, S1, S2, S3 and S4 by wife W2. On a partition of coparcenary property W1 and W2 will get:
- A) No share, as neither of them is a 6 parcenary
 B) 1/4th share each
 C) 1/5th share each
 D) 1/8th share each
69. Marriage of Suni male with Jewish female is _____
- A) Void B) Voidable C) Valid D) Irregular
70. Conversion of a non Muslim wife to Islam:
- A) Shall not ipso facto dissolve his marriage
 B) Shall dissolve his marriage with the permission of the Qazi
 C) Shall dissolve his marriage if the conversion to Islam is with the permission of the Court
 D) Shall not dissolve his marriage
71. In case of 'muta marriages', if the marriage is not consummated then the wife is to undergo 'iddat' for _____ months.
- A) 4 B) 3 C) 2 D) None of these
72. Dissolution of Muslim marriage Act, 1939 is based on the principle of which Muslim School:
- A) Hanifi School B) Shafi School C) Maliki School D) Zaidi School
73. Under Section 438 of Criminal Procedure Code, bail can be granted for _____ offences by _____ Court.
- A) Bailable or non bailable offences ; Sessions Court
 B) Non bailable offences ; High Court or Sessions Court
 C) Bailable offences ; High Court or Sessions Court
 D) Bailable or non bailable ; High Court
74. In prosecution for offences against marriage under Section 198 of Cr.P.C, the court shall take the cognizance of an offence _____.
- A) Suo moto
 B) Upon police report
 C) Upon complaint made by aggrieved person
 D) Any of the above
75. Find the incorrect statement:
- A) The sentence of death passed by Session Court shall not be executed unless confirmed by the High Court
 B) The High Court has the power to either confirm the sentence or annul the conviction or acquit the accused
 C) The court passing the sentence shall commit the convicted person to jail custody under warrant

86. Seema possessed by some superstitious belief, throws her child into a pond full of crocodiles, with the belief that by doing so the child will be free from evil spirits. Which offence Seema has committed?

- A) Murder
- B) Culpable Homicide not amounting to Murder
- C) Attempt to Murder
- D) Attempt to Culpable Homicide

87. If the offence is punishable with fine only, then in default of payment of fine, the Court shall impose _____ imprisonment.

- A) Simple
- B) Rigorous
- C) Simple or rigorous
- D) Partly simple or partly rigorous

88. The doctrine of 'volenti non fit injuria' is not covered under _____ of Indian Penal Code.

- A) Section 88
- B) Section 89
- C) Section 90
- D) Section 91

89. Punishment for a being member of unlawful assembly is _____

- A) 2 years or fine or both
- B) 1 year or fine or both
- C) 6 months or fine or both
- D) 2 months or fine or both

90. Match the following:-

- | | |
|--------------------------|---------------|
| i. Wrongful loss or gain | a. Section 22 |
| ii. Dishonestly | b. Section 23 |
| iii. Fraudulently | c. Section 24 |
| iv. Movable property | d. Section 25 |

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

91. 'A' removes floppy containing important information from 'B's pocket and takes it in his possession. 'B' objects to it. 'A' pulls out a knife from his pocket and says that I will kill you if you move a step further. Which offence 'A' has committed?

- A) Extortion
- B) Robbery based on Theft
- C) Robbery based on Extortion
- D) Voluntarily causing hurt in committing Robbery

92. Which of the following property will not be covered under Stolen Property?

- A) Property transferred by theft/extortion
- B) Property transferred by criminal misappropriation/criminal breach of trust
- C) Property transferred by cheating/mischief
- D) All of the above

93. Minimum punishment prescribed under Indian Penal Code 1860 is _____

- A) 1 month or fine or both
- B) 24 hours or Rs.500 or both

C) 24 hours or Rs.10 or both

D) 1 month or Rs.100 or both

94. Find the correct statement:

- A) Under Section 107(2) and 120B, agreement between 2 or more persons is enough to make them liable for conspiracy
- B) Under Section 107(2) and 120B, agreement between 2 or more persons is not enough but some act or illegal omission is necessary
- C) Under Section 107(2), mere agreement between 2 or more persons is enough to make persons liable for conspiracy; whereas under Section 120B some act or illegal omission must take place along with agreement
- D) Under Section 107(2), mere agreement between 2 or more persons is not enough to make persons liable for conspiracy but some act or illegal omission must take place along with agreement; whereas under Section 120B mere agreement is enough to make the persons liable

95. In which recruitment, in a system for higher position is open to all the qualified candidates who may wish to apply is known as?

- A) Direct Recruitment
- B) Recruitment by promotion
- C) Ordinary Recruitment
- D) Passive Recruitment

96. Position classification' is the classification of _____

- A) Salaries
- B) Duties
- C) Departments
- D) Personal status of incumbents

97. Promotion in Civil Services indicates _____

- A) Changes in the situation which indicates difficult work and more important responsibility
- B) Change in the place of work
- C) Transfer of work from field to headquarters
- D) Always an increase in pay

98. The Union Public Service Commission of India has been established under _____

- A) Article 315 of Indian Constitution
- B) Article 320 of Indian Constitution
- C) Article 325 of Indian Constitution
- D) Article 335 of Indian Constitution

99. Reservation for Scheduled Caste and Scheduled Tribe in the Services has been provided in Indian Constitution under:

- A) Article 315
- B) Article 335
- C) Article 365
- D) Article 375

100. Non-promotion of a Government servant whether in a substantive or officiating capacity, after consideration of his case, to a post for promotion to which he is eligible, is-

- A) Minor penalty
- B) Major penalty
- C) Reprimand
- D) Not a penalty

Master in Public Health

1. Scrub typhus is caused by
 - A) Rickettsia tsutsugamushi
 - B) Coxiella burnetti
 - C) Corona virus
 - D) Treponema pertenuae
2. Hepatitis B is caused by
 - A) Hepandna virus
 - B) Hepacivirus
 - C) Corona virus
 - D) Flavivirus
3. Incubation period for typhoid fever is
 - A) 10-14 days
 - B) 4-20 days
 - C) 2-8 days
 - D) 1-3 days
4. World Malaria Day is celebrated on
 - A) 25th April
 - B) 25th May
 - C) 14th June
 - D) 28th September
5. Burtorns line in young children indicates
 - A) Fluorosis
 - B) Hg poisoning
 - C) Pb poisoning
 - D) Exposure to hazardous material
6. Mode of transmission for dengue is
 - A) Aedes bites
 - B) Consumption of bats eaten fruits
 - C) Direct Penetration
 - D) Contaminated drinks
7. A major disaster, known as London smog, occurred in the British city of London in the year
 - A) 1942
 - B) 1952
 - C) 1962
 - D) 1972
8. Guano deposits are good fertilizer because of the presence of nutrient
 - A) Sulphur
 - B) Phosphorous
 - C) Nitrogen
 - D) Potassium
9. Sleeping sickness of Africa is transmitted by vector
 - A) Mite
 - B) Tse- Tse Fly
 - C) Housefly
 - D) Bug
10. Pyramid of energy is always
 - A) Inverted
 - B) Upright
 - C) Spindle shaped
 - D) Hexagonal
11. According to Noise Pollution (Regulation and Control) Rules, 2000 the ambient air quality standards in respect of noise for silence Zone in day time are
 - A) 40dBA
 - B) 45dBA
 - C) 50 dBA
 - D) 55 dBA
12. The Dobson Unit (DU) is a measure of the
 - A) Radioactivity
 - B) UV index
 - C) Ozone
 - D) Oxygen molecule

13. Who among following is known as Father of Epidemiology
A) Hippocrates B) Ram Nath Chopra C) John Snow D) Ian Donald
14. Who among the following introduced the concept of relationship of environment and human health?
A) Avicenna B) Charaka C) Hippocrates D) Paracelsus
15. Which of the following dimensions is not included in WHO definition of health?
A) Physical well being B) Occupational well being
C) Mental well being D) Social well being
16. Who among following is known as Father of Modern toxicology
A) Hippocrates B) Ram Nath Chopra C) Matheiu Orfila D) Ian Donald
17. A good indicator of availability, utilization and effectiveness of health care services in a country is
A) Maternal mortality rate
B) Hospital bed occupancy rate
C) Infant mortality rate
D) Disability adjusted life years (DALYs)
18. Standard of living (WHO) includes all except:
A) Income B) Sanitation and nutrition
C) Level of provision of health D) Human rights
19. Prevention of contact with microorganism is known as:
A) Asepsis B) Disinfection C) Sterilisation D) Sanitiser
20. Agent that reduces the number of bacterial contaminants to safe levels as per public health requirement is known as:
A) Germicide B) Disinfection C) Sterilization D) Sanitiser
21. Primary prevention of dental caries includes?
A) Fluoridation B) Dental health education
C) Mass screening D) Dental fitting, teeth extraction
22. Malaria is transmitted by
A) Anopheles stephensi B) Plasmodium ovale
C) Culex D) Phlebotamus
23. National Institute of occupational health is located in
A) Chennai B) Ahmedabad C) Pune D) New Delhi
24. Arthropods are the vector for all except:
A) Scrub typhus B) Epidemic typhus
C) Q-fever D) Rocky mountain sported fever.

25. World AIDS day is on

- A) 1st May B) 1st December C) 31st Octobers D) 29th May

26. A patient is called obese if BMI is:

- A) 20-30 B) >25 C) >30 D) >40

27. Salivary amylase secreted into the oral cavity starts the digestion of

- A) Proteins B) Starch C) Lipids D) Amino acids

28. Which of the following magazine honored for covering issues pertaining to science, environment and development with the first Indian Sanitation Coalition-FICCI award for best coverage on sanitation.

- A) Down to Earth B) Current Science
C) Natural Life D) None of these

29. Which anti-diabetic drug from plant source, non-toxic, safe and prevent rise in blood glucose level to normal?

- A) Biguanides B) Meglitinides
C) Chalcone D) Sulfonylureas

30. International biological diversity day celebrated on:

- A) 22 February B) 22 March C) 22 April D) 22 May

31. Seasonal variation of a disease can be assessed by

- A) Comparing the prevalence of disease B) Comparing the incidence of disease
C) Calculating the survival rates D) Calculating the Mortality rates

32. A disease is called endemic when

- A) Occurs in more than one geographical area
B) Occurs in more than one season
C) Is constantly present at low rates in a specified geographical area
D) Occurs in a frequency more than expected in a specified geographical area

33. Incidence of diarrhoea in a community can be calculated by

- A) Case control study B) Cross sectional study
C) Double blind study D) Cohort study

34. Which is the best measure of estimating impact of health interventions in general population?

- A) Relative risk B) Attributable risk
C) Population attributable risk D) All of these

35. A clinical manifest disease of man or animal resulting from infection is called?

- A) Infectious disease B) Contagious disease
C) Iatrogenic disease D) Nosocomial disease

36. ASHA is posted at the:

- A) Village level
C) Qualitative enquiry
- B) Community participation
D) Primary health care
- 37.** Primary health care involves all except:
- A) Sanitation & water supply
C) Supply of essential drugs
- B) Sound referral centre
D) Health education
- 38.** Epidemiological significance of a 'carriers' is higher than 'cases' because
- A) They infect more people
C) They are more infectious than cases
- B) They increase virulence of the agent
D) They cannot be treated
- 39.** The process which destroys all the microbial life including spores is known as
- A) Disinfection
B) Antisepsis
C) Deodorization
D) Sterilization
- 40.** World Yoga day is celebrated on
- A) 14 November
B) 21 June
C) 2 October
D) 15 October
- 41.** Swachh Bharat Mission or Clean India Mission a national campaign by the Government of India, was officially launched on
- A) 2 October 2014
C) 26 January 2015
- B) 15 August 2015
D) 15 August 2014
- 42.** Both B and T cells of immune system are produced in
- A) Spleen
B) Lymphoid nodes
C) Bone marrow
D) Thymus
- 43.** Goiter is a cause of
- A) Addisons disease
C) Hashimoto-thyroiditis
- B) Myasthenia gravis
D) Good pastures synfrome
- 44.** Trypanosoma gambiense produces in man
- A) Kala-azar
B) Sleeping sickness
C) Oriental sore
D) Malaria
- 45.** First Census of India was held in year:
- A) 1911
B) 1872
C) 1881
D) 1891
- 46.** In India death has to be registered with in:
- A) 3 days
B) 7 days
C) 14 days
D) 21 days
- 47.** The function of hemoglobin is?
- A) To transport oxygen
C) Prevention of anemia
- B) Destruction of bacteria
D) Utilization of energy
- 48.** Who discovered the Polio vaccine?
- A) Louis Pasteur
B) Jonas Salk
C) Konrad Zuse
D) Eli Whitney
- 49.** Insects responsible for transmitting diseases are called?

- A) Transmitter B) Drones C) Vector D) Conductor
- 50.** The vitamin which is generally excreted by human in urine is ?
- A) Vitamin – A B) Vitamin – D C) Vitamin – C D) Vitamin - E
- 51.** The fruit after ripping becomes soft. It is due to?
- A) Dissolution of tannin in sap B) Dissolution of middle lamella
C) Formation of ethylene gas D) Formation of auxin
- 52.** Pollination is best defined as
- A) Transfer of pollen from anther to stigma B) Germination of pollen grains
C) Growth of pollen tube in ovule D) Visiting flowers by insects
- 53.** Vaccine can be stored at subcentre for:
- A) 1 day B) 7 days C) 15 days D) 30 days
- 54.** Stone leprosy is caused by
- A) Ozone depletion B) Lead pollution
C) Acid rain D) London smog
- 55.** Ozone hole is due to mainly two green house gas which are
- A) CO₂, CH₄ B) N₂O and CFCs C) N₂O and CO D) CFC and CO₂
- 56.** For a region to be hotspot the minimum number of endemic species should be
- A) 1500 B) 500 C) 1200 D) 2200
- 57.** Which component of tobacco is carcinogenic
- A) Nicotine B) Tar C) CO D) PAH
- 58.** The indoor pollutant from the furniture is
- A) Ozone B) Formaldehyde
C) Radon D) Carbon-dioxide
- 59.** The main effect of DDT on birds is
- A) Fewer feathers B) Reduced growth
C) Blindness D) Thinner eggshell
- 60.** Which is the best index for burden of disease?
- A) Case fatality rate B) Disability adjusted life years
C) Dependency ratio D) Morbidity data
- 61.** Disease elimination means:
- A) Cure of the disease
B) Preventing the transmission totally
C) Eradication of the vector
D) Complete termination of infective organism

- 62.** Air quality index comprising of value in the range upto:
A) 100 B) 200 C) 500 D) 1000
- 63.** The purple colour in Air quality index category indicates that condition are:
A) Unhealthy for sensitive group B) Unhealthy for everyone
C) Air quality is acceptable D) Health alert
- 64.** In epidemic, 1st step is:
A) Verification of diagnosis B) Isolation
C) Immunization D) Notification
- 65.** United Nations Conference on the Human Environment was held at
A) Brazil B) Stockhom C) Berlin D) Genewa
- 66.** Health promotion logo represents
A) Circle with 3 wings and incorporates 5 key action in health promotion
B) Circle with 5 wings and incorporates 3 key action in health promotion
C) Circle with 3 wings and incorporates 3 key action in health promotion
D) Circle with 5 wings and incorporates 5 key action in health promotion
- 67.** The basic approach in cohort studies is to work from
A) Cause to effect B) Effect to cause
C) Disease to cure D) Prevention to cure
- 68.** Bhojpatra is obtained from the bark of
A) Dalbergia B) Betula C) Piper D) Cinchona
- 69.** An enzyme requires
A) Optimum pH B) Neutral pH C) Acidic pH D) Alkaline pH
- 70.** Ragi is richest source of
A) Calcium B) Iron
C) Iodine D) Vitamin B Complex
- 71.** Harmful radiation emitted by sun is
A) Visible B) Infra- red C) Ultra violet D) Radio-waves
- 72.** Swachh Yug Campaign initiated by Ministry of Drinking Water and Sanitation
A) Make banks of river Ganga clean
B) Make banks of river Ganga open defecation free
C) Make villages clean
D) Make villages open defecation free
- 73.** Permit that allow the holder to emit one ton of carbon dioxide is known as

- A) Carbon credit
- C) Environment clearance

- B) Water foot print
- D) Environment credit

74. The volume of air in a normal breath is called

- A) Vital capacity
- C) Tidal volume

- B) Total lung capacity
- D) Residual volume

75. Theme of International biological diversity day 2017 is

- A) Biodiversity and Sustainable Tourism
- B) Mainstreaming Biodiversity; Sustaining People and their Livelihoods
- C) Island Biodiversity
- D) Water and Biodiversity

x-x-x

M.E.(Chemical)

- Which controller has the maximum stabilising time?
A) P
B) PD
C) PI
D) PID
- In a laminar boundary layer, the nominal thickness varies with the longitudinal distance x as
A) $x^{-1/2}$
B) $x^{-1/3}$
C) x
D) $x^{1/2}$
- Salt cake is chemically represented by
A) Na_2SO_4
B) $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$
C) MgSO_4
D) BaSO_4
- Alkyl benzene sulphonate is
A) Detergent
B) Rubber
C) Polyester
D) Pesticide
- Transition length for a turbulent fluid entering into a pipe is around.....times the pipe diameter
A) 5
B) 50
C) 500
D) 1000
- HETP is numerically equal to HTU only when operating line
A) Lies below the equilibrium line
B) Lies above the equilibrium line
C) Is parallel to the equilibrium line
D) Is far from the equilibrium line
- Zeolite removes both temporary as well as permanent hardness of water by precipitating calcium and magnesium present in water as insoluble zeolites. Used zeolite is regenerated by flushing with the solution of
A) Calcium sulphate
B) Sodium chloride
C) Sodium sulphate
D) Magnesium chloride
- Back mixing is more predominant in
A) A well stirred batch reactor
B) A well stirred batch reactor
C) A single CSTR
D) A single CSTR
- Presence of aromatics in
A) Diesel increases its cetane number
B) Kerosene increases its smoke point
C) Kerosene increases its flash point
D) Petrol increases its octane number
- Aniline point is the temperature at which
A) equal weight of diesel & the aniline are completely miscible
B) equal weight of aniline & the test sample are completely miscible
C) equal volume of aniline & the test sample are completely miscible
D) aniline vaporises
- Internal energy change of a system over one complete cycle in a cyclic process is
A) Zero
B) +ve

- C) -ve
D) Dependent on the path
12. Slope of the feed line, if feed to a distillation column is a saturated liquid, is
A) 0
B) ∞
C) > 1
D) < 1
13. Cetane number of high speed diesel must be \geq
A) 30
B) 45
C) 75
D) 95
14. In a double pipe (concentric) heat exchanger, the hydraulic radius for heat transfer (for a fluid flowing through the annulus) would be
A) Same as that for fluid flow
B) Less than that for fluid flow
C) More than that for fluid flow
D) $D_2 - D_1$ (D_1 and D_2 are inner diameter of inner and outer pipes respectively)
15. Penetration test determines the _____ of the grease.
A) Stiffness
B) Lubricating properties
C) Service temperature
D) Variation in viscosity with temperature
16. The Grashoff number is defined as the ratio of the
A) Buoyancy to inertial forces
B) Inertial to viscous forces
C) Buoyancy to viscous forces
D) Buoyancy to surface tension forces
17. A proportional controller with a gain of K_c is used to control a first order process. The offset will increase, if
A) K_c is reduced
B) K_c is increased
C) Integral control action is introduced
D) Derivative control action is introduced
18. Chemisorption (chemical adsorption) is
A) Same as "Van der Waals" adsorption
B) Characterised by adsorption of heat
C) An irreversible phenomenon
D) A reversible phenomenon
19. Response of a system to a sinusoidal input is called _____ response
A) Impulse
B) Unit step
C) Frequency
D) Pulse
20. The vessel dispersion number (D/uL) for plug flow is
A) 0
B) 500
C) 750
D) ∞
21. A reaction in which one of the products of reaction acts as a catalyst is called
A) Homogeneous catalytic reaction
B) Heterogeneous catalytic reaction
C) Autocatalytic reaction
D) Biochemical reaction
22. The ratio of shear stress to shear strain is called
A) Bulk modulus
B) Shear modulus

- A) Reduce the number of plates B) Avoid thermal decomposition of a component
 C) Increase the total pressure of distillation D) Increase the efficiency of separation
52. Stanton number for mass transfer is defined as
 A) $(Re \times \text{Sherwood number})/\text{Schmidt Number}$ B) $Re/(\text{Schmidt Number} \times \text{Sherwood number})$
 C) $\text{Sherwood number}/(Re \times \text{Schmidt Number})$ D) $\text{Schmidt Number}/(\text{Sherwood number} \times Re)$
53. To handle smaller quantity of fluid at higher discharge pressure, use a _____ pump
 A) Volute B) Reciprocating
 C) Centrifugal D) Rotary vacuum
54. Which of the following is a pressure filter?
 A) Rotary drum filter B) Sand filter
 C) Leaf filter (Moore filter) D) Plate and frame
55. 200 mesh screen means 200 openings per
 A) cm B) cm^2
 C) inch^2 D) inch
56. Sulphuric acid mist is arrested by using a _____ scrubber
 A) Packed wet B) Hollow wet
 C) Co-current D) Venturi
57. Relative humidity is the ratio of the
 A) Partial pressure of the vapour to the vapour pressure of the liquid at room temperature B) Saturation humidity to actual humidity
 C) Partial pressure of the vapour to the vapour pressure of the liquid at gas temperature D) Actual humidity to saturation humidity
58. A good control system has all the following features except
 A) Good stability B) Slow response
 C) Good accuracy D) Sufficient power handling capacity
59. Schedule number of a pipe, which is a measure of its wall thickness, is given by
 A) $100 P/S$ B) $1000 S/P'$
 C) $1000 P/S$ D) $100 S/P'$
60. The excess energy of reactants in a chemical reaction required to dissociate into products is termed as the _____ energy

- A) Potential
C) Binding
- B) Activation
D) Threshold
61. _____ columns are used for liquid dispersion in a continuous gas phase
A) Packed
B) Pulse
C) Bubble cap
D) Sieve tray
62. Degree of freedom at triple point will be
A) 1
B) 2
C) 0
D) 3
63. 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) 40096
B) 43196
C) 53196
D) 60196
64. Which of the following is the cheapest material of construction for the storage of sodium hydroxide upto a concentration of 75%?
A) Stainless steel
B) Plain carbon steel
C) Nickel
D) Copper
65. Acetic acid will be most economically separated from a dilute solution of acetic acid in water by
A) Continuous distillation
B) Evaporation
C) Solvent extraction
D) Absorption
66. Operating principle of cyclone separator is based on the action of _____ dust particles
A) Gravitational force on
B) Centrifugal force on
C) Electrostatic force on
D) Diffusion of
67. For an isothermal reversible compression of an ideal gas
A) Only $\Delta H = 0$
B) Only $\Delta E = 0$
C) $dQ = dE$
D) $\Delta E = \Delta H = 0$
68. Most commonly used joint in the underground pipe lines is the
A) Sleeve joint
B) Coupling
C) Expansion joint
D) Flange
69. Flow occurring in a pipeline when a valve is being opened is
A) Steady
B) Unsteady
C) Laminar
D) Vortex
70. Eddy momentum diffusivity, thermal diffusivity and mass diffusivity will be same for
A) $N_{Pr} = N_{Sc} = 0.7$
B) $N_{Pr} = N_{Sc} = 1$
C) $N_{Pr} = N_{Sc} = 7.02$
D) $N_{Pr} = N_{Sc} = 297$

71. Dittus-Boelter equation cannot be used for molten metals mainly due to its very low
- A) Prandtl number
 - B) Grashoff number
 - C) Thermal conductivity
 - D) Viscosity
72. Drying operation under vacuum is carried out to
- A) Dry those materials which have very high unbound moisture content
 - B) Reduce drying temperature
 - C) Increase drying temperature
 - D) Dry materials having high bound moisture content
73. Which of the following liquid-vapor contacting devices provides maximum contact surface area for a particular duty?
- A) Sieve plate column
 - B) Bubble cap column
 - C) Randomly packed column
 - D) Wetted wall column
74. Overall efficiency of the distillation column is
- A) Always more than the point efficiency
 - B) The ratio of number of actual plates to ideal plates
 - C) Same as Murphree efficiency
 - D) The ratio of number of ideal plates to actual plates
75. Time constant of a first order system is defined as the time taken for the system output to reach 63.2% of its ultimate value after
- A) A step change in input
 - B) A ramp change in input
 - C) An impulse change in input
 - D) A sinusoidal change in input

M.E. (Food Technology)

