PUMEET – 2019

Important: *Please consult your Admit Card/Roll No. slip before filling your Roll Number on the Test Booklet and Answer Sheet.*

Roll No.   *(In Figure)*   *(In Words)*

O.M.R. Answer Sheet Serial No.

Signature of Candidate: _____   *Signature of Invigilator:* _____

Time: 100 Minutes   **Number of Questions: 100**   **Maximum Marks: 100**

DO NOT OPEN THE SEAL ON THE BOOKLET UNTIL ASKED TO DO SO.

INSTRUCTIONS:

1. Write your Roll No. on the Questions Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
2. Enter the Question Booklet Serial No. on the OMR Answer Sheet. Darken the corresponding bubbles with **Black Ball Point/Black Gel Pen**.
3. Do not make any identification mark on the Answer Sheet or Question Booklet.
4. Please check that this Question Booklet contains **100** Questions. In case of any discrepancy, inform the Assistant Superintendent within 10 minutes of the start of Test.
5. Each question has four alternative answer (A,B,C,D) of which only one is correct. For each question, darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer Sheet with **Black Ball Point/Black Gel Pen. There shall be negative marking for wrong answer, ¼ of the marks of the question will be deducted for every wrong answer.**
6. If you do not want to answer a question, leave all the bubbles corresponding to that question blank in the Answer Booklet. No marks will be deducted in such cases.
7. **35 minutes Extra would be given to the visually handicapped/PwD Candidates.**
8. **Darken** the bubbles in the OMR Answer Sheet according to the Serial No. of the question given in the Question Booklet.
9. If you want to change an already marked answer, erase the shade in the darkened bubble completely.
10. For rough work only the blank sheet at the end of the Question Booklet be used.
11. The University will provide Logarithmic table. Borrowing of log table or other material is not allowed.
12. The Answer Sheet is designed for computer evaluation. Therefore, if you do not follow the instructions given on the Answer Sheet, it may make evaluation by the computer difficult. **Any resultant loss to the candidate on the above account, i.e. not following the instructions completely, shall be of the candidate only.**
13. After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
14. In no case the Answer Sheet, the Question Booklet, or its part or any material copied/noted from this Booklet is to be taken out of the examination hall. Any candidate found doing so would be expelled from the examination.
15. A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistant or found giving or receiving assistant or found using any other unfair means during the examination will be expelled from the examination by the Centre Superintendent/Observer whose decision shall be final.
16. **Communication equipment such as mobile phones, pager, wireless set, scanner, camera or any electronic/digital gadget etc., is not permitted inside the examination hall. Use of calculators is not allowed.**
17. The candidates will not be allowed to leave the Examination Hall/Room before the expiry of the allotted time.