1. Tocopherol is chemical name of vitamin
A) D B) E C) K D) B₆
2. The primary protein in milk is
A) Casein B) Tryptophan C) Lysine D) Glutenin
3. Percentage of fat in butter is
A) 50 B) 60 C) 70 D) 80
4. The power consumed by a drum dryer depends upon
A) Drum speed B) Steam Pressure
C) Pressure exerted by the blade on the drums D) Length and diameter of the drum
5. Freeze drying time is directly proportional to the _____ of the material being dried.
A) Thickness B) Square of the thickness
C) Cube of thickness D) Fourth power of thickness
6. With increase in concentration of solute in a solution, boiling point
A) Decreases B) Increases
C) Remains constant D) None of these
7. The major forces acting in cyclone separator are
A) Gravity and centrifugal B) Gravity and centripetal
C) Centrifugal and centripetal D) None of these
8. Ultra filtration is used for production of
A) Butter B) Ghee C) Cheese D) Ice-cream
9. Which of the following enzyme is responsible for off-flavor development in cream and butter?
A) Lipase B) Protease C) Peroxidase D) None of these
10. Which of the following is a milk sugar?
A) Lactose B) Fructose C) Sucrose D) None of these
11. Anthocyanins are soluble in
A) Water B) Fat C) Oil D) None of these
12. Glutamic acid is used as a /an
A) Flavour enhancer B) Antioxidants C) Humectants D) Emulsifier
13. Salt is a better food preservative than sugar because it
A) Has lower molecular weight
B) Lowers the vapour pressure of food water by a larger extent
C) Kills microorganisms better
D) Reduces pH

14. Pectin and gums are added to foods as
 A) Thickeners and stabilizers
 C) Humectant
 B) Emulsifier
 D) Colorant
15. Flash 18 processes is also known as
 A) Smith-Ball process
 C) Luis Pasteur process
 B) Nicholas Process
 D) Martin Process
16. The level of enzyme activity in wheat flour is measured by
 A) Fouling number
 C) Farall Number
 B) Falling number
 D) Froud number
17. The pioneer of canning technology is
 A) Charles Appert
 C) Mike Lewis
 B) Nicolas Appert
 D) H. Burton
18. The temperature and time combination for batch pasteurization of milk is
 A) 63 °C for 30 min
 C) 70 °C for 20 min
 B) 65 °C for 15 min
 D) 60 °C for 40 min
19. Lecithins are structurally like fats but contain
 A) Oxalic acid
 C) Phosphoric acid
 B) Citric acid
 D) Capric acid
20. Which of the following metals are strong promoters of oxidation?
 A) Sodium and iron
 C) Aluminum and Copper
 B) Sodium and Aluminum
 D) Copper and iron
21. Vitamin C and E act as
 A) Antioxidants
 C) Stabilizers
 B) Emulsifiers
 D) Humectants
22. An enzyme that acts only in an acidic medium is
 A) Pepsin
 B) Trypsin
 C) Rennin
 D) Amylase
23. The fraction of starch which is composed of straight-chain structure is
 A) Amylopectin
 B) Amylose
 C) Pectinose
 D) None of these
24. Oils are converted into fats by a process known as
 A) Hydrogenation
 B) Hydrolysis
 C) Pyrolysis
 D) None of these
25. Diacetyl is an example of
 A) Flavouring agent
 C) Antimicrobial agent
 B) Colouring agent
 D) Leavening agent
26. Zein is found in
 A) Wheat
 B) Maize
 C) Rice
 D) Soybeans

27. What causes sliced potato to turn brown?
 A) Carmelization
 B) Staling
 C) Protein degeradation
 D) Enzymatic activity
28. Coarse endosperm particles of wheat are called
 A) Semolina
 B) Maida
 C) Flour
 D) None of these
29. Milling process of corn milling is a
 A) Dry milling method
 B) Wet milling method
 C) Conditioning method
 D) None of these
30. A food material is processed at 115 °C for 15 min in which 50 % vitamin is lost. The activation energy for vitamin is 109000 J/mol. The value of R may be taken as 8.314 J/mol K. The % vitamin loss at 120 °C after 15 minutes of processing is
 A) 75.5%
 B) 58.13%
 C) 65.37%
 D) 45.27%
31. At very low pressure, the thermal conductivity of gases approaches
 A) Maximum
 B) Zero
 C) Negative
 D) None of these
32. When a liquid is placed in a sealed container, molecules of liquid evaporate into the space above the liquid. After equilibrium is reached, this vapour will exert a pressure which is called
 A) Partial pressure
 B) Absolute pressure
 C) Vapour pressure
 D) Total pressure
33. In transient heat transfer problems, the dimensionless number used is
 A) Nusselt Number
 B) Prandtl Number
 C) Biot Number
 D) Schmidt Number
34. When vaporisation takes place directly at the heating surface, it is called
 A) Film boiling
 B) Nucleate boiling
 C) Vapour binding
 D) None of these
35. With increase in porosity, the thermal conductivity of a solid material
 A) Increases
 B) Decreases
 C) Remains unchanged
 D) May increase or decrease
36. Dietus-Boelter equation used for the determination of heat transfer co-efficient is valid for
 A) Laminar flow
 B) Turbulent flow
 C) Plug flow
 D) Transition flow
37. It is desired to concentrate a 20% salt solution (20 kg of salt in 100 kg of solution) to a 30% salt solution in an evaporator. Consider a feed of 300 kg/min at 30°C. The boiling point of the solution is 110 °C, the latent heat of vaporization is 2100 kJ/kg and the specific heat of the solution is 4 kJ/kg K. The rate at which the heat has to be supplied in (kJ/min) to the evaporator is
 A) 3.06×10^5
 B) 6.12×10^5
 C) 7.24×10^5
 D) 9.08×10^5

38. 1 kWh equals to
 A) 3.6×10^6 J B) 6.3×10^6 J C) 3.6×10^6 kJ D) None of these
39. The dimensionless number which represents the ratio of drag force to inertial force is
 A) Power number B) Reynolds number
 C) Lewis number D) Nusselt number
40. The law which describes the molecular diffusion is known as
 A) Fourier's law B) Fick's law
 C) Kick's law D) None of these
41. Which of the following analytical method can be used to distinguish flavour compounds?
 A) *Hydrometry* B) Near infrared spectroscopy
 C) Polarimetry D) Gas chromatograph
42. Which of the following foods is rich in omega-3 fatty acids?
 A) Fatty fish B) Butter C) Vegetable oil D) Olive oil
43. A food with a pH of 3.5 is considered to be
 A) Low acid B) High acid C) Medium acid D) Non-acid
44. Which of the following gas is responsible for the ripening of fruits?
 A) Ethane B) Carbon dioxide C) Ethylene D) Propane
45. Which of the following food is produced by fermentation involving lactic acid bacteria?
 A) Yogurt B) Vinegar C) Beer D) None of these
46. A milk can be sterilized either at 135 °C for 6 s or at 140 °C for 2 s. The z-value of micro organism to destroy in the process is
 A) 11.45 °C B) 13.25 °C C) 9.86 °C D) 10.48 °C
47. The F value at 121.1 °C equivalent to 99.999 % inactivation of *C. botulinum* is 1 minute. The D_0 value is
 A) 0.1 min B) 0.2 min C) 0.3 min D) 0.25 min
48. An aggregate of hyphae is called
 A) Spore B) Vegetative cells C) Mycelium D) None of these
49. Bacteria reproduce by a process called
 A) Binary fission B) Binary fusion C) Binary diffusion D) None of these
50. The destruction of microorganisms by steam may be described as
 A) Zero order reaction B) Second order reaction
 C) First order reaction D) None of these
51. The common word for bacteria which are spherical in shape is
 A) Cocci B) Bacilli C) Spirilla D) Pleomorphic

52. The paddy dehusking (sheller) machine has two rubber rolls that rotate with
 A) Identical speed in same direction
 B) Identical speed in opposite direction
 C) Differential speed in same direction
 D) Differential speed in opposite direction
53. Chill injury is most common in
 A) Banana B) Apple C) Mango D) Grape
54. In modified atmospheric packaging, the potassium permanganate is used as
 A) Moisture absorber B) Ethylene absorber
 C) Ethylene producer D) Carbon dioxide absorber
55. Clot-on-boiling test is carried out to
 A) Determine the presence of enzyme in milk
 B) Determine the heat-stability of the milk
 C) Determine the bacterial contamination level in milk
 D) None of these
56. Smoking is normally used for the preservation of
 A) Cereals B) Meat C) Egg D) Fruits
57. The law which states that the amount of gas dissolved in a liquid is proportional to its partial pressure is
 A) Dalton's law B) Gay Lussac's law C) Raoult's law D) Henry's law
58. Which of the following is called milk ejection hormone?
 A) Oxytocin B) Vasopressin C) Prolactin D) None of these
59. Storage polysaccharide made by animals is
 A) Collagen B) Cellulose C) Amylopectin D) Glycogen
60. The LMTD for counter current flow in a heat exchanger where one stream rises from 20 to 70 °C and other falls from 95 to 80 °C is
 A) 40 °C B) 45 °C C) 50 °C D) 60 °C
61. The wet basis moisture content of a particular grain is 20%. The moisture content on dry basis of that grain will be
 A) 24% B) 27% C) 25% D) 30%
62. The colorant which is used in butter is
 A) Annato B) Erythrosine C) Congo red D) None of these
63. Cereals are deficient in
 A) Methionine B) Phenylalanine C) Valine D) Lysine
64. The destruction of all microorganisms in food by thermal processing is known as:
 A) Pasteurization B) Sterilization C) Blanching D) Scalding

65. A power law fluid having consistency index 12.5 Pa s^n and flow behaviour index of 0.45 is pumped through a pipe of inside diameter 2.4 cm at the flow rate of $0.00032 \text{ m}^3/\text{s}$. The fluid has a density of 1030 kg/m^3 . The value of Reynolds number should be
- A) 20.5 B) 15.25 C) 125.23 D) 25.18
66. *Aspergillus niger* is the principal mold used in the production of
- A) Lactic acid B) Citric acid C) Sorbic acid D) Benzoic acid
67. Hydrogen swell is related to
- A) Aseptic processing B) Freezing
C) Irradiation processing D) Canning
68. Which of the following acid present in spores may be responsible for their increased resistance to heat?
- A) Phosphoric acid B) Capric acid
C) Citric acid D) Dipicolinic acid
69. A microbial kill of 99.9999% is equivalent of
- A) 4 log cycle reduction B) 6 log cycle reduction
C) 3 log cycle reduction D) 2 log cycle reduction
70. Butyric acid bacteria are
- A) Anaerobic spore-forming micro-organisms
B) Aerobic spore-forming micro-organisms
C) Facultative spore-forming micro-organisms
D) None of these
71. The amount of cream testing 35% fat that must be added to 500 kg of milk testing 4 % fat to obtain cream testing 10% fat should be
- A) 20 kg B) 100 kg C) 120 kg D) 220 kg
72. Calcium stearate is used as an
- A) Anticaking agent B) Antifungal agent
C) Antifoaming agent D) Antibacterial agent
73. Lecithin is used as
- A) Stabilizer B) Emulsifier
C) Leavening agent D) None of the above
74. Saponification number is defined as the number of mg of potassium hydroxide needed to saponify
- A) 0.5 g of fat or oil B) 0.25 g of fat or oil
C) 1 g of fat or oil D) 2 g of fat or oil
75. Air contains 79 parts nitrogen and 21 parts oxygen by volume. The molecular weight of nitrogen is 28 and molecular weight of oxygen is 32. The weight fraction of nitrogen and oxygen in the mixture will be
- A) 0.77, 0.23 B) 0.23, 0.77 C) 0.67, 0.33 D) 0.57, 0.43

M.E.(Chemical with specialization in Environmental Engg.)

1. The trapezoidal rule of integration when applied to $\int_a^b f(x)$ will give the exact value of the integral
 - A) If $f(x)$ is a linear function of x
 - B) If $f(x)$ is a quadratic function of x
 - C) For any $f(x)$
 - D) For no $f(x)$
2. The value of “a” for which the following set of equations
$$\begin{aligned}y+2z&=0 \\ 2x+y+z&=0 \\ ax+2y&=0\end{aligned}$$
have non-trivial solution, is
 - A) 0
 - B) 8
 - C) -2
 - D) 3
3. The modulus of the complex number $\frac{1+i}{\sqrt{2}}$ is
 - A) $\frac{1}{2}$
 - B) $\frac{1}{\sqrt{2}}$
 - C) 1
 - D) $\sqrt{2}$
4. The Euler’s equation of motion
 - A) Can be derived from the Navier-Stokes equation
 - B) Is a statement of energy balance
 - C) Is a preliminary step to derive the Bernoulli’s equation
 - D) Cannot be applied to fluid at rest
5. Prandtl number is the ratio of
 - A) Mass diffusivity to thermal diffusivity
 - B) Momentum diffusivity to thermal diffusivity
 - C) Thermal diffusivity to mass diffusivity
 - D) Thermal diffusivity to momentum diffusivity
6. The operation of rotameter is based on
 - A) Variable flow area
 - B) Rotation of a turbine
 - C) Pressure drop across a nozzle
 - D) Pressure at a stagnation point
7. The Weber number can be used to estimate
 - A) Ratio of inertial forces and surface tension forces
 - B) Ratio of inertial forces and compressibility forces
 - C) Ratio of inertial forces and centrifugal forces
 - D) Ratio of pressure forces and surface tension forces

8. A particle attains its terminal settling velocity when
- Gravity force + drag force = buoyancy force
 - Gravity force = buoyancy force
 - Buoyancy force + drag force = gravity force
 - Drag force = buoyancy force
9. Toothpaste is a
- Bingham plastic
 - Pseudoplastic
 - Newtonian liquid
 - Dilatent
10. Bond's law for crushing and grinding states that the work required to form particles of size D_p from very large feed is proportional to
- D_p
 - D_p^2
 - $\frac{1}{\sqrt{D_p}}$
 - $\sqrt{D_p}$
11. The gross energy requirement in kWh per tonne of feed needed to reduce a very large size to such a size that 80 percent of the product passes a 100- μm screen is known as
- The work index for crushing
 - Crushing efficiency
 - Rittinger's law
 - Kick's law
12. The power required to crush 1000 tonnes/ h of limestone (work index for limestone =12.74) if 80 percent of the feed passes a 50.8 mm screen and 80 percent of the product passes a 3.175 mm screen, is
- 169.6 kW
 - 1696 kW
 - 1189 kW
 - 11169 kW
13. What is the critical rotational speed (revolutions/sec) for a ball mill of 1.2m diameter charged with 70mm diameter balls?
- 0.5
 - 1.0
 - 2.76
 - 0.66
14. The energy required per unit mass to grind limestone particles of very large size to 100 microns is 12.7 kWh/tonne. An estimate (using Bond's law) of the energy to grind the particles from a very large size to 50 microns is
- 6.35 kWh/tonne
 - 9.0 kWh/tonne
 - 18 kWh/tonne
 - 25.4 kWh/tonne
15. A sand mixture was screened through a standard 10-mesh screen. The mass fraction of the oversize material in feed, overflow and underflow were found to be 0.38, 0.79 and 0.22, respectively. The screen effectiveness based on the undersize is
- 0.53
 - 0.58
 - 0.22
 - 0.90
16. A horizontal piston/ cylinder arrangement is placed in a constant temperature bath. The piston slides in the cylinder with negligible friction, and an external force holds it in place against an initial gas pressure of 10 bar. The initial gas volume is 0.04 m^3 . The external force on the piston is reduced gradually, and the gas expands isothermally as its volume doubles. What is the work done by the gas in moving the external force if the product of the pressure and volume of gas is always constant?

- A) 40000 ln 2 J B) 0.4ln 2J C) 40000 J D) 0.4 J

17. The specific volume of liquid water and water vapour at 100 °C and 101.325 kPa are 0.001 and 1.673 m³/kg, respectively. Heat in the amount of 22569 kJ is added to 10 kg of water to vaporise it complete at the constant temperature of 100 °C and the constant pressure of 101.325 kPa. The change in enthalpy for this process is

- A) 20875 kJ B) 24263 kJ C) 22399.6 kJ D) 22569 kJ

18. A tank containing 20 kg of water at 20 °C is fitted with a stirrer that delivers work to the water at the rate of 0.25 kW. For water, C_p= 4.18 kJ/kg°C. If no heat is lost from the water, the time required to increase the temperature of water to 30 °C is equal to

- A) 209 S B) 10032 S C) 1356 S D) 3344 S

19. For any adiabatic process

- A) ΔU= 0 B) W=0
C) Q = 0 D) ΔU, Q and W are all zero

20. For 1 mole of an ideal gas expanding isothermally to twice its volume, the work obtained is equal to

- A) RT ln2 B) RT ln(1/2) C) RT D) 2RT

21. A Carnot cycle consists of the following steps

- A) Two isothermals and two isentropics
B) Two isobarics and two isothermals
C) Two isochorics and two isobarics
D) Two isothermals and two isochorics

22. What is the order of a chemical reaction whose rate is determined by the variation of one concentration term only?

- A) Zero B) First C) Second D) Third

23. The rate constant of a first order reaction depend on the

- A) Concentration of the reactant B) Temperature
C) Concentration of the product D) Time

24. The “E” curve for a non-ideal reactor defines the fraction of fluid having age between t and t+dt

- A) At the inlet
B) At the outlet
C) In the reactor
D) Averaged over the inlet and outlet

25. For a mixed flow reactor operating at steady state, the rate of reaction is given by

- A) $\frac{F_{A0}}{V} - \frac{dC_A}{dt}$ B) $\frac{F_{A0}}{V} + \frac{dC_A}{dt}$

C) $\frac{F_{A0}}{V} \cdot X_A$

D) $\frac{-dC_A}{dt}$

26. For a first order chemical reaction in a porous catalyst, the Thiele modulus is 10. The effectiveness factor is approximately equal to

A) 1

B) 0.5

C) 0.1

D) 0

27. Pure A in gas phase enters a reactor. 50% of this A is converted to B through the reaction, A → 3B. Mole fraction of A in the exit stream is

A) 1/2

B) 1/3

C) 1/4

D) 1/5

28. Nylon 66 is so named because

A) The average degree of polymerisation of the polymer is 1966

B) A number of carbon atoms between two nitrogen atoms are 6

C) The number of nitrogen atoms between two carbon atoms are 6

D) The polymer was first synthesized in 1966

29. Prilling tower is found in the flow sheet for the manufacture of

A) Ammonium

B) Urea

C) Superphosphate

D) Triplesuperphosphate

30. Which of the following is a detergent?

A) Benzene hexachloride

B) Cellulose nitrate

C) Polyvinyl chloride

D) Alkyl benzene sulphonate

31. In the sulphite process for paper manufacture, the cooking liquor is

A) Magnesium bisulphite and magnesiumdicarbonate

B) Magnesium sulphite and magnesiumdicarbonate

C) Sodium sulphite and magnesium sulphite

D) Sodium sulphite, sodium bisulphite and sulphur dioxide

32. Match the unit process in Group I with industry in Group II

Group I

P. Steam cracking

Q. Hydrocracking

R. Condensation

Group II

1. Petroleum refining

2. Petrochemicals

3. Polymers

4. Soaps and detergents

A) P-1, Q-2, R-3

B) P-2, Q-3, R-1

C) P-1, Q-2, R-4

D) P-2, Q-1, R-3

33. Which of the following is not likely to be a constituent of vegetable oils?

A) Citric acid

B) Oleic acid

C) Stearic acid

D) Glycerol

34. Production of alcohol by fermentation of molasses is an

A) Anaerobic process

B) Aerobic process

C) Endothermic process

D) None of these

35. Ultimate analysis of coal determines
- A) Carbon, hydrogen, nitrogen, sulphur
 - B) Carbon, ash, sulphur, nitrogen
 - C) Carbon, sulphur, volatile matter, ash
 - D) Carbon, volatile matter, ash, moisture
36. Absorption of SO_3 in 97% H_2SO_4 is
- A) Exothermic
 - B) Endothermic
 - C) Not possible
 - D) None of these
37. Gypsum is
- A) Calcium chloride
 - B) Potassium sulphate
 - C) Sodium Sulphate
 - D) Calcium sulphate
38. Blue colour is imparted to glass by addition of
- A) FeSO_4
 - B) PbO
 - C) CaO
 - D) NaOH
39. A co-product during the manufacture of caustic soda by electrolysis of brine is
- A) Na_2CO_3
 - B) NaHCO_3
 - C) H_2
 - D) N_2
40. Dropwise condensation usually occurs on
- A) Glazed surface
 - B) Smooth surface
 - C) Oil surface
 - D) Coated surface
41. In shell and tube heat exchanger, the corrosive liquid is generally passed from
- A) Tube side
 - B) Shell side
 - C) Both (A) and (B)
 - D) None of these
42. For a given heat flow and for the same thickness, the temperature drop across the material will be maximum for
- A) Copper
 - B) Steel
 - C) Glass wool
 - D) Refractory brick
43. A steel ball of mass 1 kg and specific heat $0.4 \text{ kJ/kg } ^\circ\text{C}$ is at a temperature of $60 ^\circ\text{C}$. It is dropped into 1kg water at $20 ^\circ\text{C}$. The final steady state temperature of water is
- A) $23.5 ^\circ\text{C}$
 - B) $31 ^\circ\text{C}$
 - C) $35 ^\circ\text{C}$
 - D) $40 ^\circ\text{C}$
44. A steel steamed pipe 10 cm inner diameter and 11 cm outer diameter is covered with an insulation having a thermal conductivity of 1 W/m K . If convective heat transfer coefficient between surface of insulation and the surrounding air is $8 \text{ W/m}^2 \text{ K}$, the critical radius of insulation will be
- A) 10 cm
 - B) 11 cm
 - C) 12.5 cm
 - D) 15 cm
45. Air enters a counter flow heat exchanger at $70 ^\circ\text{C}$ and leaves at $40 ^\circ\text{C}$. Water enters at $30 ^\circ\text{C}$ and leaves at $50 ^\circ\text{C}$. The LMTD in degree centigrade will be

- A) 5.65 B) 14.43 C) 19.52 D) 20.17

46. Species A is diffusing at steady state from the surface of a sphere (radius =1 cm) into a stagnant fluid. If the diffusive flux at a distance, $r= 3$ cm from the center of the sphere is $27 \text{ mol/cm}^2 \text{ s}$, the diffusive flux in $\text{mol/cm}^2 \text{ s}$ at distance $r= 9$ cm is

- A) 1 B) 3 C) 9 D) 27

47. The product of Schmidt number and Prandtl number is equal to

- A) Sherwood number B) Stanton number
C) Lewis number D) Reynolds number

48. Slope of the operating line for the rectifying section of distillation column is

- A) ∞ B) 0 C) >1 D) <1

49. According to the penetration theory, mass transfer coefficient is directly proportional to

- A) D_{AB} B) D_{AB}^2 C) $D_{AB}^{1.5}$ D) $D_{AB}^{0.5}$

50. The psychrometric ratio is defined as

- A) $\frac{h_G}{K_y}$ B) $\frac{K_y}{h_G}$ C) $\frac{h_G}{C_S K_y}$ D) $\frac{N_{Sc}}{N_{Pr}}$

51. Cox chart is useful in the design of

- A) Distillation column B) Evaporator
C) Dryer D) Crystallizer

52. The inverse Laplace transform of $\frac{1}{2s^2+3s+1}$ is

- A) $e^{-t/2} - e^{-t}$ B) $2e^{-t/2} - e^{-t}$ C) $e^{-t} - 2e^{-t/2}$ D) $e^{-t} - e^{-t/2}$

53. The characteristic equation of a closed system using the proportional controller with gain K_c is

$$12s^3 + 19s^2 + 8s + 1 + K_c = 0$$

at the onset of instability, the value of K_c is

- A) $35/3$ B) 10 C) $25/3$ D) $20/3$

54. Match the following

Group I

- P. Temperature
Q. Pressure
R. Flow

Group II

1. Hot wire anemometry
2. Strain gauge
3. Chromatographic analyser
4. Pyrometer

- A) P-1, Q-2, R-3
C) P-1, Q-2, R-4

- B) P-4, Q-1, R-3
D) P-4, Q-2, R-1

55. Match the following:-

Group I

- P. Ziegler Nichols
- Q. Under damped response
- R. Feed forward control

Group II

- 1. Process reaction curve
- 2. Decay ratio
- 3. Frequency response
- 4. Disturbance measurement

- A) P-3, Q-2, R-4
- C) P-3, Q-4, R-2

- B) P-1, Q-2, R-3
- D) P-1, Q-4, R-2

56. A feedback control system is stable if all the roots of its characteristic equation have

- A) Negative real parts
- C) Zero real parts
- B) Positive real parts
- D) Zero or positive real parts

57. On – Off control is a particular case of

- A) Proportional-integral-derivative control
- B) Proportional-derivative control
- C) Proportional - integral control
- D) Proportional control

58. Brackets supports are the most suitable for supporting _____ vessels

- A) Thick walled vertical
- C) Thin spherical
- B) Horizontal
- D) None of these

59. The function of manholes provided in the shell of a distillation column is to

- A) Keep a check on the liquid gradient over the plate by direct visual observation
- B) Give access to the individual tray for cleaning, maintenance and installation
- C) Guard against foaming and entrainment by dumping antifoaming agent through it
- D) All (A), (B) and (C)

60. The normal range of velocity of water in pipes is

- A) 0.1-0.5 m/s
- B) 1 – 2 m/s
- C) 10-50 m/s
- D) 15-30 m/s

61. Spherical shaped pressure vessel is considered to be the most ideal because it can

- A) Withstand higher pressure for a given metallic shell thickness
- B) Be fabricated very easily
- C) Be designed without wind load consideration
- D) Be supported very easily

62. A pump has an installed cost of Rs. 40,000/- and a 10 year estimated life. The salvage value of the pump is zero at the end of 10 years. The pump value (in rupees), after depreciation by double declining balance method, at the end of 6 years is

- A) 4,295
- B) 10,486
- C) 21,257
- D) 37,600

63. A sale contract signed by a chemical manufacturer is expected to generate a net cash flow of Rs. 2,50,000/- per year at the end of each year for a period of three years. The

applicable discount rate (interest rate) is 10%. The net present worth of the total cash flow is Rs.

- A) 7,50,000/- B) 6,83,750/- C) 6,21,500/- D) 3,32,750/-

64. The volume occupied by 1 kmol of an ideal gas at 273.15 K and 101.325 kPa is

- A) 22.414 m³ B) 359 m³ C) 22414 m³ D) 35.9 m³

65. Air contains 79 mol% N₂ and 21 mol% O₂. Its average molecular weight is equal to

- A) 28 B) 32 C) 28.84 D) 30

66. 80 kg of Na₂SO₄ is present in 330 kg of an aqueous solution. The solution is cooled such that 80 kg of Na₂SO₄.10H₂O crystal separate out. The weight fraction of Na₂SO₄ in the remaining solution is

- A) 0 B) 0.18 C) 0.24 D) 1

67. The products of combustion of methane in atmospheric air (21% O₂ and 79% N₂) have the following composition on a dry basis

| Products | Mole % |
|-----------------|--------|
| CO ₂ | 10.00 |
| O ₂ | 2.37 |
| CO | 0.53 |
| N ₂ | 87.10 |

The ratio of the moles of CH₄ to the moles of O₂ in the feed stream is

- A) 1.05 B) 0.60 C) 0.51 D) 0.45

68. The molar composition of a gas is 15% H₂, 15% O₂, 45 % CO₂ and balance H₂O. If 50% H₂O condenses the final mole percent of H₂ in the gas on a dry basis will be

- A) 15 B) 20 C) 17.10 D) 10

69. Biodiesel is manufactured by

- A) Transesterification of triglycerides with methanol
B) Esterification of ethanol with acetic acid
C) Distillation of crude petroleum
D) Hydrocracking of reduced crude oil

70. Presence of soluble organics in polluted water causes

- A) Undesirable plants growth B) Depletion of oxygen
C) Fire hazards D) Explosion hazards

71. The lowest layer of atmosphere is known as

- A) Stratosphere
- C) Ionosphere

- B) Troposphere
- D) None of these

72. Turbidity of water is an indication of the presence of

- A) Suspended inorganic matter
- C) Floating solids

- B) Dissolved solids
- D) Dissolved gases

73. Hydraulic radius is the ratio of

- A) Wetted perimeter to flow area
- B) Flow area to wetted perimeter
- C) Flow area to square of wetted perimeter
- D) Square root of flow area to wetted perimeter

74. Check valves are used

- A) At high pressure
- C) For controlling water flow

- B) In bends
- D) For unidirectional flow

75. Priming is needed in a

- A) Reciprocating pump
- C) Centrifugal pump

- B) Gear pump
- D) Diaphragm pump

M.E. Electrical Engg. (Instrumentation & Control)

1. Three equal resistances of 5 ohms are connected in delta. What is the resistance in one of the arms in an equivalent star circuit?
A) 5.0 ohm B) 1.33 ohm C) 15 ohm D) 10 ohm
2. When the superposition theorem is applied to any circuit, the dependent voltage source in that circuit is always
A) Opened B) Shorted C) Active D) None of these
3. A single phase transformer has a maximum efficiency of 90% at full load and unity power factor. Efficiency at half load at the same power factor is
A) 86.7% B) 88.26% C) 88.9% D) 87.8%
4. When an UJT is used for triggering an SCR, the wave shape of the voltage obtained from UJT circuit is a
A) Sine wave B) Saw-tooth wave
C) Trapezoidal wave D) Square wave
5. If the velocity of a wind is doubled, then the power output will be increased by
A) 10 times B) 8 times C) 2 times D) 6 times
6. The cyclo-converters (CCs) require natural or forced commutation as under:
A) Natural commutation in both step-up and step-down CCs
B) Forced commutation in both step-up and step-down CCs
C) Forced commutation in step up CCs
D) Forced commutation in step-down CCs.
7. A 440 V shunt motor has an armature resistance of 0.5 ohms and shunt field resistance of 650 ohms. If the no load current is 3A, then current in the armature will be
A) 2.32 A B) 3 A C) 0.68 A D) 880 A
8. In single-pulse modulation of PWM inverters, the pulse width is 120° . For an input voltage of 220 V dc, the r.m.s. value of output voltage is
A) 179.63 V B) 254.04V C) 127.02 V D) 185.04 V
9. A single-phase full-bridge VSI operating in square-wave mode supplies a purely inductive load. If the inverter time period is T, then the time duration for which each of the feedback diodes conduct in a cycle is
A) T B) T/2 C) T/4 D) T/8
10. The rotor resistance and stand still reactance of 3-phase induction motor are respectively 0.015 and 0.09 ohms per phase. At a slip of 4%, the operating power factor of motor is
A) 0.164 B) 0.24 C) 0.974 D) 0.74

11. The power delivered to a star-connected load of R ohm per phase, from a 3-phase bridge inverter fed from fixed dc source, is 10 kW for 180° mode. For 120° mode, the power delivered to load would be
- A) 10 kW B) 5 kW C) 6.667 kW D) 7.5 kW
12. Control of frequency and control of voltage in 3-phase inverters operating in 120° mode or 180° mode of conduction is
- A) Possible only through inverter control circuit
 B) Possible through the control circuit of inverter and converter simultaneously
 C) Possible through inverter control for frequency and through converter control for voltage
 D) Possible through converter control only
13. In a series resonant inverter
- A) The load current has square waveform
 B) Trigger frequency is higher than damped resonant frequency
 C) Change of frequency does not alter transferred power
 D) Output voltage depends upon damping factor of the load
14. In McMurray commutation circuit, the circuit turn-off time is
- A) Dependent on load current and independent of operating frequency
 B) Dependent on load current and also on load power factor
 C) Independent of load current and dependent on operating frequency
 D) Independent of load current and dependent on recovery period
15. Bulk power transmission over long HVDC lines are preferred on account of
- A) Low cost of HVDC terminals B) No harmonic problems
 C) Less line power losses D) Simple protection
16. A separately-excited dc motor, when fed from 1 phase full converter with firing angle 60° runs at 1000 rpm. If this motor is connected to 1-phase semi-converter with the same firing angle of 60° , the motor would now run at
- A) 2000 rpm B) 1500 rpm C) 1450 rpm D) 1000 rpm
17. A separately-excited dc motor, when fed from 1-phase full converter, runs at a speed of 1200 rpm. Load current remains continuous. If one of the four SCRs gets open circuited, the motor speed will reduce to
- A) 900 rpm B) 800 rpm C) 600 rpm D) 400 rpm
18. The matrix
- $$P = \begin{bmatrix} 10 & 1 & -2 \\ 1 & 4 & -1 \\ -2 & -1 & 1 \end{bmatrix} \text{ is}$$
- A) Positive definite B) Negative definite
 C) Positive semi definite D) Negative semi definite

19. Analysis of voltage waveform of single phase bridge converter shows that it contains $x\%$ of 6th harmonic. The 6th harmonic content of the voltage waveform of a 3-phase bridge converter would be
- Less than $x\%$ due to an increase in the number of pulses
 - Equal to $x\%$ the same as that of a single phase converter
 - Greater than $x\%$ due to change in the input and output voltages of the converter
 - Difficult to predict as the analysis of converter is governed by any generalized theory.
20. A single phase full-wave mid-point thyristor converter uses 230/200 V transformer with center tap on the secondary side. The peak inverse voltage per thyristor is
- 100V
 - 141.4 V
 - 200 V
 - 282.8 V
21. A 220V, 1400 rpm, 40A. separately excited dc motor has an armature resistance of 0.4Ω . The motor is fed from a signal 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 1000 rpm will be:
- $43^\circ, 137^\circ$
 - $43^\circ, 47^\circ$
 - $39^\circ, 141^\circ$
 - $39^\circ, 51^\circ$
22. When biasing JFET, if drain and source are interchanged, then
- Device will work normally
 - Device will get damaged
 - Device will work but value of I_D will get affected
 - Device will not operate at all
23. The control of ALFC loop of a multi-area system is achieved by using _____ mathematical approach.
- Root locus
 - Bode plot
 - State variable
 - Nyquist plots
24. In the dynamic programming method, the cost function $F_N(X)$ represents minimum cost in Rs/hour of generation of
- N MW by X units
 - X MW by N units
 - N MW by Xth units
 - X MW by Nth units
25. In the priority list method of solving an optimal problem:
- Most efficient unit is loaded first to be followed by less efficient unit in order as load increases
 - Less efficient unit is loaded first to be followed by most efficient unit in order as load increases
 - Most efficient unit is loaded first followed by less efficient unit in order as load increases
 - Either A or B
26. To find the optimal trajectory for the first order system, $\dot{x} = -x + 2u$, with the given boundary conditions and performance index as

$J = \int_0^1 (x^2 + 4u^2) dt$, the Euler equation is given by

A) $\ddot{x} + 2(\dot{x} + x) = 0$
 C) $\ddot{x} - 2x = 0$

B) $\ddot{x} + 2x = 0$
 D) $\ddot{x} - 2(\dot{x} + x) = 0$

27. The conditions at the sliding surface are given by

A) $\sigma = 0, \dot{\sigma} = 0$ B) $\sigma\dot{\sigma} = 0$ C) $\sigma\dot{\sigma} < 0$ D) $\sigma\dot{\sigma} > 0$

28. A dead beat control system has closed loop poles

A) On negative real axis B) On imaginary axis
 C) Origin D) At infinity

29. Consider the system

$$\dot{x} = 2x + u$$

with performance index

$$J = \int_0^{\infty} (x^2 + ru^2) dt$$

The value of r such that the optimal closed loop system has pole at -3 is

A) $\frac{1}{\sqrt{5}}$ B) $\frac{1}{5}$ C) $\frac{1}{\sqrt{3}}$ D) $\frac{1}{3}$

30. The invariant approximation, for sampling interval = 0.1 sec, to the following continuous time transmittance

$$G(s) = \frac{2}{(s+4)}$$

A) $\frac{0.165}{(z-0.67)}$ B) $\frac{0.65}{(z-0.67)}$ C) $\frac{0.165}{(z-0.617)}$ D) $\frac{0.65}{(z-0.617)}$

31. The details of the system for $t \geq 0$ with given input and initial conditions are

$$\dot{x} = -2x + u(t)$$

$$y = 10x$$

$$x(0_-) = 3$$

$$u(t) = 4e^{5t}$$

The output is

A. $\frac{70}{7}e^{-2t} + \frac{40}{7}e^{5t}$
 B. $\frac{70}{7}e^{-2t} + \frac{40}{7}e^{-5t}$
 C. $\frac{70}{7}e^{-2t} + \frac{140}{7}e^{5t}$
 D. $\frac{170}{7}e^{-2t} + \frac{40}{7}e^{5t}$

32. In an microprocessor with PUSH operation the content of stackpointer is

A) Increased by 1 B) Decreased by 1
 C) Increased by 2 D) Decreased by 2

43. 'Cogging' in Induction Motor occurs when
- A) Number of stator teeth – number of rotor teeth = odd number
 - B) Number of stator teeth – number of rotor teeth = even number
 - C) Number of stator teeth – number of rotor teeth = zero
 - D) Number of stator teeth – number of rotor teeth = negative number
44. In which of the following, it is not desired to attain the condition of maximum power transfer
- A) Electronic circuits
 - B) Communicational circuits
 - C) Computer circuits
 - D) Electrical circuits
45. A 100 km long transmission line is loaded at 100 kV. If the loss of line is 5 MW and the load 150 MVA, the resistance of the line is
- A) 0.806 ohms/phase
 - B) 8.06 ohms/phase
 - C) 0.0806 ohms/phase
 - D) 80.6 ohms/phase
46. In a dual slope integrating type digital voltmeter. The first integration is carried out for 10 periods of the supply frequency of 50 Hz. If the reference voltage used is 2V, the total conversion time for an input of 1V is
- A) 0.01 s
 - B) 0.05 s
 - C) 0.1 s
 - D) 1 s
47. Determine the output voltage of an op-amp for input voltages of 200 μV and 160 μV . The differential gain of op-amp is 4000 and value of CMRR is 150
- A) 16 V
 - B) 164.8 mV
 - C) 64 mV
 - D) 76 mV
48. What is frequency of the output of the eight flip-flops when the input clock frequency is 512 kHz
- A) 16 kHz
 - B) 4 kHz
 - C) 2 kHz
 - D) 8 kHz
49. The yearly load duration curve of a power plant is a straight line. The maximum load is 750 MW and the minimum load is 600 MW. The rated plant capacity is 900 MW. The capacity factor and utilization factor are
- A) 0.56, 0.80
 - B) 0.75, 0.83
 - C) 0.78, 0.9
 - D) 0.83, 0.75

50. Match List 1 (Protective Schemes) with List 2 (Equipment) and select the correct answer using codes given the lists.

| List 1 | List 2 |
|-------------------------------------|-----------------------|
| P. Mho relays | 1. Generators |
| Q. Inverse time over current relays | 2. Transmission Lines |
| R. Differential Relays | 3. Motors |

Codes

| | P | Q | R |
|------|---|---|---|
| A) 2 | 1 | 3 | |
| B) 2 | 3 | 1 | |
| C) 3 | 2 | 1 | |
| D) 1 | 3 | 2 | |

51. The circuit is driven by an unit impulse source, then the response equal to

- A) Transfer function
- B) One
- C) Zero
- D) Inverse of transfer function

52. If the input of a circuit is represented by series of impulse function, the response consists of

- A) Sum of the series of uniformly delayed impulse responses
- B) Sum of the series of responses
- C) One
- D) Zero

53. For physically realizable circuit, impulse response is

- A) Zero for $t < 0$
- B) Zero for $t > 0$
- C) One for $t < 0$
- D) Infinite for $t > 0$

54. The instantaneous current in an inductor when an impulse voltage V_0 applied to the terminals of an inductor

- A) Zero
- B) Unity
- C) $\frac{V_0}{L}$
- D) $\frac{V_0 \delta(t)}{L}$

55. The function is said to be having simple poles and zeros and only if

- A) The poles are not repeated
- B) The zeros are not repeated
- C) Both poles and zeros are not repeated
- D) None of the above

56. The necessary condition for a driving point function is

- A) 0° B) 30° C) 90° D) 180°

65. In the m-derived low pass filters, the resonant frequency is to be chosen so that it is

- A) Above the cut-off frequency
B) Below the cut-off frequency
C) Equal to cut off frequency
D) None of the above

66. In the m-derived high pass filters, the resonant frequency is to be chosen so that it is

- A) Above the cut-off frequency
B) Below the cut-off frequency
C) Equal to cut off frequency
D) None of the above

67. The Laplace transform of a unit step function is

- A) $1/s$ B) 1 C) $1/s^2$ D) $1/(s+a)$

68. A band elimination filter is one

- A) Which attenuates all frequencies less than lower cut-off frequency f_1 .
B) Which attenuates all frequencies greater than upper cut-off frequency f_2 .
C) Frequencies lying between f_1 and f_2 are attenuated and all other frequencies are passed.
D) Frequencies lying between f_1 and f_2 are passed and all other frequencies are attenuated.

69. Norton's equivalent circuit consists of

- A) Voltage source in parallel with resistance.
B) Voltage source in series with resistance
C) Current source in series with resistance
D) Current source in parallel with resistance.

70. The reciprocity theorem is applicable to

- A) Linear networks only B) Bilateral networks only
C) Linear/bilateral networks D) Neither of the two

71. In a constant torque-angle control of a permanent magnet synchronous motor (PMSM), the torque angle is maintained at:

- A) Zero-degree B) 90-degree C) 180-degree D) 45-degree

72. In a single phase full converter if output voltage has peak and average value of 325 V, 133 V respectively, then the firing angle in degrees

- A) 40 B) 140 C) 50 D) 130

73. Modern ac to dc converters employ GTOs instead of SCRs in order to have

- A) Low reactive volt amp flow
- B) Reliable commutation
- C) Low switching losses
- D) Smaller heat sink

74. Each diode of a 3 phase half wave diode rectifier conducts for

- A) 60°
- B) 120°
- C) 180°
- D) 90°

75. In a 3 phase full wave diode rectifier, the Peak Inverse Voltage in terms of average output voltage is

- A) 1.57
- B) 0.955
- C) 1.047
- D) 2.094

x-x-x

M.E.(Electronics& Communication Engg.)

1. A storage capacitor is used in a
 - A. SRAM
 - B. DRAM
 - C. MOSFET
 - D. MESFET

2. In semiconductor electronics, the term light, heavy and split off are associated with
 - A. Photons
 - B. Holes
 - C. Atoms
 - D. Ions

3. Which one of the following is not a dielectric?
 - A. Silicon oxy nitride
 - B. Silicon Nitride
 - C. Silicon Oxide
 - D. Silicon Germanium

4. D,F,S are the
 - A. Discreet Fourier transforms
 - B. Classes of amplifiers
 - C. Classes of resistors
 - D. Types of semiconductors

5. Gold is doped in a semiconductor diode
 - A. For fast recombination of majority carriers
 - B. To make them slow
 - C. To control minority carrier lifetime
 - D. Gold is not doped

6. The body effect
 - A. Increases the threshold voltage
 - B. Decreases the threshold voltage
 - C. No effect on the threshold voltage
 - D. Increases the substrate doping

7. Which one of the following is not a non volatile memory?
 - A. Phase change RAM
 - B. Dynamic RAM
 - C. Ferroelectric RAM
 - D. Flash memory

8. At 0K, Silicon behaves as
- A. Semiconductor
 - B. Metal
 - C. Insulator
 - D. Gas
9. GST is a
- A. Material for memories
 - B. A standard for packaging
 - C. Communication protocol
 - D. Type of transistor
10. Which one of the following is true for an HBT?
- A. It is a class of field effect transistors
 - B. Used at low frequencies
 - C. Uses germanium in the base
 - D. It is a class of resistors
11. A program counter in 8085 microprocessor is a
- A. 16 bit register
 - B. 8 bit register
 - C. 32 bit register
 - D. 64 bit register
12. The difference of the contact potential in a silicon diode and a germanium diode is approximately (mV)
- A) 700
 - B) 400
 - C) 100
 - D) 1000
13. In a MOSFET, moderate and weak are types of
- A. Amplifiers
 - B. Inversion mode
 - C. Depletion mode
 - D. Accumulation mode
14. Low k dielectrics are used in
- A. Interconnect technology
 - B. Gate oxide
 - C. Field oxide
 - D. Substrate
15. MNOS and NMOS are
- A. Class of dielectrics

- B. BJT type
- C. Same
- D. Memory and a transistor

16. Which of the following are the advantages of a closed loop control system?

- A. Reduces the overall gain
- B. Complex and costly
- C. Oscillatory response
- D. Less affected with noise

17. Which of these logic gates act as universal gates?

- A. NOR, XNOR
- B. OR, NOT
- C. NOR, NAND
- D. XOR, NOR

18. Which logic family consumes least power?

- A. TTL
- B. CMOS
- C. RTL
- D. DTL

19. A digital circuit that can store a bit is a

- A. NOR gate
- B. Flip-flop
- C. NAND gate
- D. XOR gate

20. Crystal oscillator

- A. Uses piezoelectric effect
- B. Used in AM transmitters
- C. Produces stable frequency
- D. All of the above

21. The oscillator used for LF applications

- A. LC
- B. RLC
- C. RC
- D. MFC

22. Transit time effect is present in

- A. Gunn diode
- B. Tunnel diode
- C. Junction diode
- D. MOSFET

23. A single PMOS can be used as

- A. CMOS inverter
- B. NAND gate
- C. Transmission gate
- D. Pass transistor

24. MOSFET model is

- A. Eber Moll
- B. Gummel poon
- C. BSIM
- D. MIS

25. Schottky diodes have

- A. Planar technology
- B. Au-Si contact
- C. 0.3V as contact potential
- D. All of the above

26. An Op-Amp comparator uses

- A. Positive feedback.
- B. Negative feedback
- C. Both negative and positive feedback
- D. No need of feedback

27. DCTL stands for

- A. Direct coupled transistor logic
- B. Diode coupled transistor logic
- C. Diode circuit type logic
- D. Direct coiled transistor logic

28. GaAs is generally used in

- A. MESFET
- B. Gunn diode
- C. LED
- D. All

29. Electric field inside a hollow conducting sphere is

- A. Zero
- B. Non zero but constant
- C. Vary with the radius of sphere
- D. None

30. IGBT and GTO are

- A. Communication protocols
- B. Power devices
- C. MOSFETs
- D. CMOS inverter types

31 The amount of time between the creation and disappearance of a free electrons is called

- A. Lifetime
- B. Recombination
- C. Generation
- D. Transit time

32. SRAM is a
- A. Parallel combination of MOS transistors
 - B. Serial combination of MOS transistors
 - C. Crisscross combination of MOS transistors
 - D. Parallel and serial combination of MOS transistors

33. SiC is used for
- A. High temperature applications
 - B. Low temperature applications
 - C. As a dielectric
 - D. None

34. Class C amplifier
- A. Produces distortion
 - B. Conducts for less than half the cycle
 - C. Highly efficient
 - D. All

35. If holding current of a thyristor is 1mA then latching current is of the order of
- A. 1m A
 - B. 2mA
 - C. 0.5mA
 - D. 0.1mA

36. Quantization error occurs in

- A. AM signals
- B. Noise signals
- C. PCM signals
- D. FM signals

37. Reflex Klystron is a
- A. Tubular device
 - B. Low power microwave generator
 - C. Two cavity device
 - D. All

38. A BJT works because
- A. Base is kept thin
 - B. Base is kept thick
 - C. Base is highly doped
 - D. None

39. No of comparators present in an 8 bit flash type ADC?

- A. 256
- B. 128
- C. 255
- D. 127

40. An optocoupler consists of

- A. MOSFET and a Junction diode
- B. LED and a photodiode
- C. BJT and a MOSFET
- D. GTO and MOSFET

41. Language used for programming an FPGA

- A. HDVL
- B. Verilog
- C. LHVD
- D. Antilog

42. DIBL occurs in

- A. Long channel MOSFET
- B. Short channel MOSFET
- C. BJT
- D. None

43. GAA is a type of

- A. Diode
- B. MOSFET
- C. BJT
- D. Capacitor

44. Kirk effect occurs in

- A. Diode
- B. MOSFET
- C. BJT
- D. Capacitor

45. Gain-bandwidth product in a closed loop feedback system is

- A. Constant
- B. Variable with gain
- C. Variable with bandwidth
- D. None

46. Schering bridge and Hay's bridge are used to measure

- A. Frequency and inductance
- B. Capacitance and inductance
- C. Capacitance and resistance
- D. Resistance and mutual inductance

47. The number of software interrupts in a 8085 microprocessor is

- A. Five

- B. Eight
- C. Seven
- D. Six

48. Immediate and Direct are the

- A. Addressing modes
- B. Registers
- C. Memory storage types
- D. Interrupts

49. The difference in the number of pins (for interrupt) on a 8085 chip and the number of interrupts is

- A. Zero
- B. One
- C. Two
- D. Three

50. No. of pins in 8085 microprocessor is

- A. 38
- B. 40
- C. 42
- D. 36

51. In 8085, 16 bit register is

- A. Instruction register
- B. Stack pointer
- C. Accumulator
- D. None

52. Flags in a 8085 microprocessor are

- A. 4
- B. 5
- C. 3
- D. 6

53. In 8085, the ALE is a

- A. Control signal
- B. Data signal
- C. Address signal
- D. None

54. The DMA controller chip number is

- A. 8237
- B. 8085
- C. 8225
- D. 8155

55. The intrinsic impedance of free space is approximately

- A. 177 ohms
- B. 277 Ohms
- C. 377 ohms
- D. 477 ohm

56. Intrinsic region in a PIN diode makes it suitable for

- A. Photo detecting applications
- B. Rectifying applications
- C. Maximum absorption of Electrons
- D. Minimum absorption of Electrons

57. Super position theorem is not used to calculate

- A. Power
- B. Voltage
- C. Current
- D. Resistance

58. KCL works on the principle of conservation of

- A. Charge
- B. Power
- C. Energy
- D. Voltage

59. Total internal reflection occurs

- A. On a glass surface
- B. In a optical fiber cable
- C. In a Cu cable
- D. In an Al cable

60. Dynamic impedance of an ideal tank circuit is

- A. Zero
- B. Infinite
- C. Depends on L
- D. Depends on C

61. A resistor stores energy in the form of

- A. Electric field
- B. Magnetic field
- C. Electromagnetic fields
- D. None

62. Automatic control system is also called as

- A. Closed loop control system
- B. Open loop control system
- C. Both A and B
- D. None

63. Power density in an antenna is

- A. Reflected power per unit area
- B. Refracted power per unit area
- C. Radiated power per unit area
- D. None

64. MASER is used in

- A. Atomic clocks
- B. Radio telescopes
- C. Space applications
- D. All

65. Light emitting diode can be fabricated using

- A. III-V compounds
- B. Organic polymers
- C. Nanocrystals
- D. All of the above

66. Steradian is a measurement unit of

- A. Solid angle
- B. Planar angle
- C. Square angle
- D. Tri-angle

67. A capacitor in a steady state acts as

- A. Open circuit
- B. Short circuit
- C. Resistor
- D. Current source

68. ----- is greater than critical frequency by a factor of $\sec\theta$.