1. Determine which one of the following series converges:

(A) $\sum_{n=1}^{\infty} \frac{n-1}{n^2+1}$

(B) $\sum_{n=1}^{\infty} \sin\left(\frac{1}{n}\right)$

(C) $\sum_{n=1}^{\infty} \frac{2}{n(n+2)}$

(D) $\sum_{n=1}^{\infty} (-1)^2$

2. Determine the set of all values x such that the series $\sum_{n=0}^{\infty} (\log_e(x))^n$ converges:

(A) Diverges for all x

(B) $1 < x < e$

(C) Converges for all x

(D) $e^{-1} < x < e$

3. Find the sum $\sum_{n=1}^{\infty} \frac{2^{n-1}}{5^{n+1}}$

(A) $\frac{1}{6}$

(B) $\frac{1}{15}$

(C) $\frac{7}{3}$

(D) $\frac{5}{2}$

4. The first three nonzero terms of the Maclaurin series expansion of $e^x \sin x$:

(A) $x - x^2 + \frac{1}{2}x^3$

(B) $x + x^2 - x^3$

(C) $x + x^2 + \frac{2}{3}x^3$

(D) $x - x^2 + \frac{1}{3}x^3$

5. The radius of convergence R of the power series $\sum_{n=1}^{\infty} \frac{(x-5)^n}{n^n}$ is:

(A) $R = 1$

(B) $R = 5$

(C) $R = 1/5$

(D) $R = \infty$

6. An integrating factor for differential equation $xy' - 2y = 10x^3$ is:

(A) y

(B) x

(C) x+y

(D) x^{-2}

7. The differential equation that includes the curve $y = e^x$ as a solution is:

(A) $xy' = y \log y$

(B) $xy' = y \log x$

(C) $yy' = y \log y$

(D) $x + y' = y \log y$

8. Particular integral of $(D^2 - 3D + 2)y = 12e^{5x}$ is:

(A) e^{-5x}

(B) e^{5x}

(C) $e^{x/5}$

(D) $e^{5/x}$

9. $\int_0^\infty \frac{e^{-1000t} - e^{-2000t}}{t} dt =$

(A) Log 5

(B) $\log 3$

(C) $\log 2$

(D) $\log (1/2)$

10. Let $F(s) - \int_0^\infty e^t e^{-st} dt, s \in R$. Then $F(s)$ makes sense:

(A) For all $s \epsilon R$

(B) For all s with $s \neq 1$

(C) For all s with $s > 1$

(D) For all s with $s > 0$

11. If f is a function of period 2, and the Fourier series representation for f is given by:

$$\frac{a_0}{2} + \sum_{n=1}^{\infty} (a_n \cos \pi x + b_n \sin \pi x)$$

Then:

(A) $a_2 = \int_{-1}^{1} f(x)\cos 2\pi x dx \quad b_2 = \int_{-1}^{1} f(x)\sin 2\pi x dx$

(B) $a_2 = \frac{1}{2}\int_{-1}^{1} f(x)\cos 2\pi x dx \quad b_2 = \frac{1}{2}\int_{-1}^{1} f(x)\sin 2\pi x dx$

(C) $a_2 = \int_{-1}^{1} f(x)\cos \pi x dx \quad b_2 = \int_{-1}^{1} f(x)\sin \pi x dx$

(D) $a_2 = \frac{1}{2}\int_{-1}^{1} f(x)\cos \pi x dx \quad b_2 = \frac{1}{2}\int_{-1}^{1} f(x)\sin \pi x dx$

12. The value of $\int_0^{\infty} e^{-st}\cos t \sin t\, dt$ is:

   (A)   0.5   (B)   0.2   (C)   0.4   (D)   Not defined

13. Which of the following partial differential equation is linear?

   (A) $u_t - ku_{xx} = u^2$ (B) $u_{tt} - u_t u_x = u + xt$

   (C) $u_{tt} + 3u_x = 3$ (D) $u_t t - uu_x = 0$

14. The Fourier series for the function $f(x) = x, -2 < x < 2, f(x+4) = f(x)$ is given by

$f(x) = \frac{4}{\pi}\sum_{n=1}^{\infty} \frac{a_n}{n}\sin\left(\frac{n\pi x}{2}\right)$. Then $a_n =$

   (A) $(-1)^n$ (B) $(-1)^{n+1}$ (C)   1   (D)   -1

15. If the Laplace transform of $f(t)$ if $F(s)$, then the Laplace transform of $e^{at}f(t)$ is:

   (A) $F(s-a)$ (B) $F(s+a)$ (C) $e^{s/a}F(s)$ (D) $e^{-s/a}F(s)$

16. Given differential equation $y'' - 3y' + 2y = 4e^{2t}$, $Y(0) = -3$ and $y'(0) = 5$. If the Laplace transform of y is denoted by Y, then Y=

   (A) $\dfrac{3s^2 - 20s + 24}{(s-1)(s-2)}$ (B) $\dfrac{3s^2 + 20s + 24}{(s-1)^2(s-2)}$

   (C) $\dfrac{3s^2 - 20s + 24}{(s-1)(s-2)^2}$ (D) $\dfrac{3s^2 - 20s + 24}{(1-s)(s-2)^2}$

17. Let a_k and b_k be the Fourier coefficients for the square impulse function:

$f(x) = \begin{cases} 1 & 0 < x < 1 \\ 0 & 1 < x < 2\pi \end{cases}$, and $f(x+2\pi) = f(x)$. Then for $k \geq 1$

   (A) $a_k = \dfrac{\sin k}{k\pi}, \quad b_k = \dfrac{\cos k}{k\pi}$ (B) $a_k = \dfrac{\sin k}{k\pi}, \quad b_k = 0$