- A. LUF
- B. HUF
- C. MUF
- D. UHF

69. Antenna power gain is

- A. Less than directivity
- B. More than directivity
- C. Can be both A and B
- D. Neither A nor B

70. Matthiessen's rule is generally used for
- A. Carrier mobility
 - B. Carrier charge
 - C. Mass
 - D. None
71. Elliptical, Chebyshev, Bessel, Cauer represent
- A. AM transmitters
 - B. Analog filters
 - C. Rectifiers
 - D. Transistors
72. An RC coupled amplifier has an open loop gain of 100 and a lower cutoff frequency of 60 Hz. If negative feedback with ($\beta=0.2$) is used, the lower cut off frequency (Hz) will be about
- A. 60
 - B. 50
 - C. 2.8
 - D. 1.8
73. If a PMOS transistor replaces NMOS transistor in a circuit under same conditions,
- A. ON current will increase
 - B. ON current will decrease
 - C. No change in analysis
 - D. Just sign of the calculated values will change
74. 2 input CMOS AND gate requires
- A. 2 NMOS and 1 PMOS
 - B. 3 NMOS and 3 PMOS
 - C. 1 NMOS and 2 PMOS
 - D. 1 NMOS and 1 PMOS
75. 2 input CMOS OR gate requires
- A. 2 NMOS and 1 PMOS
 - B. 3 NMOS and 3 PMOS
 - C. 1 NMOS and 2 PMOS
 - D. 1 NMOS and 1 PMOS

M.E. Civil Engg. (Construction Technology & Management)

1. Of the total estimated cost, the contractor's profit usually accounts for
A) 10% B) 15% C) 20% D) 25%
2. If the whole circle bearing of a line is 270° , its reduced bearing will be
A) $N90^\circ W$ B) $S90^\circ W$ C) $W90^\circ N$ D) $W90^\circ S$
3. Plotting of inaccessible point on plane table is done by
A) Intersection B) Traversing C) Radiation D) Ranging
4. The equivalent length of a column fixed at both ends is
(Assume L as the clear span between fixed ends)
A) $0.5L$ B) $0.7L$ C) $2L$ D) $1.5L$
5. Modulus of rigidity is defined as the ratio of
A) Longitudinal stress to longitudinal strain B) Shear stress to shear strain
C) Stress to strain D) Stress to volumetric strain
6. If the width ' b ' and depth ' d ' of a simply supported beam with a concentrated load at centre are interchanged, the deflection at the centre of the beam will change in the ratio of
A) b/d B) d/b C) $(d/b)^2$ D) $(b/d)^2$
7. The deflection due to couple M at the free end of a cantilever of length L is
A) ML/EI B) $2ML/EI$ C) $ML^2/2EI$ D) $M^2L/2EI$
8. For a truss of number of members m , number of joint j and number of external reactions r , if $(m + r) > 2j$, the truss will be known as
A) Redundant B) Deficient C) Determinate D) Balanced
9. When force acts normal to the displacement, the work done (W) is
A) Infinity B) Zero C) Positive D) Negative
10. A floating body attains stable equilibrium, if the metacentre is
A) At the Centroid B) Above the Centroid C) Below the Centroid D) Anywhere
11. Sullage does not contain waste from
A) Bathroom B) Washbasin C) Kitchen Sinks D) Toilets
12. If D.O. concentration falls down to zero anywhere in a stream, it indicates
A) Zone of Degradation B) Zone of active decomposition
C) Zone of recovery D) Zone of clear water
13. A Standard BOD test is
A) BOD for 1 Day at $30^\circ C$ B) BOD for 2 Day at $20^\circ C$
C) BOD for 3 Day at $27^\circ C$ D) BOD for 5 Day at $25^\circ C$

14. The Detention time of a settling tank may be defined as the time required for
- A) A particle to travel along its length
 - B) A particle to travel from top surface to bottom sludge Zone
 - C) The flow of sewage to fill the tank.
 - D) The flow of sewage to empty the tank
15. Cohesionless soil is
- A) Sand
 - B) Silt
 - C) Clay
 - D) Clay & Silt
16. The coefficient of active earth pressure K_a is $1/3$, then the coefficient of passive earth Pressure K_p shall be
- A) $1/3$
 - B) $2/3$
 - C) 3
 - D) $3/2$
17. For the construction of RCC slabs, beams, columns and walls, the grade of concrete mix used is
- A) 1:3:6
 - B) 1:1.5:3
 - C) 1:2:4
 - D) 1:1:2
18. Expansion joints are provided, if length of concrete structure exceeds
- A) 50m
 - B) 45m
 - C) 35m
 - D) 40m
19. The shuttering of a hall measuring $4\text{m} \times 5\text{m}$ can be removed after
- A) 5 days
 - B) 7 days
 - C) 14 days
 - D) 21 days.
20. Gypsum is added to the cement for
- A) Colour
 - B) Strength
 - C) Controlling setting time
 - D) Increasing durability
21. If the diameter of a reinforcing bar is 'd', the anchorage value of hook shall be
- A) $4d$
 - B) $8d$
 - C) $12d$
 - D) $16d$
22. The diameter of longitudinal bars of a column should never be less than
- A) 6 mm
 - B) 8 mm
 - C) 10mm
 - D) 12 mm
23. The Shear reinforcement in RCC beam is provided to resist
- A) Vertical Stress
 - B) Horizontal Shear
 - C) Diagonal Compression
 - D) Diagonal Tension
24. Poisson's Ratio for steel within elastic limit ranges from
- A) 0.15-0.20
 - B) 0.25-0.33
 - C) 0.33-0.35
 - D) 0.45-0.50
25. For simply supported beam, maximum permissible deflection is
- A) $1/325$ of the span
 - B) $1/425$ of the span
 - C) $1/150$ of the span
 - D) $1/36$ of the span
26. The difference in level between the top of a bank and FSL of water in canal is called

- A) Berm B) Free Board C) Height of Bank D) Depth
27. In a canal siphon, flow is
 A) Under Atmospheric Pressure B) Pipe Flow
 C) With Critical Velocity D) Under Negative Pressure
28. In a sharda type fall, the rectangular crest may be used for discharge up to
 A) 6 cumec B) 10 cumec C) 14 cumec D) 20 cumec
29. In Concrete Roads, Camber provided is
 A) 1 in 20 to 1 in 24 B) 1 in 36 to 1 in 48
 C) 1 in 60 to 1 in 72 D) 1 in 48 to 1 in 60
30. The minimum width of pavement of a National Highway should be
 A) 4.7 m B) 5.7 m C) 6.7 m D) 8.0m
31. Bar charts are suitable for
 A) Minor works B) Major works
 C) Very Large projects D) Scheduled projects
32. For completion of a project, the critical path network represents
 A) Minimum time B) Maximum time
 C) Minimum cost D) Maximum cost.
33. Cost-benefit analysis of a project is essential
 A) To monitor the expenditure
 B) To evaluate the viability and usefulness
 C) To estimate the escalation in cost
 D) To assess the total cost
34. The main principle of surveying is
 A) Part to Whole B) Whole to Part
 C) Traversing D) Triangulation
35. FTN in water quality is used to indicate
 A) Colour B) Odour C) Taste D) Turbidity
36. Fore and Back Bearing of a line should differ by
 A) 360° B) 180° C) 90° D) None of these
37. The horizontal angle between True North and Magnetic North at any place is known as

- A) Dip B) Declination C) Bearing D) Local

attraction

38. Curing of Cement concrete work is done for
A) Water absorption B) Hydration
C) Keeping it wet D) Workability
39. Dry Rot in Timber is caused due to
A) Excessive Drying B) Fungus
C) Termite D) Rupture of Tissues
40. Abrasion test on aggregates is conducted to find the
A) Hardness B) Impact value C) Toughness D)

Permeability

41. The position occupied by the centre line of a road is called
A) Superelevation B) Road Alignment C) Camber D) Shoulder
42. Dump Truck is also called
A) Tipper B) Dumper C) Crane D) Dozer
43. Hook's Law holds good up to
A) Yield point B) Elastic Limit C) Plastic Limit D) Breaking
Point
44. The Unit of Modulus of elasticity is same as those of
A) Stress, Strain and Pressure
B) Stress, Force and Modulus of Rigidity
C) Stress, Force and Pressure
D) Stress, Pressure and Modulus of Rigidity
45. A steel bar of 5 mm is heated from 15° to 40°C and it is free to expand. The bar will induce
A) No stress B) Shear Stress
C) Tensile Stress D) Compressive Stress
46. The planes which carry no shear stress are known as
A) Principal planes B) Oblique planes
C) Inclined planes D) Minor planes
47. The Bending moment diagram for a simply supported beam carrying a uniformly distributed load of w per unit length will be
A) A horizontal Line B) A vertical Line
C) An inclined Plane D) A parabolic Curve

59. A saturated soil sample has a water content of 49%. If the specific gravity of solids is 2.7, the void ratio of the soil sample will be
 A) 1.32 B) 0.8 C) 1 D) 2.2
60. The specific gravity and in situ void ratio of a soil deposit are 2.71 and 0.85, respectively. The value of the critical hydraulic gradient is:
 A) 0.82 B) 0.85 C) 0.95 D) 0.92
61. A brick, which is cut in such a way that the width of one of its end is half that of a full brick is called
 A) Bevelled closer B) Queen closer C) Quoin D) King
 closer
62. Car is moving at a speed of 72 km/hr on a road having 2% upward gradient. The driver applies brakes when he sees an obstruction. If his reaction time is 1.5 seconds, assuming that the co-efficient of friction between the pavement and tire as 0.15, calculate the distance traversed before the car finally stops.
 A) 24m B) 150m C) 1056 m D) 324 m
63. Rapid curing cutback bitumen is produced by blending bitumen with
 A) Kerosene B) Benzene C) Diesel D) Petrol
64. Width of carriageway for a single lane is recommended to be
 A) 7.5m B) 2.5 m C) 3.75m D) 5.5 m
65. The revolutions of wheels of a vehicle without any forward or backward movement on the road is termed as
 A) Slipping B) Skidding C) Travelling D) Turning
66. Junction between the flange and web of a beam is known as
 A) Lap Joint B) Butt Joint C) Fillet D) Shear Joint
67. The strength of a riveted joint is equal to the
 A) Strength of joint against shearing of the rivets
 B) Strength of joint against bearing of the rivets
 C) Strength of plate in tearing
 D) Least of the values obtained in A, B, C
68. If A is the cross-sectional area of an eccentrically loaded column and Z is the sectional modulus, then the bending factor is equal to
 A) Z/A B) A/Z C) $2A/Z$ D) $A/2Z$
69. In roof trusses, the most frequently used section is
 A) Two-angle sections placed back to back
 B) Two-channel sections placed back to back
 C) Two channel section placed at a distance apart
 D) Four angle section
70. If a crop requires total depth 125 cm of water for a base period of 120 days, then the duty

of the crop in hectares/cumec is

- A) 250 B) 245 C) 657 D) 830

71. A water treatment plant treats 5000 cubic meters of water per day. If it consumed 20 kg of chlorine per day, then the chlorine dosage would be

- A) 10 mg/L B) 4 mg/L C) 0.40 mg/L D) 0.25 mg/L

72. Time taken by run-off to reach the culvert from the remotest point in the drainage basin is called as

- A) Time of reaching B) Time of collection
C) Time of concentration D) Time of delay

73. Which of the following has the maximum water application efficiency?

- A) Surface irrigation B) Sprinkler irrigation
C) Lift irrigation D) Furrow irrigation

74. Which of the following does not affect self purification of streams?

- A) Fish Population B) Turbulence of river
C) Sunlight D) DO deficit

75. The best hydraulic section for an open channel flow is

- A) Rectangular B) Trapezoidal
C) Semi-circular D) Circular

x-x-x

M.Tech.(Material Science & Technology)

- Superconductors are
 - Diamagnetic
 - Ferromagnetic
 - Paramagnetic
 - Super paramagnetic
- Two photons are approaching each other, their relative velocity is
 - c^2
 - $c/2$
 - $2c$
 - c
- Two wave function ψ_1 and ψ_2 are said to be orthogonal to each other is
 - $\int \psi_1 \psi_2 dv=0$
 - $\int \psi_1 \psi_2 dv=1$
 - $\int \psi_1 / \psi_2 dv= 1$
 - $\int (\psi_1 / \psi_2) dv=0$
- Among these, which one has largest wave length?
 - X- Rays
 - UV rays
 - Micro waves
 - Radio waves
- A phonon is a quantum of
 - Electromagnetic wave
 - Gravitational wave
 - Elastic wave
 - Microwave
- Cooper pair of electron is a
 - Boson
 - Fermion
 - Classical particle
 - Nucleon
- Stress amplitude (S) Vs number of cycles to the fatigue failure (N) plot provides the information about the following property
 - Roughness
 - Hardness
 - Creep
 - Fatigue
- Match the phrases in the group I and II and identify the correct option.

| Group I | Group II |
|---|-----------------------------|
| P. Electron spin resonance | i) Radio frequency |
| Q. Nuclear magnetic resonance | ii) Visible range frequency |
| R. Transition between vibrational states of molecules | iii) Microwave frequency |
| S. Electronic transition | iv) Far infrared range |

 - P-(i),Q-(ii),R-(iii),S-(iv)
 - P-(ii), Q-(i),R-(iv), S-(iii)
 - P-(iii), Q-(iv),R- (i),S-(ii)
 - P-(iii),Q-(i),R-(iv),S-(ii)
- Zero point energy of harmonic oscillator is
 - $\frac{1}{2} \hbar \omega$
 - 0
 - $\frac{3}{2} \hbar \omega$
 - $\hbar \omega$
- In Newton's rings experiment, the diameter of rings is proportional to
 - λ
 - λ^2
 - λ^{-2}
 - $\lambda^{\frac{1}{2}}$

11. In HCP unit cell the value of c/a is equal to

A) $\sqrt{\frac{8}{3}}$
C) $\sqrt{\frac{5}{3}}$

B) $\sqrt{\frac{6}{3}}$
D) $\sqrt{\frac{3}{8}}$

12. The Poynting vector S of an electromagnetic wave is:

A) $S = E \times H$

B) $S = E \times B$

C) $S = E/B$

D) $S = E/H$

13. Two heat capacities of an ideal gas are related as

A) $C_p - C_v = R$

B) $C_p + C_v = R$

C) $C_p/C_v = R$

D) $C_v/C_p = R$

14. Which of the following is not a thermoelectric effect?

A) Seebeck Effect

B) Peltier effect

C) Peltier Effect

D) Meissner Effect

15. The degree of freedom when ice, water and water vapors co-exist in equilibrium is

A) 1

B) 0

C) 2

D) 3

16. Hydrogen bonds are stronger than

A) Van der Waals bonds

B) Ionic bonds

C) Metallic bonds

D) Covalent bonds

17. A 1mm particle is converted into a number of nanometer size particles, the effective surface area of the

A) Increases

B) Decreases

C) Remain unchanged

D) Cannot predict

18. Number of tetrahedral voids in HCP unit cell is

A) 4

B) 6

C) 12

D) 10

19. The SI units of current density are

A) Am^{-2}

B) Am

C) Am^3

D) Am^{-3}

20. The resistivity of pure silicon at room temperature is 3000 ohm m. The intrinsic carrier density is

A) $2 \times 10^6 \text{ m}^{-3}$

B) $1.09 \times 10^{16} \text{ m}^{-3}$

C) $1 \times 10^8 \text{ m}^{-3}$

D) None of these

21. Band gap of Si is

A) 1.1 eV

B) 0.66eV

C) 6eV

D) 2.2 eV

22. $\frac{N\alpha}{3\epsilon_0} = \frac{\epsilon_r - 1}{\epsilon_r + 1}$ is

A) Einstein relation

B) Clausius-Mossotti relation

C) Maxwell-Boltzmann Relation

D) Clausius-Clapeyron

23. The wave function for the motion of a particle in a one dimensional potential box of length L is given by $\psi_n = A \sin\left(\frac{n\pi x}{L}\right)$ where A is the normalization constant. The value of A is

A) $\frac{1}{L}$

B) $\sqrt{\frac{1}{L}}$

C) $\sqrt{\frac{2}{L}}$

D) $\sqrt{\frac{3}{L}}$

24. Uncertainty relation holds for

A) Macroscopic particles

B) Microscopic particles

C) Macro as well as micro particles

D) None of these

25. The dimensions of Planks constant are

A) $M L^2 T^{-1}$

B) $M L^1 T^{-1}$

C) $M L^3 T^{-1}$

D) $M L^2 T^{-2}$

26. Temperature of the system increases in an

A) Adiabatic expansion

B) Isothermal expansion

C) Adiabatic compression

D) Isothermal compression

27. The variation of enthalpy of a reaction with temperature is given by

A) Clausius-Clapeyron equation

B) Kirchoff's equation

C) Van't Hoff equation

D) Gibbs Duhem equation.

28. The internal energy of an ideal gas is dependent on

A) Only V

B) Only T

C) T and V

D) T and P.

29. At the triple point of water, the degree of freedom of the system is

A) 3

B) 2

C) 1

D) 0

30. Bond energy of a substance is

A) Always positive

B) Always negative

C) Can be positive or negative

D) Zero

31. The colour of $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ ion is due to

A) Presence of water molecule

B) Intramolecular vibrations

C) Charge transfer transition

D) d-d transition.

32. Tetrahedral complexes are generally high spin complexes due to

A) High crystal field stabilization energy

B) Low crystal field stabilization energy

C) Absence of inversion center

D) Low pairing energy

33. Which of the following property is not shown by transition metals?

A) Variable co-ordination number

B) Colour

C) Variable oxidation state

D) Natural radioactivity.

C) Acid

D) Base

47. Estimation of hardness of water by using EBT as indicator is an example of

A) Precipitation titration

B) Redox titration

C) Complexometric titration

D) Neutralization titration.

48. The number of gram equivalents per litre of the solution is called

A) Molarity

B) Molality

C) Normality

D) Strength

49. The most important indoor air pollutant is

A) SO₂

B) CO₂

C) O₃

D) Radon

50. The maximum number of isomers for an alkene C₄H₈ is

A) 3

B) 4

C) 5

D) 6

51. The possible set of eigen values of a 4 × 4 skew-symmetric orthogonal real matrix is

A) {±i}

B) {±i, ±1}

C) {±1}

D) {0, ±i}

52. Let P be a 2×2 complex matrix such that $\text{trace}(P) = 1$ and $\det(P) = -6$. Then, $\text{trace}(P^4 - P^3)$ is

A) 78

B) 81

C) 16

D) 64

53. Let C be the contour $|z| = 2$ oriented in the anti-clockwise direction and $|z| = 1$ in the clockwise direction. The value of the integral $\oint_C \frac{e^z}{z} dz$ is

A) $2\pi i$

B) $3\pi i$

C) πi

D) 0

54. The matrix $A = \begin{bmatrix} 1 & 2 & 0 \\ 1 & 3 & 1 \\ 0 & 1 & 3 \end{bmatrix}$ can be decomposed uniquely into the product $A = LU$, where

$L = \begin{bmatrix} 1 & 0 & 0 \\ l_{21} & 1 & 0 \\ l_{31} & l_{32} & 1 \end{bmatrix}$ and $U = \begin{bmatrix} u_{11} & u_{12} & u_{13} \\ 0 & u_{22} & u_{23} \\ 0 & 0 & u_{33} \end{bmatrix}$. The solution of the system $LX = \begin{bmatrix} 1 & 2 & 2 \end{bmatrix}^t$ is

A) $\begin{bmatrix} 1 & 1 & 1 \end{bmatrix}^t$

B) $\begin{bmatrix} 1 & 1 & 0 \end{bmatrix}^t$

C) $\begin{bmatrix} 0 & 1 & 1 \end{bmatrix}^t$

D) $\begin{bmatrix} 1 & 0 & 1 \end{bmatrix}^t$

55. Two distinguishable fair coins are tossed simultaneously. Given that one of them lands up head, the probability of the other to land up tail is equal to

A) 1/3

B) 1/2

C) 2/3

D) 3/4

56. Which one of the following statements holds?

A) The series $\sum_{n=0}^{\infty} x^n$ converges for each $x \in [-1, 1]$.

B) The series $\sum_{n=0}^{\infty} x^n$ converges uniformly in $x \in (-1, 1)$.

- C) The series $\sum_{n=0}^{\infty} \frac{x^n}{n}$ converges for each $x \in [-1, 1]$.
- D) The series $\sum_{n=0}^{\infty} \frac{x^n}{n^2}$ converges uniformly in $x \in (-1, 1)$.

57. If $\frac{d}{dx}$ then the value of $\frac{1}{(x^D+1)}(x^{-1})$ is

- A) $\log x$ B) $\frac{\log x}{x}$ C) $\frac{\log x}{x^2}$ D) $\frac{\log x}{x^3}$

58. The value of the integral $\int_0^{\infty} \int_x^{\infty} \frac{1}{y} e^{-y/2} dy dx$ is

- A) $-\frac{1}{2}$ B) 1 C) -1 D) $\frac{1}{2}$

59. M has a son Q and a daughter R. He has no other children. E is the mother of P and daughter-in-law of M. How is P related to M?

- A) P is the son-in-law of M B) P is the grandchild of M
 C) P is the daughter-in law of M D) P is the grandfather of M

60. For $f(z) = \frac{\sin z}{z^2}$, the residue of the pole at $z = 0$ is

- A) 1 B) 0 C) -1 D) 2

61. The particular solution of the initial value problem given below is

$$\frac{d^2y}{dx^2} + 12 \frac{dy}{dx} + 36y = 0$$

with $y(0) = 3, y'(0) = -36$

- A) $(3 - 18x)e^{-6x}$
 B) $(3 + 25x)e^{-6x}$
 C) $(3 + 20x)e^{-6x}$
 D) $(3 - 12x)e^{-6x}$

62. A triangle in the xy -plane is bounded by the straight lines $2x = 3y, y = 0$ and $x = 3$. The volume above the triangle and under the plane $x + y + z = 6$ is

- A) 11 B) 9 C) 10 D) 12

63. M and N start from the same location. M travels 10 km East and then 10 km North-East. N travels 5 km South and then 4 km South-East. What is the shortest distance (in km) between M and N at the end of their travel?

- A) 18.60 B) 22.50 C) 20.61 D) 25.00

64. How many distinct values of x satisfy the equation $\sin(x) = x/2$, where x is in radians?

- A) 1 B) 2 C) 3 D) 4 or more

65. P, Q, R and S are working on a project. Q can finish the task in 25 days, working alone for 12 hours a day. R can finish the task in 50 days, working alone for 12 hours per day. Q worked 12 hours a day but took sick leave in the beginning for two days. R worked 18

hours a day on all days. What is the ratio of work done by Q and R after 7 days from the start of the project?

- A) 10:11 B) 11:10 C) 21:20 D) 20:21

66. The distinct eigen values of the matrix $\begin{bmatrix} 1 & 1 & 0 \\ 1 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ are

- A) 0 and 1 B) 1 and -1 C) 1 and 2 D) 0 and 2

67. The inverse Laplace transform of $\frac{s^2}{(s^2-4)(s^2-9)}$ is

- A) $\frac{3 \sin 3t - 2 \sin 2t}{5}$
 B) $\frac{3 \sin 3t + 2 \sin 2t}{5}$
 C) $\frac{2 \sin 3t - 3 \sin 2t}{5}$
 D) $\frac{2 \sin 3t + 3 \sin 2t}{5}$

68. If x ; y and z are positive real numbers, then the minimum value of $x^2 + 8y^2 + 27z^2$ where $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 1$ is

- A) 1048 B) 216 C) 405 D) 108

69. The number that least fits this set: (324, 441, 97 and 64) is _____.

- A) 324 B) 441 C) 97 D) 64

70. It takes 10 s and 15 s, respectively, for two trains travelling at different constant speeds to completely pass a telegraph post. The length of the first train is 120 m and that of the second train is 150 m. The magnitude of the difference in the speeds of the two trains (in m/s) is _____.

- A) 2.0 B) 10.0 C) 12.0 D) 22.0

71. Which of the following is the imaginary part of the $\log \sqrt{i}$?

- A) $\frac{\pi}{2}$ B) $\frac{\pi}{4}$ C) $\frac{\pi}{8}$ D) Π

72. If $y = 5x^2 + 3$, then the tangent at $x = 0, y = 3$

- A) Passes through $x = 0, y = 0$
 B) Has a slope of +1
 C) Is parallel to the x -axis
 D) Has a slope of -1

73. If $A = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$, then A^{50} is

- A) $\begin{bmatrix} 1 & 0 & 0 \\ 50 & 1 & 0 \\ 50 & 0 & 1 \end{bmatrix}$

- B) $\begin{bmatrix} 1 & 0 & 0 \\ 48 & 1 & 0 \\ 48 & 0 & 1 \end{bmatrix}$
- C) $\begin{bmatrix} 1 & 0 & 0 \\ 25 & 1 & 0 \\ 25 & 0 & 1 \end{bmatrix}$
- D) $\begin{bmatrix} 1 & 0 & 0 \\ 24 & 1 & 0 \\ 24 & 0 & 1 \end{bmatrix}$

74. The root of the equation $xe^x = 1$ between 0 and 1, obtained by using two iterations of bisection method, is

- A) 0.25 B) 0.50 C) 0.75 D) 0.65

75. The flux of the vector field $\vec{u} = x\hat{i} + y\hat{j} + z\hat{k}$ flowing out through the surface of the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$, $0 < b < a$, is

- A) πabc
- B) $2\pi abc$
- C) $3\pi abc$
- D) $4\pi abc$

x-x-x

M.E. Biotechnology

- The hydrolytic enzymes found in lysosomes work most effectively under conditions of
(A) Low pH (B) High pH
(C) High saline (D) Neutral pH
- Autoclave is primarily used for
(A) Lyophilization (B) Crystallization
(C) Polarization (D) Sterilization
- Endotoxins produced by gram negative bacteria is present in
(A) Inner cell membrane (B) Lipopolysaccharide
(C) Ribosomes (D) Peptidoglycan
- In an exponentially growing batch culture of *Saccharomyces cerevisiae*, the cell density is 30 g l^{-1} (DCW), the specific growth rate (μ) is 0.5 and substrate uptake rate (v) is $20 \text{ g l}^{-1} \text{ h}^{-1}$. The cell yield coefficient, $Y_{x/s}$, will be
(A) 0.05 (B) 0.25
(C) 0.50 (D) 0.75
- Which one of the following is a sulfur containing amino acid?
(A) Tryptophan (B) Valine
(C) Cysteine (D) Arginine
- A hapten is:
(A) A small chemical group which reacts with preformed antibodies (B) A strong immunogen
(C) An antibody (D) A region of antibody
- Adenine and Thymine in complementary DNA strands are joined by hydrogen bonds
(A) One (B) Two
(C) Three (D) Four
- The bond in subsequent amino-acids responsible for primary structure of proteins is
(A) Ionic Bond (B) Phosphodiester Bond
(C) Glycosidic bond (D) Peptide Bond
- Which of the following is NOT present in RNA?
(A) Uracil (B) Adenine
(C) Thymine (D) Cytosine
- Vitamins are:
(A) Organic substances that cannot be synthesized by animals
(B) Inorganic substances that cannot be synthesized by animals
(C) Inorganic substances that can be synthesized by animals
(D) Organic substances that can be synthesized by animals
- Which of the following is the nucleotide database?
(A) BLASTn (B) PROSITE
(C) CATH (D) GenBank

12. Which of the following CANNOT be grown on artificial culture medium?
- (A) *Escherichia coli* (B) Tobacco Mosaic Virus
(C) *Saccharomyces cerevisiae* (D) *Aspergillus niger*
13. *Penicillium chrysogenum* is industrially used to produce the antibiotic penicillin. In a batch culture of *Penicillium chrysogenum*, the maximum penicillin synthesis occurs during the
- (A) Lag phase (B) Exponential phase
(C) Stationary phase (D) Death phase
14. During bacterial conjugation the genetic material is transferred from the donor bacteria to the recipient through
- (A) Cell wall (B) Pili
(C) Medium (D) Capsule
15. According to Oparin's Theory, atmosphere of earth just before the origin of life consisted of
- (A) Water vapors, reducing environment (CH₄, NH₃, H₂) without oxygen
(B) Water vapors, reducing environment (CH₄, NH₃, H₂) with oxygen
(C) Reducing environment (CH₄, NH₃, H₂) without oxygen and water vapours
(D) Reducing environment (CH₄, NH₃, H₂) with oxygen and without water vapours
16. The bacterial cells having F plasmid integrated in their chromosome are termed as
- (A) P+ (B) F⁻
(C) Hfr (D) Hbr
17. Which of the following organelle is called "suicide bags" of cells?
- (A) Nucleolus (B) Ribosome
(C) Chloroplast (D) Lysosome
18. α-D-Glucose and β-D-glucose are.....of each other
- (A) Epimers (B) Anomers
(C) Mutarotation pair (D) Ketoenol pair
19. The unit of chromosome map is
- (A) Millimendel (B) Decibarr
(C) Centimorgan (D) Femtostern
20. The process for the synthesis of RNA from a DNA template is known as
- (A) Replication (B) Translation
(C) Transcription (D) Mutation
21. An organism which has two identical alleles of a gene is called
- (A) Dominant (B) Hybrid
(C) Heterozygous (D) Homozygous
22. Which of the following is the SI unit of Absorbance (A) of light by a solution?
- (A) Absorbance (A) is a unitless quantity.
(B) Candela
(C) Candela/ m² (Candela per square meter)
(D) Candela/s (Candela per second)

23. Which of the following molecular genetic techniques is used to identify protein-protein interactions?
 (A) Southern hybridization analysis (B) Polymerase chain reaction
 (C) Fluorescence in situ hybridization (D) Yeast two-hybrid system
24. At a pH below its isoelectric point, an amino acid exists as
 (A) Anion (B) Cation
 (C) Undissociated molecule (D) Zwitterion
25. Which of the following is the immediate source of energy for active transport?
 (A) Carbohydrates (B) Lipids
 (C) ATP (D) NADP
26. Which of the following is NOT a method to introduce genetic variation into bacteria?
 (A) DNA amplification (B) Transduction
 (C) Transformation (D) Directed Mutagenesis
27. Match the vitamins in Group I with the processes/reactions in Group II.

| Group I | Group II |
|---------------------------|--------------------------|
| P. Pantothenic acid | 1. Electron transport |
| Q. Riboflavin (Vitamin 2) | 2. Transfer of 1-C units |
| R. Vitamin B6 | 3. Decarboxylation |
| S. Folic acid | 4. Fatty acid metabolism |
| | 5. Hydrolysis |

- (A) P-5, Q-2, R- 4, S-1 (B) P- 4, Q-1, R-3, S-2
 (C) P- 4, Q- 2, R-1, S-5 (D) P- 2, Q- 1, R-3, S-5
28. Which of the following represents a dihybrid?
 (A) WsSs (B) WsSS
 (C) WWSs (D) wwSs
29. Which technique is most frequently employed for repeated use of enzymes in bioprocesses?
 (A) Polymerization (B) Isomerization
 (C) Ligation (D) Immobilization
30. Match the entries in Group I with the most suitable methods of sterilization in Group II.

| Group I | Group II |
|-------------------------------|------------------------|
| P. Serum | 1. Autoclave |
| Q. Luria broth | 2. Membrane filtration |
| R. Biological safety cabinets | 3. UV irradiation |
| | 4. Gamma irradiation |

- (A) P-4, Q-2, R-3 (B) P-1, Q-4, R-2
 (C) P-2, Q- 1, R-3 (D) P-1, Q- 1, R-4
31. Which of the following processes is involved during the identification of blood groups?
 (A) Precipitation (B) Immunization
 (C) Opsonization (D) Agglutination

32. Independent assortment of genes occurs due to the orientation of chromosomes at
 (A) Metaphase I of meiosis (B) Metaphase II of meiosis
 (C) Metaphase of mitosis (D) Telophase of mitosis
33. Which one of the following is a known protoplast fusion inducing agent?
 (A) Nucleotides (B) ATP
 (C) Polyethylene glycol (D) Colchicine
34. Given is the sequence of one strand of DNA - 5' TCGATC 3'. Which of the following is the sequence of the complementary strand?
 (A) AGCTAG (B) TCGATC
 (C) CTAGCT (D) ACTAGC
35. A solute binds with an adsorbent with a dissociation constant K_D . The retention time of the solute in a chromatography column containing this adsorbent
 (A) Influences K_D
 (B) Increases with increasing K_D
 (C) Decreases with increasing K_D
 (D) Is independent of K_D
36. Heat inactivation of serum is carried out to inactivate
 (A) Prions (B) Pathogenic bacteria
 (C) Mycoplasma (D) Complement
37. Nude mice are a type of laboratory animal with a genetic mutation that results in an inhibited immune system due to a greatly reduced number of T cells. Nude mice refers to
 (A) Mice without thymus (B) Mice without skin
 (C) Knockout mice (D) Transient mice
38. Which of the following protects cells by preventing crystallization of water during cryopreservation of mammalian cells?
 (A) Dimethyl Sulfoxide (B) Polyvinyl Alcohol
 (C) Ethanol (D) Ethylene oxide
39. Which of the following organelle is found only in plants but not in animals?
 (A) Nucleus (B) Plastids
 (C) Mitochondria (D) Ribosomes
40. The catalytic efficiency for an enzyme is defined as
 (A) K_{cat} (B) V_{max}/K_{cat}
 (C) K_{cat}/K_m (D) K_{cat}/V_{max}
41. Endogenous antigens are presented on to the cell surface along with
 (A) MHC-I (B) MHC-II
 (C) Fc receptor (D) Folic acid receptor
42. In steady state fermentation, the washout stage occurs if
 (A) Dilution rate is less than the maximum specific growth rate
 (B) Dilution rate is higher than the maximum specific growth rate
 (C) Cell concentration becomes maximum
 (D) Substrate concentration becomes minimum

43. In a thin layer chromatography experiment using a silica gel plate, the solvent front and a compound showed migration of 20 cm and 15 cm, respectively. What would be the R_f value for the compound?
 (A) 0.25 (B) 0.33
 (C) 0.75 (D) 1.33
44. Prior exposure to pathogens is known to increase resistance to future pathogen attacks. This phenomenon is known as
 (A) Systemic acquired resistance (B) Hypersensitive response
 (C) Innate immunity (D) Antibody mediated response
45. Match the entries in the Group I with the elution conditions in Group II.

| Group I | Group II |
|--------------------------------------|------------------------------------|
| P. Ion-exchange chromatography | 1. Isocratic solvent |
| Q. Hydrophobic column chromatography | 2. Ampholytes |
| R. Gel filtration chromatography | 3. Increasing gradient of salt |
| S. Chromatofocusing | 4. Decreasing gradient of polarity |

- (A) P-4, Q-1, R-2, S-3 (B) P-4, Q-3, R-1, S-2
 (C) P-3, Q-4, R-2, S-1 (D) P-3, Q-4, R-1, S-2
46. During sterilization of a fermentation medium in a given bioreactor, $\square_{\text{heating}} = 12.56$, $\square_{\text{cooling}} = 7.48$ and the total value of \square required for whole sterilization process is 52, where \square is the design criteria. What is the value of \square_{holding} ?
 (A) 31.96 (B) 72.04
 (C) 46.92 (D) 57.08
47. Cell lysis needs to be carried out as a downstream process if the product of interest is
 (A) Extracellular (B) Intracellular
 (C) Toxic (D) Heat labile
48. Which of the following features is NOT required in a prokaryotic expression vector?
 (A) Origin of replication (B) Selection Marker
 (C) Ribosome binding site (D) CMV promoter
49. Which of the following is a sequence alignment tool?
 (A) BLAST (B) PRINT
 (C) NCBI (D) EMBL
50. For an enzymatic reaction, K_m is defined as the substrate concentration at which
 (A) The reaction rate is double of the maximum
 (B) The reaction rate is one half of the maximum
 (C) The enzyme is completely saturated with substrate
 (D) The enzymatic reaction stops
51. The helix content of a protein can be determined using
 (A) A high resolution electron microscope
 (B) A fluorescence spectrometer
 (C) A circular dichroism spectrometer
 (D) A UV-Visible spectrophotometer

52. Which of the following is a protein sequence database?
(A) GenBank (B) PIR
(C) DDBJ (D) FASTA
53. When a cell is about to divide, before cell division, the amount of DNA in cell becomes
(A) One fourth (B) Half
(C) Less than Half (D) Double
54. The use of living organisms to degrade the pollutants present in environment is called
(A) Clarification (B) Centrifugation
(C) Bioremediation (D) Amplification
55. The process of introducing DNA into cells by exposing them to high voltage electric pulse is known as
(A) Electrofission (B) Electrofusion
(C) Electrosonication (D) Electroporation
56. The effect of a reversible competitive inhibitor on an enzyme can be nullified by
(A) Increasing the concentration of reactant (B) Increasing the concentration of product
(C) Increasing the temperature of reaction (D) Increasing the salt concentration
57. The specific activity of an enzyme in a crude extract of *S. Cerevisiae* is 10 units/mg of protein. The extract is passed through an ion-exchange column. After this purification step, the specific activity of the enzyme changes to 68 units/mg of protein. The fold purification for this step is:
(A) 0.14 (B) 6.8
(C) 680 (D) 58
58. An apoenzyme is
(A) Vitamin (B) Amino Acid
(C) Carbohydrate (D) Inactive Protein
59. Protoplasts are the cells which are lacking in
(A) Cell wall (B) Cell Membrane
(C) Cytoplasm (D) Periplasm
60. Primary mediator in anaphylaxis reactions is
(A) Histamine (B) Serotonin
(C) Heparin (D) Asparagine
61. Proteomics is the study of
(A) Regulatory proteins of an organism (B) Structural proteins of an organism
(C) Catalytic proteins of an organism (D) All proteins of organism
62. Which one of the following is an RNA dependent DNA synthetase (an enzyme that synthesizes DNA using RNA as a template)?
(A) DNA Polymerase I (B) DNA Polymerase II
(C) Reverse Transcriptase (D) Deoxy ribonuclease

63. Using monod's model, determine the dilution rate at the cell wash out condition for a chemostat with the given parameters $\mu_{\max} = 1 \text{ h}^{-1}$; $Y_{x/s} = 0.55 \text{ gg}^{-1}$; $K_s = 0.2 \text{ gL}^{-1}$; $S_0 = 10 \text{ gL}^{-1}$
- (A) 0.98 h^{-1} (B) 1.98 h^{-1}
 (C) 0.49 h^{-1} (D) 1.49 h^{-1}
64. Association of nitrogen fixing bacteria with the leguminous roots is an example of
- (A) Parasitism (B) Neutralism
 (C) Mutualism (D) Communalism
65. IPR stands for
- (A) Indian Patent Rights (B) International Patent Rights
 (C) International Property Rights (D) Intellectual Property rights
66. Which statement is *true* of both prokaryotic and eukaryotic cells?
- (A) Prokaryotic cells are generally much larger than eukaryotic cells
 (B) Eukaryotic cells have ribosomes but prokaryotic cells do not
 (C) Both have DNA as their primary genetic material
 (D) Eukaryotic cells have plasma membrane and prokaryotic cells do not
67. Which of the following biomolecules is likely to have buffering action?
- (A) Carbohydrates (B) Proteins
 (C) DNA (D) Lipids
68. Resolving power of a microscope is determined by
- (A) Wavelength of light source
 (B) Intensity of light source
 (C) Power of light source
 (D) Does not depend on any feature of light source
69. The soil bacteria most commonly used for transformation in plants is
- (A) *Rhizobacterium* (B) *Escherichia coli*
 (C) *Agrobacterium tumifaciens* (D) *Mycorrhizae*
70. During fermentation, the top portion inside the reactor is left free without broth. This portion is called
- (A) Shaft (B) Head space
 (C) Impeller (D) Sparger
71. The sugar moiety present in DNA is
- (A) Deoxyribose (B) Ribose
 (C) Fructose (D) Ribulose
72. The micro-organism most commonly used for industrial production of amylase enzyme is
- (A) *Saccharomyces cerevisiae* (B) *Aspergillus niger*
 (C) *Bacillus subtilis* (D) *Penicillium chrysogenum*
73. Analysis of protein antigen is carried out by which of the following techniques
- (A) Southern blot (B) Northern blot
 (C) Eastern blot (D) Western blot
74. Batch fermentation is an example of
- (A) Closed system (B) Open system
 (C) Fed-batch system (D) Equilibrium system
75. The enzyme usually used in Polymerase Chain Reaction is
- (A) RNA polymerase (B) Taq polymerase
 (C) Ribonuclease (D) Endonuclease

M.E.F.B.

1. Complete the series DC, HG, KK, PO, SS,by choosing one of the following options.
A) UV B) WW C) RT D) WR
2. In certain coding method, the word PGIMER is encoded as SJLPHU. In this coding, what is the code word for the word SCHOOL?
A) VFKRRO B) CHESSO C) FERKKO D) BRACCO
3. Which one is odd out of the following?
A) Cricket B) Hockey C) Polo D) Football
4. Which one is odd out of the following?
A) School B) Teacher C) Book D) Community
5. Which of the following is odd
A) Swimming B) Sailing C) Driving D) Diving
6. Binary equivalent of decimal number 35 is....
A) 100011 B) 110001 C) 110101 D) 101011
7. Lamp: Oil::Electric Bulb:?
A) Bright B) Holder C) Switch D) Current
8. Poem: Poet::Book?
A) Author B) Editor C) Writer D) Publisher
9. 7:47:: 9: ?
A) 79 B) 89 C) 49 D) 39
10. Which word does not belong to the others?
A) Inch B) Ounce C) Centimeter D) Yard
11. Which word does NOT belong with the others?
A) Tyre B) Steering Wheel C) Engine D) Car
12. Which word does NOT belong with the others?
A) Noun B) Preposition C) Punctuation D) Adverb
13. Reptile is to lizard as flower is to
A) Petal B) Stem C) Daisy D) Alligator
14. Cobbler: Shoe
A) Jockey : Horse B) Contractor : Building
C) Mason : Stone D) Cowboy : Boot
15. Vineet has a paper route. Each morning, he delivers 37 newspapers to customers in his neighborhood. It takes Vineet 50 minutes to deliver all the papers. If Vineet is sick or has other plans, his friend Rakesh, who lives on the same street, will sometimes deliver the papers for him. Which one out of the following can be conclusively said?

- A) It takes Rakesh more than 50 minutes to deliver the papers.
- B) Vineet and Rakesh are neighbors
- C) It is dark outside when Vineet begins his deliveries
- D) Rakesh would like to have his own paper route.

16. **Statements:** All roads are waters. Some waters are boats.

Conclusions: 1. Some boats are roads. 2. All waters are boats.

- A) Only conclusion 1 follows
- B) Only conclusion 2 follows
- C) Either conclusion 1 or 2 follows.
- D) Neither conclusion 1 nor 2 follows

17. **Statements:** 1. Some swords are sharp. 2. All swords are rusty.

Conclusions: 1. Some rusty things are sharp. 2. Some rusty things are not sharp.

- A) Only Conclusion 1 follows.
- B) Only Conclusion 2 follows.
- C) Either conclusion 1 or 2 follows.
- D) Neither conclusion 1 nor 2 follows

18. Which is the largest ocean?

- A) Indian
- B) Atlantic
- C) Arctic
- D) Pacific

19. How is density of population usually measured?

- A) Persons per square Km
- B) The number of people in a country
- C) The number of households in a country
- D) The average size of houses in a country

20. What are those smaller rivers called that flow into a large, main river?

- A) Feeders
- B) Streams
- C) Tributaries
- D) Rivulets

21. What is the science of making maps called?

- A) Cartography
- B) Pantography
- C) Geodesy
- D) Seismography

22. What is the upper part of the atmosphere called?

- A) Lithosphere
- B) Stratosphere
- C) Barysphere
- D) Hydrosphere

23. Which is the earth's satellite?

- A) Uranus
- B) Neptune
- C) Venus
- D) Moon

24. Which is the smallest planet?

- A) Mercury
- B) Venus
- C) Pluto
- D) Mars

25. In India, TRAI regulates the functioning of

- A) Ports
- B) Tobacco
- C) Transport
- D) Telecommunication

26. **Which is India's highest peacetime gallantry award?**

- A) Param Vir Chakra
- B) Maha Vir Chakra
- C) Ashok Chakra
- D) Kirti Chakra

27. The International Court of Justice is located in _____.

- A) New York
- B) Washigton
- C) Geneva
- D) The Hague

28. The currency of Indonesia is _____.

- A) Rupiah
- B) Dinar
- C) Rangit
- D) Riyal

29. The headquarters of NATO is located in _____.
A) New York B) Paris C) Geneva D) Brussels
30. The world's highest mountain is in _____
A) China B) Pakistan C) Nepal D) India
31. The headquarters of Red Cross is in _____.
A) New York B) Washington C) Geneva D) The Hague
32. Suez Canal is between _____.
A) Arabian Sea and Red Sea B) Red Sea and North Sea
C) Mediterranean Sea and North Sea D) Mediterranean Sea and Red Sea
33. Napoleon Bonaparte was finally defeated at the _____ in June 1815.
A) Peninsular War B) Invasion of Russia
C) Battle of Waterloo D) Battle of Leipzig
34. In medical science a doctor who deals with cancer in body is called
A) Oncologist B) Pediatrician C) Orthopedic D) Urologist
35. Which one of the following green house gases has the shortest residence time in the atmosphere?
A) Chlorofluorocarbon B) Carbon dioxide
C) Methane D) Nitrous oxide
36. Education as a subject of legislation figures in the
A) Union List B) State List C) Concurrent List D) Residuary Powers
37. The grains that appear on a television set when operated are also referred to as
A) Sparks B) Green dots C) Snow D) Rain drops
38. 2016 Olympics were held in _____.
A) London B) Rio de Janeiro C) Doha D) Beijing
39. Which from the following countries has no armed forces?
A) Niger B) Nigeria C) Iceland D) Latvia
40. An employ may claim Rs. 8 for each KM when he travels by taxi and Rs 7 for each Km if he travels by his own car. If for one month he claimed Rs. 750 for travelling, how many Kms he travelled by taxi?
A) 20 B) 30 C) 40 D) 50
41. A merchant has 1000 Kg of sugar and part of this he sells at 8% profit and the rest at 18% profit. His gain in all is 14%. How many Kgs he sold at 18% profit?
A) 560 B) 600 C) 340 D) 640
42. Look at this series: 2, 1, (1/2), (1/4), ... What number should come next?
A) 1/6 B) 1/8 C) 1/12 D) 1/16
43. Look at this series: 7, 10, 8, 11, 9, 12, ... What number should come next?
A) 7 B) 10 C) 12 D) 13

44. If the series 4, 5, 8, 14, 15, 18, 24..... is continued in the same pattern, which one of the following is not a term of this series?
 A) 28 B) 25 C) 33 D) 34
45. Today the ratio of the ages of Arun to Krishan is 6 : 7 respectively. Five years hence, this ratio would become 7: 8. How old is Arun?
 A) 26 Years B) 28 Years C) 30 Years D) 35 Years
46. At a shop, toys are available priced at Rs 7, 8 and 10 available. Out of the following for which exact amount one cannot buy toys
 A) 19 B) 20 C) 23 D) 32
47. A man started walking from his house towards south. After walking 6 km, he turned to his left and walked 5 km. Then he walked further 3 km after turning left. He then turned to his left and continued his walk for 9 km. How far is he away from his house?
 A) 3 km B) 4 km C) 5 km D) 6 km
48. One writes all numbers from 50 to 99 except the numbers having digits 2 and 7. How many numbers have been written?
 A) 30 B) 31 C) 32 D) 33
49. Of the three angles of a triangle one is seven times the smallest and another is Ten times the smallest then find the value of smallest angle?
 A) 8° B) 10° C) 12° D) 15°
50. Three partners A , B , C start a business . B's Capital is four times C's capital and twice A's capital is equal to thrice B's capital. If the total profit is Rs 16500 at the end of a year, Find out B's share in it.
 A) Rs. 5,000 B) Rs. 6,000 C) Rs. 7,000 D) Rs. 8,000
51. If $8x+9y=43$ and $9x+8y=42$ then $xy=?$
 A) 36 B) 26 C) 16 D) 06
52. Three years ago the average age of A and B was 27 years. While C has joined them now and the average of the three has come down to 25 years. What is the age of C?
 A) 25 Years B) 27 Years C) 15 Years D) 23 Years
53. A worker's basic pay is Rs 600 per week and he has to work for 40 Hrs per week. If he works overtime then he is paid overtime at normal hourly rate plus 20 % extra. In a week he got Rs. 825/-. How much hours of overtime he worked for that week?
 A) 12.5 Hrs B) 14.5 Hrs C) 15 Hrs D) 16 Hrs.
54. Two trains starting at the same time from two stations, 200 km apart and going in opposite directions, cross each other at a distance of 110 km from one of them. What is the ratio of their speeds?
 A) 11: 20 B) 09: 20 C) 11: 09 D) 19: 20
55. Ramesh got a mean of 370 marks for the first three years of his four year degree course and his mean marks for the last three years was 340. If his marks for the fourth year were $\frac{4}{5}$ th of the first year, then what marks Ramesh got in fourth year?
 A) 365 B) 360 C) 370 D) 375