   (C) $a_k = 0, \quad b_k = \dfrac{\cos k}{k\pi}$ (D) $a_k = \dfrac{\sin k}{k\pi}, \quad b_k = \dfrac{1-\cos k}{k\pi}$

18. A first order partial differential equation with solution $(x-y)^{3/2} + 2y$ is:

   (A) $u_x + u_y = 2$ (B) $u_x + u_y = 2y$ (C) $u_x - u_y = 2$ (D) $u_x - u_y = 2y$

19. Which of the following functions is solution of the partial differential equation $u_{xx} - 9u_{yy} = 0$?

(A) $u(x,y) = x^3 + y^2$

(B) $u(x,y) = \cos(3x + y)$

(C) $u(x,y) = e^{3x}\sin y$

(D) $u(x,y) = \sin(x + 3y)$

20. The Laplace transform of $f(x) = \begin{cases} 0 & x < 9 \\ 1 & x < 9 \end{cases}$ is:

(A) $e^{-9s/s}$

(B) $e^{9s/s}$

(C) $e^{-9s}s$

(D) e^{-9s}

21. If $\ell = \lim\limits_{(x,y,z) \to (0,0,0)} \dfrac{x + 2y - 3z}{\sqrt{x^2 + y^2 + z^2}}$, then:

(A) $\ell = 0$

(B) $\ell = 1$

(C) $\ell = 2$

(D) The limit does not exist

22. Find parametric equations for the tangent line to the curve at t=0
$$r(t) = \left(t^2 + 3t + 1, e^t \cos t, \log_e(t+1)\right)$$

(A) $(2+3t,1+t,t)$

(B) $(3+2t,1+t,1)$

(C) $(3t,2t,1+t)$

(D) $(2-t,1+t,3-3t)$

23. The maximum value of $(xy)^6$ on $x^2 + 4y^2 = 4$ occurs at a point (x,y) for which y^2 is equal to:

(A) $\sqrt{2}/3$

(B) $2/3$

(C) $1/2$

(D) 1

24. Find $\iint_R \left(8 - \dfrac{(x^2 + y^2)^2}{2}\right) dx\,dy$ where $R = \{(x,y): x^2 + y^2 \le 2\}$

(A) 23π

(B) $80\pi/3$

(C) $34\pi/3$

(D) $46\pi/3$

25. Find the volume under the surface $z = \sqrt{1 - x^2}$ and above the triangle formed by $y = x, x = 1$ and the x-axis:

(A) 1

(B) $1/2$

(C) $1/3$

(D) $1/4$

26. For a vector field $F = (x^2, 4xy^3, xy^2)$ and the surface S, the rectangular region in the plane $z = y$ with vertices $(0,0,0),(1,0,0),(1,3,3),(0,3,3)$ compute the surface integral $\iint_S F.\hat{n}dS$:

(A) 90

(B) 45

(C) $3\pi/4$

(D) $2\pi/7$

27. The directional derivative of $f(x,y) = x^2y^3 + 2x^4y$ at the point $(1,-2)$ in the direction $3\hat{i} - 4\hat{j}$ is:

(A) -152

(B) -20

(C) -30.4

(D) -4

28. The integral $\iint_G (x^2 + y^2) dx\,dy$ where G is domain bounded by $x^2 + y^2 = 2ax$. When passing to polar coordinates the integral is:

(A) $\int_0^{\pi/2} \int_0^r r^3 dr\,d\theta$

(B) $\int_{-\pi/2}^{\pi/2} \int_0^r r^3 dr\,d\theta$

(C) $\int_{-\pi/2}^{\pi/2} \int_0^{2a\cos\theta} r^2 dr\,d\theta$

(D) $\int_{-\pi/2}^{\pi/2} \int_0^{2a\cos\theta} r^3 dr\,d\theta$

(3)