56. Mr Shamin's salary increases every year by 10% in June. If there is no other increase or reduction in the salary and his salary in June 2011 was ₹22,385, what was his salary in Jun 2009?
- A) 18,650 B) 18,000 C) 19,250 D) 18,500
57. Profit earned by an organisation is distributed among officers and clerks in the ratio of 5 : 3. If the number of officers is 45 and the number of clerks is 80 and the amount received by each officer is ₹25,000, what was the total amount of profit earned?
- A) 22 lakh B) 18.25 lakh C) 18 lakh D) 23.25 lakh
58. Total quality management is
- A) A commitment to continuous improvement.
B) A relatively permanent change in behaviour that occurs as a result of work experiences.
C) The attempt by scholars to identify how situations can be understood and managed in ways that respond appropriately to their unique characteristics.
D) The study of individuals and groups in organizations.
59. The Principle of unity of command implies
- A) In union there is strength
B) Employees should receive orders from one superior only
C) Group to be assigned the responsibility of commanding
D) Command be equally distributed among horizontal line
60. A Plan is a determined course of action. The first major step in the process is
- A) Developing premises
B) Stating organizational objectives
C) Developing plans
D) Putting plans into action
61. Supervision as a mechanism of control over subordinates has been founded to be
- A) The most effective mechanism of control
B) As effective as input control
C) The less effective mechanism of control
D) More effective than behavior control
62. Which of the following aptly describes the role of line managers and staff advisors, namely HR professionals?
- A) Staff advisors focus more on developing HR programmes while line managers are more involved in the implementation of those programmes.
B) Line managers are concerned more about developing HR programmes whereas staff advisors are more involved in implementing such programmes.
C) Staff advisors are solely responsible for developing, implementing and evaluating the HR programmes while line managers are not all involved in any matters concerning HR.
D) Line managers alone are responsible for developing, implementing and evaluating the HR programmes while staff advisors are not all involved in any matters concerning HR.
63. The attempt to build good corporate image is referred to as
- A) Advertising B) Personal Selling
C) Public relations D) Sales promotion
64. Disguised unemployment means

- A) Willing to work and not getting work
 - B) Not getting work on all days of the year
 - C) More people working than required
 - D) The number of the unemployed is not known
65. The study of individuals and groups in organizations is known as:
- A) Total quality management
 - B) Human resource maintenance
 - C) The contingency approach
 - D) Organizational behavior
66. Per capita income of a country is the measure of
- A) Income earned by its residents on the interest earned.
 - B) National Income divided by Population
 - C) Income generated by a person on the capital invested
 - D) Income per thousand persons
67. A closed economy is a term used for
- A) A country which has no economic relations with other countries
 - B) A country which is surrounded by sea from all the sides
 - C) A country which does not allow entry of foreign visitors
 - D) A country which is not economically growing
68. World Trade Organization was established in _____.
- A) 1980
 - B) 1985
 - C) 1990
 - D) 1995
69. -----is small groups of workers who meet regularly with their supervisor to solve work related problem.
- A) Quality of Work life
 - B) Quality Circle
 - C) Alternative Work schedule
 - D) Job Redesign
70. The term venture capital means
- A) A short-term capital provided to industries
 - B) A long-term start-up capital provided to new entrepreneurs
 - C) Funds provided to industries at times of incurring losses
 - D) Funds provided for replacement and renovation of industries.
71. If interest rate is decreased in an economy, it will
- A) Decrease the consumption expenditure in the economy
 - B) Increase the tax collection of the Government
 - C) Increase the investment expenditure in the economy
 - D) Increase the total savings in the economy
72. Which of the following statements about performance appraisal is not true?
- A) Performance appraisal has become a tool to motivate and control workers.
 - B) Companies use appraisal to encourage employee loyalty and commitment.
 - C) Performance appraisal reduces managerial control.
 - D) Employees may be appraised on both objective and subjective measures.
73. The process by which a manager assigns some of his total work load to others is:
- A) Decentralization
 - B) Delegation
 - C) Division of work
 - D) Centralization

74. "An Enquiry into the Nature and Causes of Wealth of Nations" is the book of economist—
A) Adam Smith B) Marshall C) Robbins D) Pigo
75. Marginal utility is equal to average utility at that time when average utility is_____.
A) Increasing B) Maximum C) Falling D) Minimum

x-x-x

MBACIT

1. A cartel is a combination of firms
 - A) Which are functioning in a particular industry
 - B) Whose combined assets are worth more than 90% of total assets of the industry
 - C) Who control major chunk of the market
 - D) Whose combined profits are enormous

2. The term 'Organizational climate' best represents
 - A) Union-management relations within an organization
 - B) Problems introduced by faulty organizational structure
 - C) Socio-cultural environment in an organization
 - D) Human environment prevailing in an organization

3. Test checking of entries in the audit work refers to
 - A) The internal checks
 - B) The internal controls
 - C) Checking some sample items from a large number of similar items
 - D) Checking the cash flow of business

4. The distinctive characteristic of 'perpetual succession' of a joint stock company refers to
 - A) Uninterrupted business in spite of continuous losses
 - B) Immunity from government direction for the closure of the company
 - C) Immunity from resolution passed in the annual general body meeting for closure of the company
 - D) Uninterrupted existence not affected by the death or insolvency of members of the company

5. Who is a 'bull'?
 - A) A stock broker who deals or specializes in a few shares
 - B) An investor who sells securities in anticipation of being able to rebuy them later at a lower price
 - C) An investor who buys securities in anticipation of being able to sell them later at a higher price
 - D) An investor who expects the price of a security or of the market as a whole to fall

6. The first step of the control process actually gets initiated in the managerial function of
 - A) Staffing
 - B) Planning
 - C) Communication
 - D) Co-ordination

7. Among the following 'change management' methods, which one is the most, appropriate when the employees are unwilling to accept change?
 - A) Participative method
 - B) Directive method
 - C) Leading by example
 - D) Negative reinforcement

8. A systematic and orderly process of determining the worth of a job in relation to other jobs is known as
- | | |
|----------------------|--------------------|
| A) Job analysis | B) Job evaluation |
| C) Job specification | D) Job description |
9. Job evaluation is used for
- | | |
|--|------------------------------------|
| A) Study of progress of production | B) Study of job composition |
| C) Determining wage rate differentials | D) Rating the merit of an employee |
10. Which one of the following reports deals with 'Corporate governance'?
- | | |
|------------------------|--------------------------------|
| A) Sabhanayagam Report | B) L.C. Gupta Report |
| C) Narasimhan Report | D) Kumaramangalam Birla Report |
11. The managerial function of organizing involves
- Reviewing and adjusting plan in the light of changing conditions
 - Establishing program me for the accomplishment of objectives
 - Creating a structure of functions and duties to be performed by a group
 - Getting things done
12. When there are large numbers of smaller projects and the activities of those projects are to be accomplished by setting up some temporary departments, the appropriate organisation structure should be
- | | |
|-------------------------|----------------------------|
| A) Project organization | B) Functional organization |
| C) Matrix organization | D) Divisional organisation |
13. Which one of the following accounting equations is correct?
- $\text{Assets} = \text{Owner's Equity}$
 - $\text{Assets} = \text{Liabilities} + \text{Owner's Equity}$
 - $\text{Assets} = \text{Liabilities} - \text{Owner's Equity}$
 - $\text{Assets} + \text{Liabilities} = \text{Owner's}$
14. Which one of the following is not related to the convention of conservatism?
- Making provision for doubtful debts and discount on debts in anticipation of actual bad debtors and discount
 - Valuation of stock at Market Price or Cost Price whichever is higher
 - Charging of small capital items as Revenue
 - Adopting Written-down Value Method of depreciation as against Straight-line
15. Informal organization is as necessary as formal organization chiefly for the reason that it
- Resists change
 - Fulfils separate goals and standards
 - Has close association with decision making
 - Builds morale

16. Who was the first administrator-statesman to attempt planning as a means for economic development?
- A) Sir CP Ramaswami Aiyar
B) M Viswesvarayya
C) VT Krishnamachari
D) C Rajagopalachari
17. Which of the following is the basic characteristic of Oligopoly?
- A) Few sellers, one buyer
B) Few sellers, many buyers
C) Few sellers, a few buyers
D) Many sellers, a few buyers
18. Who is known as the 'Father of White Revolution'?
- A) VKurien
B) MS Swaminathan
C) JP Narayan
D) Baba Amte
19. Recently announced RERA deals with which of the following
- A) Real stocks
B) Telecom sector
C) Real estate
D) Foreign exchange regulations
20. Which of the following organizations looks after the credit needs of agriculture and rural development in India?
- A) FCI
B) IDBI
C) ICAR
D) NABARD
21. Which of the following taxes is a progressive tax?
- A) Income Tax
B) Custom Tax
C) Sales Tax
D) Excise Duty
22. The terms TRIPS and TRIMS are related to
- A) NAFTA
B) SAPTA
C) EFTA
D) GATT
23. Which of the following deals with economic offences?
- A) MISA
B) NSA
C) TADA
D) COFEPOSA
24. In India, inflation is measured by
- A) Wholesale price index number
B) Consumer price index for urban non-manual workers
C) Consumer price index for agricultural workers
D) National income deflation
25. The law of demand states that
- A) Demand increases with increase in income
B) When income and prices rise, the demand also rises
C) When price falls, demand increases
D) When price increases, and demand increases

26. Which of the following is known as plastic money?
 A) Bearer cheques
 B) Credit cards
 C) Demand drafts
 D) Gift cheques
27. Which is the largest commercial bank in India?
 A) Reserve Bank of India
 B) State Bank of India
 C) ICICI Bank
 D) Bank of India
28. Who is known as the 'Father of Economies'?
 A) Adam Smith
 B) Chanakaya
 C) Machiavelli
 D) Frederick Taylor
29. The economic liberalization in India was introduced in which year
 A) 1991
 B) 1990
 C) 1985
 D) 1988
30. Which Indian state has the lowest percentage of people living below the poverty line?
 A) Maharashtra
 B) Gujarat
 C) Karnataka
 D) Punjab
31. You can convert existing Ms Excel Worksheet data and chart to on HTML document by using the
 A) FTP Wizard
 B) Internet Assistant Wizard
 C) Internet Wizard
 D) Import Wizard
32. Which is the first electronic digital computer?
 A) ENIAC
 B) MARK I
 C) Z3
 D) ABC
33. Multiple calculations can be made in a single formula using
 A) Standard Formulas
 B) Array Formula
 C) Complex Formulas
 D) Smart Formula
34. Getting data from a cell located in a different sheet is called
 A) Accessing
 B) Referencing
 C) Updating
 D) Functioning
35. The chart wizard
 A) Can place a chart on a new chart sheet or on sheet in the workbook
 B) Can only place a chart on a new black worksheet
 C) Can only be used to created embedded chart
 D) Can only place a chart on a new chart sheet
36. FORTRAN is a programming language. What does FORTRAN stand for?
 A) File Translation
 B) Format Translation
 C) Formula Translation
 D) Floppy Translation

37. Which unit is known as nerve center of computer?
 A) ALU B) CU C) Memory D) Registers
38. Which of the following is a class of computers based on model?
 A) Digital Computer B) Hybrid Computers
 C) Analog Computers D) AT Computers
39. Central Processing Unit is a combination of
 A) Control and storage B) Control and output unit
 C) Arithmetic logic and input unit D) Arithmetic logic and control unit
40. Number crunchier is the informal name for
 A) Minicomputer B) Super computer
 C) Microcomputer D) Mainframe computer
41. On which aspect the analog computers are better than digital?
 A) Speed B) Accuracy C) Reliability D) Automatic
42. The ALU of a computer normally contains a number of high speed storage element called
 A) Semiconductor memory B) Magnetic disk
 C) Hard disks D) Registers
43. A typical personal computer used-for business purposes would have_____ of RAM.
 A) 4 KB B) 16K C) 64 K D) 256 K
44. Access time is
 A) Seek time + latency time B) Seek time
 C) Virtual time D) Latency time
45. A computer program that converts an entire program into machine language is called a/an
 A) Interpreter B) Simulator C) Compiler D) Commander
46. OTE, PUF, QVG, RWH,.....? Complete the series
 A) SYJ B) TCI C) SXJ D) SXI
47. CHAIR: TABLE::draw an analogy
 A) Object: Prop B) Son : Father C) Car: Scooter D) Pen: Paper
48. Find the odd one out
 A) December B) February C) March D) July

49. If in a certain language KINDLE is coded as ELDNIK, how is EXOTIC coded in that code?
- A) EOXITC B) EXOTLC C) CITOXE D) COXITE
50. Pointing to a photograph, a man said, "I have no brother or sister but that man's father is my father's son." Whose photograph was it?
- A) His own B) His nephew's C) His father's D) His son's
51. Truthfulness: court: : cleanliness :
- A) Virtue B) Bath C) Restaurant D) Pig
52. Choose the opposite of rebuked
- A) Awarded B) Praised C) Invited D) Received
53. Choose the opposite of erudite
- A) Unfamiliar B) Illiterate C) Unknown D) Scholarly
54. Find a synonym for FASTIDIOUS
- A) Dormant B) Delicious C) Fussy D) Faint
55. Find a synonym for EFFICACY
- A) Solemnity B) Efficiency C) Ruthlessness D) Delicacy
56. Find an analogy; Doctor: Nurse:: ? : Follower
- A) Employer B) Leader C) Worker D) Manager
57. In a chess tournament each of six players will play every other player exactly once. How many matches will be played during the tournament?
- A) 12 B) 15 C) 30 D) 36
58. Reena is twice as old as Sunita. Three years ago, she was three times as old as Sunita. How old is Reena now?
- A) 6 years B) 12 years C) 14 years D) 16 years
59. A shepherd had 27 sheep. All but 10 died. How many sheep are left with him?
- A) 10 B) 15 C) 17 D) 27
60. A group of 1200 persons consisting of captains and soldiers is travelling in a train. For every 15 soldiers there is one captain. The number of captains in the group is?
- A) 70 B) 75 C) 80 D) 85

- 61.** Who has become the first Indian woman to drive Formula E racing car at a race track?
A) Kritika Chandhok
B) Gul Panag
C) Rajini Krishnan
D) Divya Malik
- 62.** Who has become the first Indian actor to deliver a speech at the internationally acclaimed TED Talks?
A) Amitabh Bachchan
B) Shah Rukh Khan
C) Aamir Khan
D) Akshay Kumar
- 63.** Which Indian bank has won the 2017 Golden Peacock Innovative Product / Service Award (GPIPSA)?
A) Yes Bank
B) ICICI Bank
C) State Bank of India
D) Reserve Bank of India (RBI)
- 64.** Which IIT institute will start 'Vastu Shastra' classes for architecture students?
A) IIT Kharagpur
B) IIT Bombay
C) IIT Madras
D) IIT Indore
- 65.** Which company won the AIMA Indian MNC of the Year award?
A) Hero motocorp
B) Hero Cycles
C) Maruti
D) Nissan
- 66.** Which two nations are planning to build a moon village for deep space missions, lunar mining and space tourism?
A) China, UK
B) China, EU
C) China, US
D) China, Russia
- 67.** Which summer fruit has IIT Roorkee science team used to make solar cells?
A) Jamun
B) Mango
C) Banana
D) Melon
- 68.** Which book has FB COO Sheryl Sandberg released in March 2017?
A) Option B: Facing Adversity, Building Resilience and Finding Joy
B) Lean In
C) Lean out
D) Option A
- 69.** TIME Magazine has on 7th Dec named whom as its Person of the Year?
A) Narendra Modi
B) Hillary Clinton
C) Donald Trump
D) Barak Obama

70. Which facility was announced for senior citizens in Budget 2017-2018?
- A) Aadhaar-enabled smart cards B) BHIM app
C) Shakti Kendras D) Service kendras
71. Which of the following statements is true about the BHIM App?
- A) Cashback scheme has been announced for individuals
B) Referral bonus schemes have been announced for individuals
C) Cashback scheme has been announced for merchants
D) Only B and C
72. Which national agency will be phased out in the next fiscal, as per the Budget 2017?
- A) Niti Aayog
B) Foreign Investment Promotion Board
C) Securities Exchange Board of India
D) FICCI
73. Which country did India ink a pact with to upgrade railways?
- A) Australia B) Denmark C) France D) New Zealand
74. India and which country has signed a long term agreement for Sukhoi Su-30 MKI combat aircraft fleet?
- A) Russia B) Siberia C) Tanzania D) Turkey
75. Which country has announced the plan to adopt Chinese yuan as legal tender?
- A) Ethiopia B) Liberia C) Nigeria D) Zimbabwe

x-x-x

MSc(HS)(Biophysics)

1. The diameter of platelets when expressed in microns is close to
A) 0.2-0.4 B) 2-4 C) 6-8 D) 8-10
2. Among leukocytes, the percentage of eosinophils is
A) 1-5 B) 5-10 C) 10-15 D) 15-20
3. Which of the following element preferably requires hydride generator for its estimation using atomic absorption spectrometry?
A) Sodium B) Lithium C) Arsenic D) Calcium
4. Collagen is mostly formed by which of the following cells?
A) Myoblasts B) Monocytes C) Fibroblasts D) Melanocytes
5. During which oxidation state of Iron, binding of oxygen to haemoglobin takes place?
A) A + 4 B) +3 C) +2 D) +1
6. Which of the following methods is most sensitive for quantification of proteins?
A) Raman spectroscopy B) UV spectroscopy
C) FTIR D) Southern blotting
7. The levels of TSH in a healthy person when expressed in mIU/L, are nearly in the range?
A) 0.04 to 0.4 B) 0.4 to 4 C) 4-8 D) 8-12
8. Which of the following enzyme unwinds double helix of DNA ?
A) Endonuclease B) Gyrase C) Helicase D) Topoisomerase
9. Schilling test is done to know the absorption defect of
A) Vitamin B12 B) Vitamin B6
C) Vitamin B1 D) Vitamin B5
10. Phosphate group in RNA is attached to which of the carbon atom of sugar?
A) 5' B) 4' C) 2' D) 1'
11. Which of the following is a consequence of Stochastic effect?
A) Skin erythema B) Cataract C) Arrhythmia D) Cancer
12. Radionuclide P-32 can be used to treat
A) Bone pain caused by metastases
B) Malignant ascites
C) Polycythemic vera
D) Both polycythemia vera and bone pain caused by metastases
13. The level of which of the following is greatly reduced in Nude mice?
A) Kupfer cells B) T lymphocytes
C) B lymphocytes D) Both B lymphocytes and Kupfer cells
14. Nearly how much percent of cardiac output is received by lungs?
A) 85 B) 95 C) 105 D) 115

15. Myelin that surround the axons of some nerve cells, is made up of
A) Proteins B) Lipids C) Proteins and Lipids D) Carbohydrates
16. Which of the following secretes Intrinsic factor?
A) Schwann cells B) Glial Cells
C) Parietal Cells D) C-Cells
17. Nearly what percent of organic matrix contribute to the dry weight of bones?
A) 10 B) 30 C) 60 D) 80
18. The transmission of light along the axis of optical fiber is on the basis of
A) Compton effect B) Total internal reflection
C) Photoelectric effect D) Optical absorption
19. Which of the following does not cross blood-brain barrier?
A) Ethyl cysteinyl dimer B) Fluorodopa
C) FDG D) DTPA
20. The physical half life of Iodine-125 when expressed in days is
A) 40 B) 50 C) 60 D) 70
21. Iodine is taken up by the thyroid by which of the following process?
A) Diffusion B) Passive transport
C) Active transport D) Osmosis
22. Nearly what amount of blood plasma when expressed in liters is filtered by glomeruli in kidneys per day?
A) 1.8 B) 8 C) 18 D) 180
23. Gamma ray energy of radioisotope Cs-137 when expressed in KeV, is
A) 452 B) 552 C) 662 D) 762
24. How many neutrons are there in the nucleus of Iodine-131
A) 76 B) 77 C) 78 D) 79
25. Which of the following enzyme plays a key role in the organification of iodide?
A) Iodinase B) $\text{Na}^+ - \text{K}^+$ ATPase
C) Catalase D) Peroxidase
26. For the shielding of P-32, which of the following material should be used?
A) Lead B) Plastic C) Aluminium D) Copper
27. If the content of adenine in double helical DNA is 30 percent of the total bases, then cytosine content shall be how much percent :
A) 10 B) 20 C) 30 D) 40
28. 37 MBq of radioactivity shall correspond to how much activity in mCi
A) 0.01 B) 0.1 C) 1.0 D) 10
29. How many protons are present in Tc-99m

- A) 42 B) 43 C) 44 D) 45

30. Which of the following is not used in Radioimmunoassay?
A) Antibodies labeled with radioisotope
B) Antibodies not labeled with radioisotope
C) Antigen labeled with radioisotope
D) Antigen not labeled with radioisotope
31. Which of the following better supports Glucose transport across the plasma membrane?
A) Facilitated diffusion B) Osmosis
C) Active transport D) Reverse Osmosis
32. The near normal levels of T3 in the systemic circulation of a normal adult are in the range
A) 10-50ng/dl B) 50-80 ng/dl
C) 80-220 ng/dl D) 220-400 ng/dl
33. Which type of radiations are emitted by the disintegration of Carbon-11?
A) Gamma B) Beta positive
C) Beta negative D) Positrons
34. Ultra Violet radiations rays preferably cause
A) Deletion of purines
B) Cross linking of purine and pyrimidines
C) Dimerisation of pyrimidines
D) Substitution of purine and pyrimidines
35. Which of the following is more appropriate in determining the tertiary conformation of a protein?
A) Protein's motifs
B) Number of disulfide bonds within the protein
C) Primary sequence
D) Presence of coils
36. Which of the following has a double membrane with pores?
A) Lysosome B) Vacuole C) Peroxisome D) Nucleus
37. The cells which may form myelin
A) Schwann B) Myocyte C) Histocyte D) Melanocyte
38. During imaging procedure, stress in the heart muscle can be induced by
A) Carbimazole B) Methionine C) Adenosine D) Iodine
39. ^{113m}In decays by which of the following appropriate method?
A) Isomeric transition B) Internal conversion
C) Auger transition D) Isobaric transition

40. The detection of bacteremia is done by using which of the following most accepted mean
- A) Immunoradiometric assay B) Serial blood culture
C) Complement fixation D) Gram stain
41. Which of the following has a maximum bone to muscle target ratio?
- A) ^{123}I -IMP B) $^{99\text{m}}\text{Tc}$ -DTPA C) $^{99\text{m}}\text{Tc}$ -MDP D) ^{18}F FDG
42. Which of the following causes Graves' disease?
- A) Deficiency of peroxidase B) Antibodies to peroxidase
C) Antibodies to TSH receptor D) Deficiency of tyrosine iodinase
43. Out of the following cells, which are the first ones that the site of inflammation?
- A) Monocytes B) Eosinophils C) Neutrophils D) Thrombocytes
44. The length of the microRNA in terms of nucleotides, is close to
- A) 2 B) 12 C) 22 D) 32
45. The information of nearly how many known number of isotopes is available?
- A) 500 B) 1000 C) 1500 D) 2500
46. Kidneys receive nearly how much percent of cardiac output?
- A) 20 B) 25 C) 30 D) 35
47. Red Blood Cells require which of the following vitamins?
- A) B5 B) A C) B12 D) K
48. The purpose of using DNA micro array analysis is
- A) To measure the copy number B) To measure the quantity of DNA
C) To assess the quality of genes D) To quantify expressions of genes
49. Which one of the following is used to generate X-rays?
- A) Nucleons B) Protons C) Electrons D) Neutrinos
50. Which of the following take up colloids?
- A) Kupffer cells B) Hepatocytes C) Myocytes D) Thrombocytes
51. Northern blots are used to identify which of the following?
- A) RNA B) DNA C) Protein D) Plasmids
52. The diameter of blood capillaries when expressed in microns, is close to
- A) 4 B) 8 C) 16 D) 32
53. Each alveolus in lungs is surrounded by nearly how many capillaries?
- A) 200 B) 800 C) 1600 D) 2400
54. Standard deviation is
- A) Square root of the variance B) Square root of the standard error
C) Square of arithmetic mean D) Square of geometric mean

55. Liquid scintillation counter can preferably be used to measure the radioactivity of which of the following?
 A) I-123 B) Tc-99m C) H-3 D) Tl-201
56. What is the maximum annual permissible dose for bone marrow of a radiation worker when expressed in mSv?
 A) 5 B) 25 C) 50 D) 75
57. Brunners gland is present in which of the following?
 A) Colon B) Ileum C) Jejunum D) Duodenum
58. Which of the following process does not occur in nucleus?
 A) Translation B) Transcription C) Repair D) Replication
59. Gamma ray energy of Iodine-123 when expressed in KeV is
 A) 59 B) 159 C) 259 D) 359
60. Which of the following radiations kill thyroid follicles during treatment of Graves' disease?
 A) Alpha particles B) Gamma radiations
 C) Beta particles D) Positrons
61. TSH is released from
 A) Thyroid B) Parathyroid C) Pituitary D) Hypothalamus
62. Primarily Basal Ganglia is associated with
 A) Voluntary movements control B) Hormonal release control
 C) Involuntary control D) Control of hypothalamus function
63. Which of the following is released during annihilation of e^+ and e^- ?
 A) Two photons, each of 511KeV B) Two photons, each of 51KeV
 C) One photon of 51KeV D) One photon 511KeV
64. A dose of 10 rads corresponds to the absorption of which of the following?
 A) 0.01Gy B) 0.1Gy C) 1.0Gy D) 10Gy
65. Which of the following has high affinity for calcium?
 A) Calnexin B) Cathepsin C) Opsonin D) Rhodopsin
66. Which of the following is not related to alimentary canal?
 A) Gastrin B) Ghrelin C) Oxyntomodulin D) Calcitonin
67. Length of the duodenal bulb is close to
 A) 5mm B) 5cm C) 15 mm D) 15 cm
68. Which of the following is part of saliva?
 A) Ptyalin B) Secretin C) Cholecystokinin D) Ghrelin
69. Maximum energy of beta particles emitted from Iodine-131
 A) 506 KeV B) 506 eV C) 606 KeV D) 606 eV