29. The least value of the function $f(x, y, z) = x$ such that $x^2 + y^2 + z^2 = 1$ and $x + y + z = 1$ is:

    (A) $-1/3$ (B) $-1/2$ (C) $-1/9$ (D)   1

30. Let $f(x, y) = e^{xy} \sin(x + y)$. In what direction, starting at $\left(0, \pi/2\right)$, is changing the fastest:

    (A) $\hat{i}$ (B) $\hat{j}$ (C) $\hat{i} + \hat{j}$ (D) $\hat{i} - \hat{j}$

31. A mass-spring system will behave like a damped harmonic oscillator with exponentially decaying amplitude, if :
    (A)   The restoring force and resistive force, both are proportional to displacement
    (B)   The restoring force is proportional to instantaneous velocity and resistive force is are proportional to displacement of mass
    (C)   The restoring force proportional to displacement and the resistive force proportional to instantaneous velocity of mass
    (D)   The restoring force and resistive force, both are constant

32. Which of the following expressions correctly represents forced oscillations?

    (A) $\frac{d^2y}{dt^2} + \omega^2 y = 0$ (B) $\frac{d^2y}{dt^2} + 2k\frac{dy}{dt} + \omega^2 y = F \sin pt$

    (C) $\frac{d^2y}{dt^2} = 0$ (D) $\frac{d^2y}{dt^2} + 2k\frac{dy}{dt} + \omega^2 y = 0$

33. A massless spring suspended from a rigid support, carries a flat disc of mass 200 g at its lower end. It is observed that the system oscillates with frequency 20 Hz and amplitude of the damped oscillation reduces to half of its undamped value in 60 sec. Then, the time in which its amplitude decays to (1/e) of its initial value is (Given $Log_e\ 2 = 2.303 \times 0.3010$)

    (A)   ~ 85 sec   (B)   ~ 25 sec   (C)   ~ 115 sec   (D)   ~ 70 sec

34. Ionic solids with Schottky defects contain in their structures:
    (A)   Cation vacancies and interstitial cations
    (B)   Interstitial anions and anion vacancies
    (C)   Cation vacancies only
    (D)   Equal number of cation and anion vacancies

35. Shift in wavelength of incident photons after scattering from a free electron depends on:
    (A)   Scattering angle and wavelength of incident photon
    (B)   Scattering angle only
    (C)   Wavelength of incident photon only
    (D)   Impact factor

36. An X-ray tube has 0.5 cm gap between the Cu anode and cathode filament. The maximum energy photons produced for an applied voltage of 20,000 V will be:
    (A)   40 keV bremsstrahlung
    (B)   Cu K X-rays
    (C)   Cu L X-rays
    (D)   20 keV bremsstrahlung

37. In He-Ne laser, the 632.8 nm laser transition takes place between:
    (A) Metastable state and the ground state of Ne
    (B) Metastable state and the excited state of Ne
    (C) Metastable state of He and the ground state of Ne
    (D) Metastable state and the ground state of He

38. Light of wavelength 500 nm is made to pass from air to glass, its wavelength and frequency in the glass (refractive index = 1.5) will be:
    (A) 500 nm and 6×10^{14} Hz   (B) 500 nm and 4×10^{14} Hz
    (C) 333 nm and 6×10^{14} Hz   (D) 333 nm and 4×10^{14} Hz

39. A match box exhibits:
    (A) Orthorhombic geometry   (B) Triclinic geometry
    (C) Cubic geometry   (D) Tetragonal geometry

40. The Miller indices of a plane parallel to the x and y-axes can be:
    (A) (1 1 0)   (B) (0 0 1)   (C) (0 1 0)   (D) (1 1 1)

41. Michelson-Morley experiment was performed to:
    (A) Prove particle nature of light
    (B) Measure the speed of light
    (C) Measure speed of the earth relative to ether
    (D) Test the isotropy of space

42. Covalent bonds are formed due to:
    (A) Electrostatic attraction of oppositely charged ions
    (B) Electrostatic force due to oscillating dipoles between molecules
    (C) Mutual sharing of valence electrons between atoms
    (D) Electrostatic force due to permanent dipoles between molecules

43. Two beams, A and B, of plane polarised light have mutually perpendicular planes of polarisation. These beams are seen through a polaroid. From the position when the beam A has maximum intensity and beam B has a zero intensity, a rotation of plane polaroid through 30° makes the two beams appear equally bright. If the initial intensities of the two beams are I_A and I_B, respectively, then the ratio I_A/I_B equals:
    (A) 3   (B) 1/2   (C) 2   (D) 1/3

44. The kinetic energy of a body (rest mass m_0 and relativistic mass m) moving with relativistic speed v is given by:
    (A) $(m-m_0)c^2$ (B) $\frac{1}{2}mv^2$ (C) m_0c^2 (D) mv^2

45. A loaded vertical spring executes simple harmonic motion with a time period of 4 sec. The difference between the kinetic energy and potential energy of this system varies with a period of:
    (A) 8 sec   (B) 1 sec   (C) 2 sec   (D) 4 sec

46. The number of atoms present in the unit cell of hcp structure is:
   (A) 2   (B) 6   (C) 4   (D) 7

(5)

47. Which of the following is not an acceptable wave function:
    (A) k/x (B) k/x^2 (C) $\exp(-\alpha x)$ (D) kx^2

48. When light is incident on a transparent slab at an angle of incidence equal to Brewster's angle, the reflected and refracted rays are:
    (A) $180°$ to each other   (B) $60°$ to each other
    (C) Right angles to each other   (D) $135°$ to each other

49. A relativistically moving sphere will be observed as:
    (A) Contracted longitudinally   (B) Sphere of contracted size
    (C) Sphere of enlarged size   (D) Contracted in transverse direction

50. If $\psi(x, t)$ is the time dependent wavefunction describing the motion of a particle. The expectation value of position coordinate x is given by:

    (A) $\int \psi^* x \dfrac{\partial \psi}{\partial t} dx$ (B) $\int x \dfrac{\partial \psi}{\partial t} dx$ (C) $\dfrac{\int \psi^* x \psi dx}{\int \psi^* \psi dx}$ (D) $\int x dx$

51. Which of the following molecular orbital/s of F_2 has highest energy?
    (A) $\pi^* 2p_x$ (B) $\pi^* 2p_y$
    (C) $\sigma 2p_z$ (D) $\pi^* 2p_x$ and $\pi^* 2p_y$

52. What is the shape of SOF_4 molecule?
    (A) Square pyramidal   (B) Trigonal bipyramidal
    (C) See-Saw   (D) Octahedral

53. Which of the following orbitals interact to form δ-overlap/bond?
    (A) d_z^2 orbitals   (B) d_{xy} orbitals   (C) d_{xz} orbitals   (D) d_{xy} and d_{yz}

54. Which of the following has Wurtzite structure?
    (A) ZnS   (B) MnO_2 (C) NaCl   (D) CsCl

55. Which of the following represents a double chain silicate?
    (A) SiO_3^{2-} (B) $Si_4O_{11}^{6-}$ (C) $Si_2O_5^{2-}$ (D) $Si_3O_9^{6-}$

56. Which of the following complexes shows lowering of energy of d_z^2 as compared to d_{xy} and d_{x2-y2} after crystal field splitting?
    (A) Octahedral complexes   (B) Tetrahedral complexes
    (C) Tetragonal complexes   (D) Square planar complexes

57. What is the crystal field stabilization energy for Fe^{3+} ion when $\Delta_o > P$?
    (A) $-20Dq + 2P$ (B) 0 (C) $-20 Dq$ (D) $+8 Dq$

58. Which of the following metal is responsible for Minamata disease?
    (A) Pb   (B) Hg   (C) Cr   (D) Cd

59. Which of the following cannot be used for anoidic coating of copper?
    (A) Zn   (B) Al   (C) Cd   (D) Ni

60. Which of the following is produced at cathode in corrosion?
    (A) Hydrogen gas (B) Oxygen gas (C) Fe ions (D) $Fe(OH)_2$

61. A 15 L cylinder contains 12 moles of oxygen gas at 27°C. Due to the sudden explosion of cylinder, the oxygen gas escapes into the atmosphere where the pressure recorded is 1.5 atm. Calculate the word done by the gas. ($R = 0.082$ L atm K^{-1} mol^{-1})
    (A) -27.84 kJ (B) -27.58kJ (C) -28.24kJ (D) -27.34kJ

62. Which of the following sate function is an extensive property?
    (A) Temperature (B) Refractive index
    (C) Viscosity (D) Volume