70. Rubidium is an analogue of
A) Strontium B) Potassium C) Selenium D) Technetium
71. Which of the following suppresses the uptake of iodine by the thyroid?
A) Potassium B) Calcium C) Sodium D) Lithium
72. Physical half life of ^{60}Co is
A) 5.27 min B) 5.27 hours C) 5.27 days D) 5.27 years
73. SI unit of exposure is
A) Rontgen B) Sievert
C) Coulomb per Kilogram D) Rad
74. The diameter of nucleus of an element when expressed in meters is approximately
A) 10^{-12} B) 10^{-13} C) 10^{-14} D) 10^{-15}
75. Which of the following cells secrete mucin?
A) Fibroblasts B) Goblet C) Crypt D) Parietal

x-x-x

MSc(HS/2Yr)(Biotechnology)

- Which of the following enzymes have Ribonuclease H like activity
A) 3'→5' Exonuclease
B) Polynucleotide kinase
C) S1 Exonuclease
D) 5'→3' Exonuclease
- Recognizing self antigen over the nonself antigen represents;
A) Immuno-tolerance
B) Immuno-rejection
C) Immuno-compromization
D) Immuno-adherence
- Industrial production of yoghurt from milk protein is produced by which of the following component
A) Aceto-acetic acid
B) Succinic Acid
C) Lactic Acid
D) Acetic Acid
- Isoschizomers are the endonucleases that represent
A) Enzymes isolated from different species of bacteria but recognize and cut same palindrome sequence
B) Enzymes isolated from same species of bacteria but recognize same site but cut at different palindrome sequence
C) Enzymes isolated from same species of bacteria but recognize more than two different site but cut at different palindrome sequence
D) Enzymes isolated from different species of bacteria but recognize more than two different site but cut at different palindrome sequence
- What are the Shine-Dalgarno sequences;
A) Sequences on mRNA where ribosome's binds
B) Sequences on tRNA on to which mRNA binds
C) Sequences on tRNA on to which protein is extended
D) Sequences on rRNA on to which mRNA binds
- The infectious agent that lack any protein coat and consists of RNA only is represented as:
A) Prophage
B) Autophage
C) viroid
D) Cyanobacteria
- Iron forms an important metal ion for functional activity of the proteins, which one of the following proteins does not use Iron for its functional activity
A) Cytoschrome *c*
B) Chlorophyll
C) Hemoglobin
D) Catalase
- A protein with approximate molecular weight of 5720, would have how many number of amino acids:
A) 57 amino acids
B) 52 amino acids
C) 42 amino acids
D) 55 amino acids
- During generation of synthetic organism the host cell in which foreign DNA was inserted is represented by:
A) *M capricolum*
B) *M mycoids*
C) *M. bovis*
D) *M. tuberculli*

- 10.** During somatic cell nuclear transfer , which of the following event is practiced
- A) Nuclear DNA of somatic cell is removed and mixed with nucleus of oocytes to generate Embryo.
 - B) Nuclear DNA of somatic cell is removed and added to enucleated oocytes to generate Embryo
 - C) Nuclear DNA of oocytes is added to enucleated somatic cell to generate Embryo,
 - D) Mitochondrial DNA of oocyte is inserted into somatic cell to generate embryo

- 11.** Which one of the following methodology would you use to identify the terminal ends of RNA molecule?
- A) Restriction Fragment Length Polymorphism
 - B) Repeated Restriction of DNA ends
 - C) Rapid Amplification of cDNA Ends
 - D) Restricted Amplification of DNA molecule

- 12.** All the following methods except one can be used for identifying protein binding sites on DNA molecules
- A) Gel retardation method
 - B) DNA foot printing assay
 - C) Modification interference Assay
 - D) Flowcytometry assay

- 13.** A techniques used to assemble a clone contig is represented by
- A) Chromosome reduction
 - B) Chromosome destruction
 - C) Chromosome recombination
 - D) Chromosome walking

- 14.** Concentration of Magnesium ten times higher than the recommended will result in which of the outcome on gel following PCR reaction.
- A) Absence of any amplified band on gel
 - B) Appearance of multiple bands with high intensity of desired product size
 - C) Appearance of multiple bands with absence of desired product size.
 - D) Single very specific size band will be amplified

- 15.** Vaccines that uses only the component of pathogenic organism to elicit immune response are called
- A) Vector vaccine
 - B) Attenuated vaccine
 - C) Subunit vaccines
 - D) Non infections strain of the infectious species

- 16.** During which cycle of PCR would you first time get the right size Fragment being amplified
- A) 3 cyles
 - B) 30 cycles
 - C) 5 cycles
 - D) 35

- 17.** Antibiotics that are synthesized by successive enzymatic condensation of small carboxylic acids like acetate, propionate and butyrate are called
- A) Polyketide antibiotics
 - B) Polyacidic antibiotics
 - C) Lactam series antibiotics
 - D) sulfuranyl antibiotics

18. Microbially produced polyhydroxyalkanoates are used for making which of the following product
- A) Increasing the taste of the cheese plastic
 B) Producing biodegradable plastic
 C) Producing collagenous scaffolds
 D) Producing digestible colours
19. Which of the following microorganism, classified as world's toughest microorganism, can be potentially exploited for the bioremediation of radioactive contaminants..
- A) *Deinococcus radiodurans*
 B) *Bacillus radiodurans*
 C) *Candida albicans*
 D) *Pseudomonas aeruginosa*
20. Soil microorganism synthesize and secrete a molecule of low molecular mass, called siderophore, which is being exploited in the biotechnology for binding of which of the following ion
- A) Ferric ion
 B) Magnesium ion
 C) Phosphate ion
 D) Nitrogen ion
21. Increase in the lipid content more than the normal, specifically of cholesterol, in plasma membrane will produce which type of effects on membrane.
- A) Increase in the membrane fluidity
 B) Increase in the membrane permeability
 C) increase in the membrane flip flop mechanism
 D) Increase in the membrane rigidity
22. Oubain an known inhibitor of $\text{Na}^+\text{-K}^+$ ATPase activity blocks the active transport through which side of the membrane
- A) Extracellular part of enzyme that binds Na^+ ion.
 B) Intracellular part of enzyme binds K^+ ion.
 C) Extracellular part of enzyme that binds K^+ ion.
 D) Intracellular part of enzyme binds Na^+ ion.
23. The serum in the animal cell culture medium provides all the following, except
- A) Growth hormones
 B) Trypsin inhibitor
 C) Buffering action
 D) Albumin
24. Repeated guanine containing nucleotide in DNA would adopt which type of DNA structure.
- A) G-double helical Watson crick DNA
 B) G-quadruplex
 C) G- singlet
 D) G-triplex
25. DNA Gyrase, assists in unwinding the DNA strand by catalyzing one of the following:
- A) Inducing telomerase activity
 B) Inducing supercoiling activity
 C) Inducing RNAase H activity
 D) Inducing compactness of chromatin

- D) Left and Right borders, ori, Cytokine, Opine.
35. Which of the following orders will hold true for relative permeability in descending order for different classes of molecules across lipid bilayer,
- A) Hydrophobic molecules > small uncharged polar molecules > large uncharged polar molecules > ions
 - B) Hydrophobic molecules > large uncharged polar molecules > small uncharged polar molecules > ions
 - C) ions > small uncharged polar molecules > large uncharged polar molecules > Hydrophobic molecules
 - D) ions > large uncharged polar molecules > small uncharged polar molecules > Hydrophobic molecules
36. The following statements are true for complement system, except
- A) It consists of water soluble proteins
 - B) It consists of inactive proteins that can be activated
 - C) These proteins are continuously made by liver
 - D) These proteins are always active do not need any activation
37. During capping of mRNA which of the following is unusually formed
- A) 5'-3' cyclic triphosphate covalent bond formation
 - B) 3'-3' triphosphate covalent bond formation
 - C) 5'-5' Triphosphate covalent bond formation
 - D) 5'-3' Triphosphate covalent bond formation
38. Which of the following represents an important characters of normal animal cells inculture incomparison to transformed cell in culture.
- A) Crossing of Hayflick limit
 - B) High nuclear to cytosol ratio
 - C) Polyploidy
 - D) Contact Inhibition
39. The resolution limit of a microscope is dependent on
- A) Wavelength of the light and medium of the sample fixation used
 - B) Wavelength of the light and quality of light souce used
 - C) Numerical aperture of the lens system and medium of the sample fixation used
 - D) Numerical aperture of the lens system and wavelength used
40. The eukaryotic cells have three types of RNA polymerases, which of these are used for transcription of protein coding genes.
- A) RNA polymerase I only
 - B) RNA polymerase II only
 - C) RNA polymerase III only
 - D) RNA polymerase I, II and III
41. The human cells use many of the vitamins as critical coenzymes, Identify which of the following does not belong to this group.
- A) Lipoic Acid
 - B) Biotin
 - C) Niacin
 - D) Ascorbic acid
42. The Dendritic cells captures antigen in an innate response and displays it on
- A) Random cells
 - B) MHC molecules
 - C) Antibody molecules
 - D) Complement systems

43. One of the following character best explains the nature of phospholipids
- A) Polar head groups and chain
 - B) Polar head groups and hydrophobic chain
 - C) Hydrophobic head and polar chain
 - D) Hydrophobic head and chain
44. As per the Lambert-Beer's law
- A) Absorbance of a solution is inversely proportional to transmittance
 - B) Absorbance of a solution is directly proportional to transmittance
 - C) Absorbance has no relation with transmittance
 - D) Absorbance is indirectly related to molar equivalence of solute in solution
45. Which of the following mutation is responsible for manifestation of Sickle Cell Anemia disease?
- A) Individuals homozygous for change in codon for sixth amino acid of the α -chain of haemoglobin.
 - B) Individuals homozygous for change in codon for sixth amino acid of the β -chain of haemoglobin.
 - C) Individuals heterozygous for change in codon for sixth amino acid of the α -chain of haemoglobin.
 - D) Individuals heterozygous for change in codon for sixth amino acid of the β -chain of haemoglobin.
46. Which of the following components do not constitute a part of the series of electron carriers in mitochondrial electron transport chain?
- A) Succinyl –CoQ Reductase
 - B) NADPH –CoQ Reductase
 - C) NADPH –Cyt P450 Reductase
 - D) Cytochrome *c* oxidase
47. A culture of animal cells with an indefinite life span is termed as.
- A) Primary cell culture
 - B) Secondary cell culture
 - C) Cell line
 - D) Cell strain
48. Allergy is a result of an antigen leading to dimerization of:
- A) IgE
 - B) IgD
 - C) IgM
 - D) IgG
49. The spindle poles in mitotic dividing animal cells are responsible for organization of which of the proteins?
- A) Tubulin
 - B) Myelin
 - C) Myosin
 - D) Kinesin
50. Identify which of the following stages do not take place in Anaphase of Mitosis.
- A) Duplicated chromosomes separate.
 - B) Chromosomes aligned at equatorial plate.
 - C) Shortening of the kinetochore microtubules at spindle poles.
 - D) Spindle poles move apart
51. The rationale for carrying out fermentation under anearobic conditions is:
- A) To regenerate NAD^+ from NADH for continuing glycolysis

- B) To prevent the loss of energy currency by inhibiting proton pump
 C) To halt glycolysis due to absence of oxygen
 D) To restore glucose level due to anaerobic condition.
- 52.** A specialized invagination of the inner mitochondrial membrane is termed as
 A) Crista B) Thylakoid C) Stroma D) Lamella
- 53.** The pH of 10^{-4} M HCL is equal to:
 A) 8 B) 2 C) 4 D) 6
- 54.** The active site of an enzyme is constituted of the following functionally important regions
 A) Substrate binding site only
 B) Catalytic site only
 C) Substrate binding as well as catalytic site
 D) Substrate binding site serves as the catalytic site also.
- 55.** A living actively metabolizing cell despite production of many acids is able to maintain constant pH due to
 A) Its buffer reservoir of weak bases and acids
 B) Its buffer reservoir of strong bases and weak acids
 C) Its buffer reservoir of weak bases and strong acids
 D) Its buffer reservoir of strong bases and acids
- 56.** DNA fragments are made up of repeating units of nucleotides that are composed of bases sugars and phosphates. When DNA fragments are separated by agarose electrophoresis, the separation proceeds from which of the following ends of electrodes .
 A) From negative to positive
 B) From positive to negative
 C) First from negative to positive and then from positive to negative
 D) First from positive to negative and then from negative to positive
- 57.** The term heterochromatin describes the
 A) Regions of chromatin that remain highly condensed and transcriptionally inactive during interphase
 B) Regions of chromatin that remain highly condensed and transcriptionally active during interphase
 C) Regions of chromatin that remain loosely condensed and transcriptionally inactive during interphase
 D) Regions of chromatin that remain loosely condensed and transcriptionally active during interphase
- 58.** The term *sn*- glycerol in lipids stands for
 A) Specific numbering B) Stereospecific numbering
 C) Similar numbering D) Simplified numbering
- 59.** The signalling mechanism in which a target cell responds to a neurotransmitter produced by a nearby cells and reaching to target by diffusion is termed as.

- A) Paracrine B) Endocrine C) Autocrine D)
Exocrine

60. The majority of digestive enzymes are secreted as zymogens, identify which of the following does not belong to this group

- A) Pepsin B) Trypsin C) Elastase D)
Amylase

61. During fermentation, an Ideal filtration system for sterilization of animal cell culture media, fulfils all the following criteria except.

- A) Filtered medium must be free of fungal, bacterial and mycoplasma contamination
B) Minimal adsorption of proteins to the filter surface
C) Filter pores must be more than 4.0 micron mesh size
D) Filtered medium should be free of endotoxins

62. All the following products are the outcome of fermentation process except

- A) Acetate B) Lactate C) Alcohol D) Oxygen

63. You are asked to chalk out the plan for industrial production of chemical X, which steps would you follow to produce chemical X at industrial scale

- A) Screening, fermentation, downstream processing, Inoculation, removal of waste
B) Screening, Inoculation, fermentation, downstream processing, removal of waste
C) inoculation, screening, removal of waste, Fermentation, downstream processing
D) inoculation , Fermentation, screening, downstream processing, removal of waste,

64. Which of the following genetic change increases the foreign DNA transformation efficiency in bacterial host?

- A) Host cells that are transposases negative
B) Host cells that are both recombination negative and transposases negative
C) Host cells that are both recombination negative and endonucleases negative
D) Host cells that are both transposases negative and endonucleases negative

65. All except one are known method of fermentation

- A) Batch culture B) Continuous culture
C) Exhausting culture D) Fed Batch culture

66. Fatty acids that predominate in phospholipids have been listed below. Identify which one of the Following is unsaturated

- A) Myristic acid B) Palmitic acid C) Stearic acid D)
Palmitoleic

67. Which one of the following is the most abundant carbohydrate in nature

- A) Collagen B) Albumin C) Starch D)
Cellulose

68. The half life of ^{32}P

- A) 4.9 days B) 14.9 days C) 140.9 days D) 1400.9 days

69. As per linkage analysis, if two loci are inherited together then one of the outcome is possible

- A) These must be very close on the same chromosome
B) These must be distant away on the same chromosome
C) The loci got duplicated
D) A mediator DNA fragment connected the two loci

70. Formation of inclusion bodies following transformation of expression plasmid with in bacteria lead to which of the difficulty.

- A) Recovering supercoiled plasmid DNA
B) Recovering correctly folded proteins
C) Recovering correctly folded mRNA
D) Recovering miRNA

71. While studying the protein-protein interaction, a common method of phage display works on the bases that

- A) Phage expresses different proteins on their surface
B) Phage expresses different proteins within the coat proteins
C) Phage expresses single protein on their surface
D) Phage expresses single protein with in coat proteins

72. Among the following, the _____ give the Humoral immunity while _____ give cell mediated immunity.

- A) B cells/T cells B) T cells/B cells
C) Antibodies /Antigens D) Antigens /Antibodies

73. The Kanamycin resistance is used as selection criteria for recombinant DNA selection but as an antibiotic it works through which of the following mechanism.

- A) Binds to 30S subunit & prevents translocation from aminoacyl tRNA site to peptidyl site.
B) Binds to 50S subunit & prevents translocation from aminoacyl tRNA site to peptidyl site.
C) Inhibits cell wall formation
D) Blocks initiation complex formation

74. SDS –PAGE separates the proteins based on which of the following basis

- A) Molecular size B) Electric charge
C) pH D) Protein confirmation

75. Which of the following is the biological buffer

- A) Tris-hydrochloride Buffer B) K_2HPO_4/KH_2PO_4 buffer
C) HEPES Buffer D) Carbonate/Bicarbonate buffer

MSc(2Yr)(Microbial Biotechnology)

1. Protists contain all of the following forms of life except
A) Protozoa B) Fungi C) Slime molds D) Algae
2. Which of the following light is suitable for getting maximum resolution in light microscopy?
A) Red B) Green C) Orange D) Blue
3. The resolving power of unaided human eye is
A) 1 cm B) 100 μ m C) 200 nm D) 400 nm
4. Common chemical fixatives (e.g., ethanol, acetic acid, mercuric chloride, formaldehyde, and glutaraldehyde) used in the staining of microorganisms or tissues are used for
A) Protecting fine cellular substructure generally by reacting with cellular components (proteins and lipids) to render them inactive, insoluble, and immobile
B) Removing water and dehydrating the specimen so dyes may work
C) Immobilize the organism so dyes may work better
D) Make surface of molecules charged so dyes may permanently bind
5. General autoclaving procedure used in the microbiology laboratories would be able to destroy the pathogens EXCEPT those belonging to category
A) Prions B) Virophages C) Bacteriophages D) Planctomycetes
6. Essential amino acid for *Escherichia coli*
A) Lysine
B) Arginine
C) Histidine
D) No amino acids are essential for *Escherichia coli*
7. Selenocysteine, the 21st proteinogenic amino acid is coded by codon
A) UGA B) AGA C) UAG D) UAA
8. Chitin, a major constituent of the exoskeleton, or external skeleton, of many arthropods as well as found in the cell walls of some species of fungi is a
A) Polysaccharide B) Protein C) Proteoglycan D) Lipoprotein
9. Linus Pauling first proposed a model for DNA molecule that consisted of
A) Triple-stranded DNA helix with phosphate groups towards the exterior of the helix
B) Triple-stranded DNA helix with phosphate groups towards the center of the helix
C) Double stranded DNA with parallel strands
D) Double stranded DNA with anti-parallel strands
10. Plasmids are important to the genetics of many bacteria. This is because

- A) They are inherited from one generation to the next
 - B) They may carry genes that give their host a selective advantage
 - C) They can render bacteria drug-resistant
 - D) Statements made in choices A, B, and C above are true for plasmids
- 11.** Some bacteria are considered pleomorphic. This means
- A) They are shaped like bent rods
 - B) They have a corkscrew shape
 - C) They do not have just one shape
 - D) They are not either bacilli or cocci
- 12.** The 70S prokaryotic ribosomes consist of
- A) Two 40S subunits.
 - B) A 50S and a 30S subunit
 - C) A 40S and a 30S subunit
 - D) A 50S and a 20S subunit
- 13.** During Gram staining the Gram positive cells appear so as they
- A) Have a second, outer membrane that helps retain the crystal violet stain
 - B) Have multiple layers of peptidoglycan that help retain the crystal violet stain
 - C) Have a thick capsule that traps the crystal violet stain
 - D) Have a periplasmic space that traps the crystal violet
- 14.** Chemotaxis of Bacteria is accomplished by
- A) Steering toward better growth conditions
 - B) Making long, uninterrupted runs when conditions are good
 - C) Frequently stopping and tumbling to better sense good conditions
 - D) Stopping movement when conditions are good
- 15.** Bacterial endospores serve the purpose of
- A) Allow the bacterium to make hundreds of "seeds" to spread on the wind
 - B) Help the bacterium to differentiate into faster growing stages of bacteria
 - C) Allow the bacterium to survive the absence of oxygen
 - D) Allow the bacterium to survive extended periods of heat or dryness
- 16.** In an exponentially growing culture of *Escherichia coli* there are 2×10^5 cells/ml at a given instance. If the doubling time for *Escherichia coli* is 20 minutes, how many cells/ml you would expect in the culture after 2 hours.
- A) 2×10^5 cells/ml
 - B) 1.2×10^6 cells/ml
 - C) 1.28×10^7 cells/ml
 - D) 2×10^7 cells/ml
- 17.** Which one of the following is the most abundant protein /enzyme in biosphere
- A) Actin
 - B) ATPase
 - C) Pyruvate dehydrogenase
 - D) Ribulose 1,5-bisphosphate carboxylase/oxygenase (rubisco)
- 18.** Most of the CO_2 is fixed in the biosphere by organisms belonging to the group(s) of

- A) Cyanobacteria and Diatoms
- B) Chlorophytes
- C) Plantae and Chlorophytes
- D) Cyanobacteria

19. Phycobilins are

- A) Pigments found in cyanobacteria and red algae
- B) Pigments found in some edible Fungi giving it particular taste
- C) Small chemicals produced on RBC degradation in liver that help in lipid absorption
- D) Small chemicals produced by kidneys to induce RBC production

20. Most abundant microbes on Earth are

- A) Eukaryotes
- B) Prokaryotes
- C) Monerans
- D) Viruses/Virus like particles

21. snoRNA and snRNA play important role in _____ and _____, respectively

- A) Pre-rRNA transcript processing; splicing of pre-mRNA
- B) tRNA processing; gRNA processing
- C) tRNA splicing; splicing of pre-mRNA
- D) miRNA processing; ciRNA processing

22. Red tides are generally

- A) Population blooms of dinoflagellates that release red pigments and toxins, which can lead to paralytic shellfish poisoning
- B) Population blooms of red algae that release red pigments and toxins, which can lead to paralytic shellfish poisoning
- C) Seasonal population blooms of red colored algae in coral reef systems that help sustain the coral reef ecosystem
- D) Observed around full red moons

23. "Nod factors" and "Myc factors" are

- A) Produced/secreted by microbial symbionts of plants and help in the establishment of a symbiotic relationship
- B) Aids the formation of 'Heterocysts' in *Anabaena spp.* that helps in Nitrogen fixation
- C) Responsible for the formation of galls in the members of *Graminae*
- D) Produced by *Agrobacterium tumifaciens* that helps in tumor formation

24. 'Anammox reaction' refers to

- A) Chemolithoautotrophy that employs ammonium ion (NH_4^+) as the electron donor and nitrite (NO_2^-) as the terminal electron acceptor producing nitrogen gas (N_2)
- B) Rare form of Amoxicillin hypersensitivity reaction observed in certain individuals
- C) Chemical reaction that generates an adduct of an animal protein and ammonia
- D) Both choices A and B are true

25. 'Ergotism'
- A) Results from eating grains infected with *Claviceps purpurea*
 - B) Often accompanied by gangrene, psychotic delusions, nervous, spasms, abortion, and convulsions
 - C) The presence of an active ingredient, lysergic acid diethylamide (LSD) in the fungus infected grain is primarily responsible for the symptoms of 'ergotism'
 - D) Statements made in choices A, B and C are true about 'ergotism'
26. If no class I MHC is found / recognized on a cell,
- A) The NK cell uses cytotoxic granules containing perforin and granzyme to induce cell death by apoptosis
 - B) B-cells get activated becoming plasma cells and start producing antibodies
 - C) T_H-cells get activated recruiting T_c for killing such cell
 - D) MHC II class production is induced and cell is ready to change its lineage
27. Aflatoxins are
- A) Produced by *Aspergillus flavus* and related species
 - B) Planar, ringed compounds that easily intercalate in nucleic acids and act as potent frameshift mutagens and carcinogens, primarily affecting liver and causing liver dysfunction and cancer
 - C) Heat stable and have been found in milk, beer, cocoa, raisins, peanut butter, and soybean meal
 - D) Statements made in choices A, B and C are true about aflatoxin
28. Nucleotide-binding and oligomerization domain (NOD) receptors or NOD-like receptors (NLRs)
- A) Found in phagocytes that detect cytosolic pathogen-associated molecular patterns (PAMPs), such as the terminal meso-DAP of Gram-negative peptidoglycan, and host molecules called "damage-associated molecular patterns" (DAMPs), such as uric acid and heat-shock proteins, endogenous metabolites and regulate/promote programmed cell death
 - B) Roots of legumes that detect presence of arbuscular fungi and promote nodule formation
 - C) Nucleoplasm of eukaryotic cells that detect nucleotide levels in the cells and induces salvage pathway of nucleotides.
 - D) Involved in nucleotide uptake from extracellular medium using proton motive force
29. 'Superantigens' are
- A) Molecules that "trick" a huge number of T-cells into activation when no specific antigen is present.
 - B) Antigens that induce strong immune reaction so that protective immunity is generated in a single shot without requiring any booster

- C) An Antigen that induce protective immunity against a number of antigens/pathogens
 D) Complex Antigens that induce protective immunity against a number of antigens/pathogens
30. Which of the following disease is best diagnosed by serologic means?
 A) Pulmonary tuberculosis B) Gonorrhea
 C) Actinomycosis D) Q Fever
31. In lactic acid fermentation the final electron acceptor would be
 A) Oxygen B) Nitrate C) Pyruvate D) Glucose
32. Which of the following best explains why the production of ethanol is important in yeast cells that are growing under anaerobic conditions?
 A) Ethanol keeps the electron transport system functioning
 B) Yeast would be unable to activate the enzymes of the Krebs cycle without ethanol
 C) The process generates oxygen, which is required for glycolysis
 D) The process regenerates NAD⁺, which is required for glycolysis
33. The enzymes that catalyze the reactions of the Krebs cycle are found in which subcellular organelle of eukaryotes?
 A) Chloroplast B) Endoplasmic reticulum
 C) Lysosome D) Mitochondrion
34. Which of the following is accomplished in chemiosmosis?
 A) Oxidation of ATP B) Oxidation of water
 C) Oxidation of NADH D) Oxidation of H⁺
35. Fatty acids are oxidized to acetyl-CoA by which of the following pathways?
 A) Beta oxidation B) Entner-Doudoroff
 C) Tricarboxylic acid pathway D) Embden-Meyerhof pathway
36. Illegitimate recombination refers to
 A) Integration of circular plasmid DNA into linear eukaryotic chromosomes
 B) Integration of introduced DNA at random locations in the host chromosome
 C) Integration of introduced DNA at homologous sites in the host chromosome
 D) Recombination involving or in between DNA sequences that do not share sequence homology to each other
37. One of the first enzymes synthesized by many bacteriophage is _____, an RNA-dependent RNA polymerase called
 A) RNA replicase B) RNA transcriptase
 C) Reverse transcriptase D) RNA polymerase
38. T-even phage binding to *Escherichia coli* supposedly involves

- A) Electrostatic interaction
- B) Hydrophobic interaction
- C) Covalent bonds
- D) Hydrogen bonds

39. In order for CREB to activate transcription:

- A) It must act as a heterodimer
- B) It must be phosphorylated
- C) It must bind to cAMP
- D) It must bind to RNA polymerase

40. Suppose, you like to perform a *DNase*-I protection experiment to see where the binding sites for regulatory transcription factors for the mouse *GAPDH* gene are located. What would you use for a probe?