63. Calculate the difference between the heat of reaction at constant volume and that of constant pressure for the given reaction at 25°C

    $$2 C_6H_6 (l) + 15 O_2 (g) \rightarrow 12 CO_2 (g) + 6 H_2O (l)$$

    (A) -7.43kJ (B) -7.89kJ (C) -7.23kJ (D) -7.34kJ

64. A solution of fructose containing 9.56 g of fructose in 10 g of water has possessed vapour pressure of 4.988 mm at 0°C. If the vapour pressure of pure water 5.23mm of Hg. Calculate the molecular mass of fructose.
    (A) 371.82 (B) 371.89 (C) 372.82 (D) 372.89

65. Which of the following statement is true?
    (A) Boiling point of the solution falls on increasing the amount of solute
    (B) Freezing point of the solution falls on increasing the amount of solvent
    (C) Freezing point of the solution increases on increasing the amount of solute
    (D) Freezing point of the solution falls on increasing the amount of solute

66. A substance T (with mol mass 100) associates in water to form dimer. A solution of 0.75 g of T in 12.5 g of water lowers the freezing point by 0.6°C. Calculate the degree of association. [Kf for H_2O = 1.86 K kg mol^{-1}]
    (A) 90% (B) 91% (C) 92% (D) 93%

67. The natural silk is a:
    (A) Polypeptide (B) Polyacrylate (C) Polyester (D) Polysaccharide

68. Soft drinks and baby feeding bottles are generally made up of:
    (A) Polyamide (B) Polyurethane (C) Polystyrene (D) Polyester

69. The polymer used for making the bullet proof glass is:
    (A) Polypropylene (B) Polycarbonate
    (C) Polystyrene (D) Teflon

70. The low density polyethylene is a polymer with:
    (A) Large number of carbon atom in the main chain
    (B) Smaller number of carbon atom in the main chain
    (C) Less branched main carbon chain
    (D) More branched main carbon chain

(7)

71. The magnitude of current I_6 for the network of Fig. is:

$I_2 = 12$ A b $I_5 = 8$ A

$I_1 = 10$ A a I_4 d I_7

I_3 I_6 c
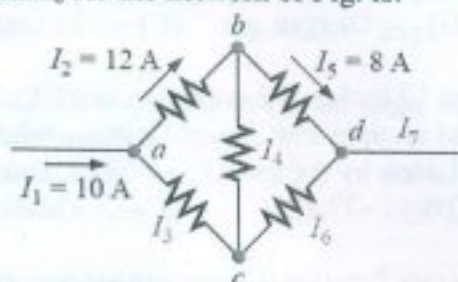
(A)   1 A   (B)   2 A   (C)   3 A   (D)   4 A

72. Norton's Theorem states that:
   (A)   Any two-terminal, linear bilateral dc network can be replaced by an equivalent circuit consisting of a voltage source and a series resistor
   (B)   Any two-terminal, linear bilateral dc network can be replaced by an equivalent circuit consisting of a voltage source and a parallel resistor
   (C)   Any two-terminal linear bilateral dc network can be replaced by an equivalent circuit consisting of a current source and a parallel resistor
   (D)   Any two-terminal linear bilateral dc network can be replaced by an equivalent circuit consisting of a current source and a series resistor

73. An electrical device is rated 5 kVA, 100 V at a 0.6 power-factor lag. the impedance of the device is:
   (A) $0.2\angle53.13°\ \Omega$ (B) $1\angle53.13°\ \Omega$
   (C) $1.5\angle53.13°\ \Omega$ (D) $2\angle53.13°\ \Omega$

74. For small signal ac operation, a practical forward biased diode can be modelled as:
   (A)   A resistance and a capacitance
   (B)   An ideal diode and resistance in parallel
   (C)   A resistance and an ideal diode in series
   (D)   A resistance

75. The drift current in a semiconductor device varies with:
   (A)   Only the electric field applied
   (B)   Only the carrier concentration
   (C)   Both electric field and carrier concentration
   (D)   Drift current is independent

76. Compared to a common base amplifier, a common emitter amplifier has:
   (A)   Lower input resistance   (B)   Lower current amplification
   (C)   Higher output resistance   (D)   Higher current amplification

77. The BCD number 0010 1001.0111 0101 when converted to binary is:
   (A)   11101.11   (B)   11001.01   (C)   11110.10   (D)   11101.01