- A) The *GAPDH* gene coding sequence
- B) A DNA fragment including about 100bp on either side of the promoter
- C) A DNA fragment containing upto several thousand bp upstream of the promoter, one small piece at a time
- D) A DNA fragment including about 500bp downstream of the polyA site of *GAPDH*

gene

41. In RNA editing, the guide RNA:

- A) Must have the same sequence as the end result of the edited RNA.
- B) Must have a complementary sequence to the 5' end of the RNA to be edited
- C) Can change a uracil to another base
- D) Can interact with many different RNAs

42. Which of these would be the best evidence for a functional role of RNA interference in resistance to viral infection?

- A) Cells resistant to double stranded RNA viruses are also likely to be resistant to single stranded RNA viruses
- B) Cells resistant to DNA viruses tend not to also be resistant to RNA viruses
- C) Cells resistant to one double stranded RNA virus tend to be resistant to all double stranded RNA viruses
- D) Cells resistant to a single stranded RNA virus tend to be resistant to DNA viruses

43. Which of the following RNA modifications could best be described as "removal of intervening sequences"?

- A) RNA editing or base modification
- B) 5' capping
- C) Splicing
- D) Trimming

44. Which of the following statements about RNA splicing is NOT correct?

- A) Introns often have a specific function after they are removed
- B) Splicing is required for some tRNAs
- C) The final step of splicing is formation of a phosphodiester linkage
- D) Some introns can splice themselves out

45. Which of the following would be expected to demonstrate that mRNA contains introns?
- A) A comparison of the DNA and mRNA sequences
 - B) A comparison of the genomic DNA and cDNA sequences
 - C) A hybridization between DNA and mRNA molecules
 - D) Any of the choices stated in A, B or C above would demonstrate it
46. What is true for RNA synthesis process carried out by bacterial RNA polymerase?
- A) RNA polymerase requires Zn and Mg ions for activity; the synthesis is DNA template dependent that does not require a primer
 - B) The RNA synthesis is stopped/terminated in a *rho*-dependent and *rho*-independent manner
 - C) The proof reading activity of RNA polymerase slightly decreases the rate of RNA synthesis
 - D) Choices A and B are true
47. Which of the following is a critical function of the 5' cap of eukaryotic mRNAs?
- A) Protection from inappropriate splicing
 - B) Synthesis of the polyA tail
 - C) Transport of mRNAs into the nucleus
 - D) Protection of the nascent mRNA from degradation and help the ribosome recognize the 5' end of the transcript
48. Which of the following is normally found in Gram-negative bacteria but NOT found in archaea?
- A) Outer membrane
 - B) A complex peptidoglycan network
 - C) Both outer membrane and a complex peptidoglycan network
 - D) Circular bacterial chromosome
49. Methanogens are of great importance because
- A) They produce methane
 - B) They consume methane
 - C) Methane is an excellent energy source
 - D) Both choices A and C are true
50. A disease that is constantly present in a population is called _____.
- A) Pandemic
 - B) Epidemic
 - C) Endemic
 - D) Re-emerging
51. Which of the statements about biofilms is INCORRECT?
- A) Biofilms are considered responsible for diseases such as cystic fibrosis
 - B) Biofilms produce dental plaque, and colonize catheters and prostheses
 - C) Biofilms colonize open wounds and burned tissue

- D) Statements made in choices A, B and C are incorrect
52. Members of the genus *Deinococcus*, e.g., *Deinococcus radiodurans* are quite distinctive in their unusually great resistance to
- A) Radiation
B) Desiccation
C) Radiation and desiccation
D) Extreme temperatures
53. The bacteriochlorophyll pigments of purple and green bacteria enable them to live in
- A) Saline environments
B) Deeper, anaerobic zones of aquatic habitats
C) Shallow, warm aquatic habitats
D) Aerobic warm zones
54. Whooping cough is caused by
- A) *Klebsiella pneumonia*
B) *Vibrio parahaemolyticus*
C) *Bordetella pertussis*
D) *Yersinia pestis*
55. *Helicobacter pylori* is responsible for
- A) Gastroenteritis
B) Cholera
C) Bacterial dysentery
D) Peptic ulcer disease
56. Which of the following statement is true about *Agrobacterium tumefaciens*?
- A) It has been used to introduce foreign DNA into plant cells
B) It causes crown gall disease when it carries a tumor inducing (Ti) plasmid
C) It is not capable of nitrogen fixation
D) Statements made in choices A, B and C are true about *Agrobacterium tumefaciens*
57. The streptomycetes may represent _____ of the viable organisms in the soil.
- A) 5%
B) 10%
C) 1-20%
D) 1-10%
58. _____ exhibit yeast-like growth at human body temperatures and mold-like growth at room temperature.
- A) Slime molds
B) Dimorphic fungi
C) Club fungi
D) Black bread molds
59. Fungi are important in the production of all of the following commercial produces EXCEPT
- A) Bread
B) Beer
C) Cheese
D) Rubber
60. The fruiting body of a mushroom is called
- A) Conidiocarps
B) Sorocarps
C) Basidiocarps
D) Ascocarps
61. Peptide nucleic acid (PNA)

- A) Is an artificially synthesized polymer similar to DNA or RNA which are not easily recognized by either nucleases or proteases, making them resistant to degradation by enzymes
 - B) Oligomers bind to complementary DNAs/ RNAs with greater specificity
 - C) Is used in the molecular biology procedures as stable homolog of DNA and RNA, diagnostic assays, and antisense therapies
 - D) Statements made in choices A, B and C are true about PNA
- 62.** “Golden Rice” and “Golden Mustard”
- A) are transgenic varieties developed that have high Vitamin A content
 - B) are high yielding varieties produced by hybridization that produce golden color grains
 - C) are varieties that have been produced to show bioaccumulation of gold in the grains when grown in gold rich soil
 - D) are two Indian varieties which were recently marketed by USA firms as their own
- 63.** As per Coombs and Gell classification the *Type III* hypersensitivity reaction is also known as..... and mediated by.....
- A) Immune complex disease; IgG, complement and Neutrophils
 - B) Cytotoxic, antibody-dependent; IgM or IgG, complement and Macrophages
 - C) receptor mediated autoimmune disease; IgM or IgG and complement
 - D) Wheal and flare; IgE
- 64.** A genomic library is
- A) A database where the sequence of an organism's genome is stored
 - B) A collection of many clones possessing different DNA fragments from the same organisms bound to vectors
 - C) A book that describes how to isolate DNA from a particular organism
 - D) A place where the information of the genetic organization of organisms are kept
- 65.** Which type of restriction endonuclease cuts the DNA within the recognition site and does not require ATP
- A) Type I
 - B) Type II
 - C) Type III
 - D) Type IV
- 66.** The piece of equipment which is used to introduce DNA into cells via DNA-coated microprojectiles is popularly known as
- A) Laser
 - B) DNA probe
 - C) Gene gun
 - D) Inoculating needle
- 67.** The advantage of using a DNA polymerases from thermophilic organisms in PCR is that
- A) These DNA polymerases are much faster than those from other organisms

- B) These DNA polymerases can withstand the high temperatures needed to denature the DNA duplex
- C) These DNA polymerases never make mistakes while replicating DNA
- D) These DNA polymerases can work in low salt concentration
- 68.** Which of the following is true about T-DNA integration in the plant nuclear DNA?
- A) Can occur at many different, apparently random, sites in the plant nuclear DNA
- B) Occurs only at one specific sites in the plant nuclear DNA
- C) Occurs at two specific sites in the plant nuclear DNA
- D) Occurs at one site that may be random in the plant nuclear DNA
- 69.** Protoplasts can be produced from suspension cultures, callus tissues or intact tissues by enzymatic treatment with
- A) Cellulolytic enzymes
- B) Pectolytic enzymes
- C) Both cellulolytic and pectolytic enzymes
- D) Proteolytic enzymes
- 70.** Examples of Probiotics and Prebiotics are _____ and _____, respectively
- A) Penicillin-G; Penicillin
- B) Curd; Cheese
- C) Yogurt/Yoghurt/ Yoghourt; Garlic
- D) Garlic; Yogurt/Yoghurt/ Yoghourt
- 71.** Metabolism of dissolved organic material released by phytoplankton allows heterotrophic bacteria to become part of the particulate organic matter that is passed up the food web to be metabolized and released as mineral elements and CO₂ at each transfer. This description refers to
- A) Microbial loop
- B) Winogradsky column
- C) Redfield ratio
- D) Sheffields law
- 72.** Because it can be used with a variety of media and allow a resuscitation step the _____ technique has become the common and often preferred method of evaluating the microbiological characteristics of water.
- A) Most probable number
- B) Winogradsky
- C) MUG
- D) Membrane filtration
- 73.** Butanol is obtained by fermenting molasses by
- A) *Clostridium butyricum* and *Clostridium acetobutylicum*
- B) *Clostridium butyricum* and *Clostridium tetanai*
- C) *Clostridium butyricum* and *Lactobacillus*
- D) *Clostridium butyricum* and *Clostridium oceanicum*
- 74.** Yeast cells are good source of
- A) Vitamin A & Vitamin D
- B) Vitamin B-complex & Vitamin D
- C) Vitamin A & Vitamin B-complex
- D) Vitamin B-complex and K

75. Fumaric acid is generally obtained from fermentation of

A) *Rhizopus spp.*

B) *Nocardia spp.*

C) *Clostridium spp.*

D) *Ocillatoria spp.*

x-x-x

M.E.Mechanical Engg. (Manufacturing Technology)

- 1. To avoid interference the minimum number of teeth required on helical pinion decreases as helix angle _____**
 - A) Decreases
 - B) Increases
 - C) Does not affect number of teeth
 - D) None of the above
 - 2. Which of the following elements is not used as a roller in roller bearings?**
 - A) Cylindrical
 - B) Taper
 - C) Spherical
 - D) None of the above
 - 3. Which of the following statements is/are true for V-belts?**
 - A) V-belt drives have low reduction ratio
 - B) Due to wedging action slip is negligible in V-belts
 - C) V-belt transmits power over long centre distances
 - D) All of the above
 - 4. The actual breaking stress in stress-strain diagram is the ratio of _____**
 - A) Load at breaking point and original cross-sectional area
 - B) Load at breaking point and reduced cross-sectional area
 - C) Maximum load and original cross-sectional area
 - D) Yield load and original cross-sectional area
 - 5. Two parallel, equal and opposite forces acting tangentially to the surface of the body is called as _____**
 - A) Complementary stress
 - B) Compressive stress
 - C) Shear stress
 - D) Tensile stress
 - 6. Which stress is induced in a member, when expansion or contraction due to temperature variation is prevented?**
 - A) Compressive stress
 - B) Tensile stress
 - C) Thermal stress
 - D) None of the above
 - 7. The beam having one end free and one end fixed is called as _____**
 - A) Cantilever beam
 - B) Continuous beam
 - C) Overhang beam
 - D) Simply supported beam
 - 8. Uniformly varying load between two sections in shear force diagram is represented by _____**
 - A) Cubic curve
 - B) Inclined line
 - C) Horizontal line
 - D) Parabolic curve
 - 9. Bending stress in the cross section of a shaft at the centre _____**
 - A) Is zero
 - B) Decreases linearly to the maximum value of at outer surface
 - C) Both A and B
 - D) None of the above
-

10. The frictional torque transmitted in a flat pivot bearing, considering uniform pressure, is (where μ = Coefficient of friction, W = Load over the bearing, and R = Radius of bearing surface)
 A) $(1/2) \mu W R$ B) $(2/3) \mu W R$ C) $(3/4) \mu W R$ D) $\mu W R$
11. A typewriter mechanism has 7 numbers of binary joints, six links and none of higher pairs. The mechanism is
 A) Kinematically sound
 B) Not sound
 C) Soundness would depend upon which link is kept fixed
 D) Data is not sufficient to determine same
12. If the opposite links of a four bar linkage are equal, the links will always form a
 A) Triangle B) Rectangle C) Parallelogram D) Pentagon
13. Cam size depends upon
 A) Base circle B) Pitch circle C) Prime circle D) Outer circle
14. In a drag link quick return mechanism, the shortest link is always fixed. The sum of
 of
 the shortest and longest link is
 A) Equal to sum of other two B) Greater than sum of other two
 C) Less than sum of other two D) There is no such relationship
15. The ratio of height of Porter governor (when length of arms and links are equal) to
 the height of Watt's governor is (where m = Mass of the ball, and M = Mass on the sleeve)
 A) $m/(m + M)$ B) $M/(m + M)$ C) $(m + M)/m$ D) $(m + M)/M$
16. The operation of forcing additional air under pressure in the engine cylinder is known as
 A) Scavenging B) Turbulence C) Supercharging D) Pre- ignition
-
17. The mean effective pressure obtained from engine indicator indicates the
 A) Maximum pressure developed B) Minimum pressure
 C) Instantaneous pressure at any instant D) Average pressure
18. Which of the following medium is compressed in a Diesel engine cylinder?
 A) Air alone B) Air and fuel
 C) Air and lubricating oil D) Fuel alone
19. A stoichiometric air-fuel ratio is
 A) Chemically correct mixture B) Lean mixture
 C) Rich mixture for idling D) Rich mixture for over loads
20. The ratio of indicated thermal efficiency to the corresponding air standard cycle efficiency is called

- A) Net efficiency
- B) Efficiency ratio
- C) Relative efficiency
- D) Overall efficiency

21. In a refrigeration system, the expansion device is connected between the

- A) Compressor and condenser
- B) Condenser and receiver
- C) Receiver and evaporator
- D) Evaporator and compressor

22. Rating of a domestic refrigerator in tons is of the order of

- A) 0.1
- B) 5
- C) 10
- D) 40

23. The bank of tubes at the back of domestic refrigerator is

- A) Condenser tubes
- B) Evaporator tubes
- C) Refrigerant cooling tubes
- D) Capillary tubes

24. The condition of refrigerant after passing through the condenser in a vapour compression system is

- A) Saturated liquid
- B) Wet vapour
- C) Dry saturated vapour
- D) Superheated vapour

25. The rear teeth of a broach

- A) Perform burnishing operation
- B) Remove minimum metal
- C) Remove maximum metal
- D) Remove no metal

26. Small nose radius

- A) Increases tool life
- B) Decreases tool life
- C) Produces chipping and decreases tool life
- D) Results in excessive stress concentration and greater heat generation

27. The tap used to cut threads in a blind hole is

- A) Taper tap
- B) Second tap
- C) Bottoming tap
- D) Any one of these

28. The increase in depth of cut and feed rate _____ surface finish.

- A) Improves
- B) Deteriorates
- C) Does not effect
- D) None of these

29. A drill mainly used in drilling brass, copper or softer materials, is

- A) Flat drill
- B) Straight fluted drill
- C) Parallel shank twist drill
- D) Tapered shank twist drill

30. The cutting tool in a milling machine is mounted on

- A) Spindle
- B) Arbor
- C) Column
- D) Knee

31. The radial component of velocity for a particle moving in circular path is _____

- A) Constant
- B) Radius itself
- C) Variable
- D) Zero

32. A stone undergoes projectile motion when thrown from top of the building. If it strikes the ground surface at a distance away from the building then its

horizontal

direction is ____

- A) Less than range
- B) More than range
- C) Same as range
- D) Unpredictable

33. The ratio of effective length and least lateral dimension for short column is

- _____
- A) > 12
 - B) < 12
 - C) ≥ 12
 - D) None of the above

34. Slenderness ratio is the ratio of effective length of column and _____

- A) Lateral dimension of a column
- B) Least radius of gyration of a column
- C) Maximum radius of gyration of a column
- D) None of the above

35. According to Coulomb's theory, material subjected to complex stresses fails, if _____ shear stress induced in the material exceeds _____ shear stress at the yield point.

- A) Minimum, maximum
- B) Maximum, minimum
- C) Maximum, maximum
- D) Minimum, minimum

36. What is the product of sectional modulus and allowable bending stress called as?

- A) Moment of inertia
- B) Moment of rigidity
- C) Moment of resistance
- D) Radius of gyration

37. Transmissibility is the ratio of _____

- A) Force transmitted to the supporting structure and force impressed upon the system
- B) Displacement amplitude of mass and displacement amplitude of supporting structure
- C) Both A and B
- D) None of the above

38. What is the head of water available at turbine inlet in hydro-electric power plant called?

- A) Head race
- B) Tail race
- C) Gross head
- D) Net head

39. What is runaway speed of the runner of Pelton wheel?

- A) Maximum unsafe speed of the runner due to sudden increase in load on turbine
- B) Minimum safe speed of the runner due to sudden increase in load on turbine
- C) Maximum unsafe speed of the runner due to sudden decrease in load on turbine
- D) Minimum safe speed of the runner due to sudden decrease in load on turbine

40. Which of the following components of reaction turbine increases the head on the turbine by an amount equal to the height of runner outlet above the tail race?

- A) Scroll casing
- B) Guide vanes
- C) Moving vanes
- D) Draft tube

41. Discharge capacity of the reciprocating pump is _____ that of the centrifugal

pump.

- A) Higher than B) Lower than C) Same as D) Unpredictable

42. The process of filling the liquid into the suction pipe and pump casing upto the level

of delivery valve is called as _____.

- A) Filling B) Pumping C) Priming D) Leveling

43. The ratio of actual whirl velocity to the ideal whirl velocity in the centrifugal compressor is called as _____.

- A) Velocity factor B) Slip factor
C) Work factor D) None of the above

44. The motion of the cam is transferred to the valves through

- A) Pistons B) Rocker arms C) Camshaft pulley D) Valve stems

45. In a single dry plate clutch, torsional vibrations are absorbed by

- A) Coil springs known as torsional springs
B) Cushion springs
C) Central hub
D) Clutch pedal

46. A grinding wheel is said to be of _____ if the abrasive grains can be easily dislodged.

- A) Soft grade B) Medium grade C) Hard grade D) None of these

47. The high cutting speed and large rake angle of the tool will result in the formation of

- A) Continuous chips B) Discontinuous chip
C) Continuous chips with built up edge D) None of these

48. In a shaper, the length of stroke is increased by

- A) Increasing the centre distance of bull gear and crank pin
B) Decreasing the centre distance of bull gear and crank pin
C) Increasing the length of the arm
D) Decreasing the length of the slot in the slotted lever

49. Heat transfer takes place as per

- A) Zeroth law of thermodynamics B) First law of thermodynamic
C) Second law of the thermodynamics D) Kirchoff's law

50. The thickness of thermal and hydrodynamic boundary layer is equal if Prandtl number is

- A) Equal to one B) Greater than one
C) Less than one D) Equal to Nusselt number

51. The critical radius is the insulation radius at which the resistance to heat flow is

- A) Maximum B) Minimum C) Zero D) None of these

52. Ram compression in turbojet involves

- A) Reduction of speed of incoming air and conversion of part of it into pressure energy
B) Compression of inlet air
C) Increasing speed of incoming air
D) Lost work

53. The maximum heat loss in a boiler occurs due to

- A) Moisture in fuel
B) Dry flue gases
C) Steam formation
D) Unburnt carbon

54. It is required to produce large amount of steam at low pressure. Which boiler should be used?

- A) Pulverized fuel fired boiler
B) Cochran boiler
C) Lancashire boiler
D) Babcock and Wilcox boiler

55. To prevent the body of the blade from jamming in the saw cut, the teeth of blade are

- A) Strengthened
B) Sharpened
C) Set
D) All of these

56. The flux commonly used in brazing is

- A) Zinc chloride
B) Ammonium chloride
C) Resin plus alcohol
D) Borax

57. Shift is a casting defect which

- A) Results in a mismatching of the top and bottom parts of a casting
B) Results in general enlargement of a casting
C) Occurs near the ingates as rough lumps on the surface of a casting
D) Occurs as sand patches on the upper surface of a casting

58. In sheet metal work, cutting force on the tool can be reduced by

- A) Grinding the cutting edges sharp
B) Increasing the hardness of tool
C) Providing shear on tool
D) Increasing the hardness of die

59. Which one among the following welding processes uses non-consumable electrode?

- A) Gas metal arc welding
B) Submerged arc welding
C) Gas tungsten arc welding
D) Flux coated arc welding

60. In DC arc welding, if leads are arranged in work as Negative pole of the welding arc

and electrode as Positive pole of the welding arc, the arrangement is known as

- A) Fusion
B) Reverse polarity
C) Forward welding
D) Direct polarity

61. In abrasive jet machining, as the distance between the nozzle tip and the work surface increases, the material removal rate

- A) Increases continuously
B) Decreases continuously
C) Decreases becomes stable and then increases
D) Increases, becomes stable and then decreases
-

- 62. During normalizing process of steel, the specimen is heated**
 A) Between the upper and lower critical temperature and cooled in still air.
 B) Above the upper critical temperature and cooled in furnace.
 C) Above the upper critical temperature and cooled in still air.
 D) Between the upper and lower critical temperature and cooled in furnace.
- 63. 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

- 64. The material property which depends only on the basic crystal structure is**
 A) Fatigue strength B) Work hardening
 C) Fracture strength D) Elastic constant
- 65. Screws used for power transmission should have**
 A) Low efficiency B) High efficiency
 C) Very fine threads D) Strong teeth
- 66. The fatigue life of a part can be improved by**
 A) Electroplating B) Polishing
 C) Coating D) Shot peening
- 67. Stress concentration in static loading is more serious in**
 A) Ductile materials B) Brittle materials
 C) Equally serious in both cases D) Depends on other factors
- 68. Spiral gears are used only if the axes of two shafts are non-intersecting, non-parallel and _____.**
 A) Perpendicular B) Parallel
 C) Non-perpendicular D) None of the above
- 69. What is the function of gudgeon pin?**
 A) Acts as stiffeners B) Supports piston head
 C) Connects piston to connecting rod D) All of the above
- 70. Which criteria of failure is used to indicate St Venant's theory?**
 A) Maximum principal stress theory B) Maximum principal strain theory
 C) Shear stress theory D) None of the above
- 71. The thermodynamic cycle on which the petrol engine works, is**
 A) Otto cycle B) Joule cycle
 C) Rankine cycle D) Stirling cycle
- 72. The basic requirement of a good combustion chamber is**
 A) Minimum turbulence
 B) Low compression ratio
 C) High thermal efficiency and power output
 D) Low volumetric efficiency
-

73. The output of a diesel engine can be increased without increasing the engine revolution or size in following way

- A) Feeding more fuel
- B) Heating incoming air
- C) Scavenging
- D) Supercharging

74. The refrigerant for a refrigerator should have

- A) High sensible heat
- B) High total heat
- C) High latent heat
- D) Low latent heat

75. In a reversed Brayton cycle, the heat is absorbed by the air during

- A) Isentropic compression process
- B) Constant pressure cooling process
- C) Isentropic expansion process
- D) Constant pressure expansion process

x-x-x