78. Which of the following expressions is known as the Idempotent Law of Boolean algebra?
   (A)   0.X=0; 1+X=1   (B)   1.X=X; 0+X=X
   (C)   X.X....X=X; X+X+..+X=X   (D)   1.X=X; 1+X=X

79. The speed of DC series motor at no load is:
    (A) Zero
    (B) Infinity
    (C) 100 rpm
    (D) Does not depend on load

80. The function of the commutator in DC machine is:
    (A) To change dc voltage to ac voltage
    (B) To change ac voltage to dc voltage
    (C) For easy control of voltage
    (D) To provide physical braking

81. The resultant force acting in a couple is:
    (A) Zero
    (B) Infinite
    (C) Twice the magnitude of the single force
    (D) Half the magnitude of the single force

82. What will be the ratio of Youngs modulus to the modulus of rigidity of a material having Poissons ratio 0.25?
    (A) 1.5   (B) 2.5   (C) 3.0   (D) 3.5

83. Spot welding is used to weld metal pieces whose thickness:
    (A) Should be greater than 12 mm
    (B) Lesser than 12 mm
    (C) Lies between 15 to 20 mm
    (D) Greater than 20 mm

84. The location of left-hand-side-view in the third-angle method of projection is on the:
    (A) Left-hand-side of front-view
    (B) Left-hand-side of top-view
    (C) Right-hand-side of front-view
    (D) Right-hand-side of top-view

85. Development of curved surface of a cylinder will be:
    (A) Circle   (B) Sector   (C) Triangle   (D) Rectangle

86. Gas laws are applicable to........
    (A) Gases as well as vapours
    (B) Gases alone and not to vapours
    (C) Gases and steam
    (D) Gases and vapours under certain conditions

87. Parameters a and b in the van der Waals and other cubic equations of state represent:
    (A) A-molecular attraction, b-molecular size
    (B) A-molecular size, b-molecular speed
    (C) A-molecular size, b-molecular attraction
    (D) A-molecular weight, b-molecular polarity

88. Instrument used to measure humidity is the:
    (A) Barometer   (B) Thermometer   (C) Spring meter   (D) Psychometer

89. In a binary liquid solution of components A and B, if component A exhibits positive deviation from Raoult's law then component B:
    (A) Exhibits negative deviation from Raoult's law
    (B) Exhibits positive deviation from Raoult's law
    (C) May exhibit either positive or negative deviation from Raoult's law
    (D) Obeys Raoult's law

90. A mixture contains 10 grams each of CH₄, H₂O and SO₂, what is the mole fraction of CH₄?
   (A) 0.147   (B) 0.317   (C) 0.467   (D) 0.677

91. Haptics in non-verbal communication refers to:
   (A) The use of hands   (B) The use of happy faces
   (C) The use of touch   (D) The use of hap hazard expression

92. Pick out the correct sentence:
   (A) Write in ink   (B) The student uses a lot of inks
   (C) This is a ink pen   (D) Have your ink finished?

93. Pick out the incorrect sentence:
   (A) Ramesh has finished his work   (B) Ramesh has finished a work
   (C) Ramesh has finish his work   (D) Ramesh had finish his work

94. The study of eye movement in non-verbal communication is called:
   (A) Gazing   (B) Oculesics   (C) Optometry   (D) Proxemics

95. Pick out the informal communication:
   (A) Email from the boss   (B) Memorandum
   (C) Letter from a supplier   (D) Email from a friend

96. The two people left in the boat were----- European and -----African:
   (A) an, an   (B) a, a   (C) an, a   (D) a, an

97. Pick out the correct sentence:
   (A) He goes usually park the to   (B) Park the usually he goes to
   (C) He usually goes to the park   (D) Usually goes he to the park

98. In oral communication, encoding and decoding take place:
   (A) Alternately   (B) Simultaneously
   (C) Rarely   (D) Once in a while

99. The cat is wagging---- tail:
   (A) its   (B) it's   (C) 'its   (D) its'

100. Pick out the correct sentence:
   (A) He has two brother in laws   (B) He has two brother in laws
   (C) He has two brothers in laws   (D) He has two brothers in law

x-x-x