MHT CET 2024 PCM May 10 Shift 1 Question Paper

Conducted by the State Common Entrance Test Cell, Maharashtra

Time Allowed: 180 Minutes **Total Questions: 150** **Maximum Marks: 200**

General Instructions

(i) This **PCM** paper is from **MHT CET 2024**, conducted by the **State Common Entrance Test Cell, Maharashtra**.

(ii) Answer all **150 multiple choice questions**: **50 Physics**, **50 Chemistry** and **50 Mathematics**.

(iii) Each question offers **four choices**, with **one correct answer**.

(iv) Allow **90 minutes for Physics and Chemistry together**, followed by **90 minutes for Mathematics**. The first group closes before the second opens.

(v) Correct answers earn **1 mark in Physics and Chemistry** and **2 marks in Mathematics**.

(vi) There is **no negative marking**. Unanswered questions score zero.

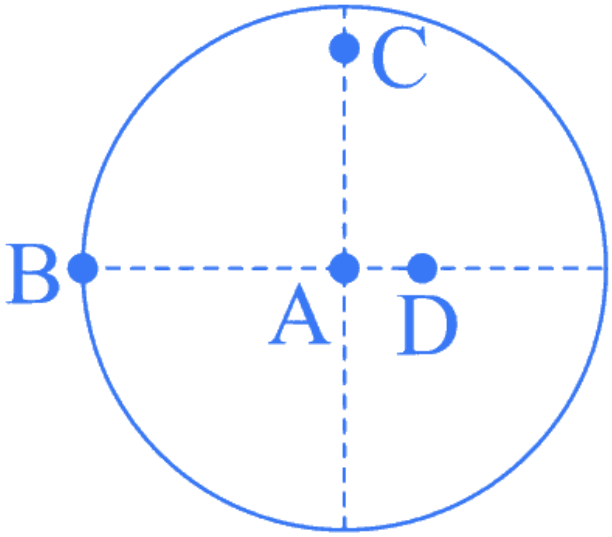
1. A particle performing S.H.M. with maximum velocity ' V '. If the amplitude double and periodic time is made, $\left(\frac{1}{3}\right)^{\text{rd}}$ then the maximum velocity is

(A) 6V
(B) $\frac{\mathrm{V}}{3}$
(C) $\frac{3V}{2}$
(D) $\frac{2\,\mathrm{V}}{3}$

2. A circular arc of radius r carrying current ' I ' subtends an angle $\frac{\pi}{8}$ at its entre. The radius of a metal wire is uniform. The magnetic induction at the centre of circular arc is (μ_0 = permeability of free space)

(A) $\frac{\mu_0 \mathrm{I}}{8\mathrm{r}}$
(B) $\frac{\mu_0 I}{32r}$
(C) $\frac{\mu_0 I}{64r}$
(D) $\frac{\mu_0 I}{16r}$

3. The moment of inertia of uniform circular disc is maximum about an axis perpendicular to the disc and passing through point



(A) A
(B) B
(C) C
(D) D

4. An inductor coil of inductance L is divided into two parts and both parts are connected in parallel. The net inductance is

(A) L
(B) 2L
(C) $\frac{\mathrm{L}}{2}$
(D) $\frac{\mathrm{L}}{4}$

5. If the momentum of a body of mass ' m ' is increased by 20% then its kinetic energy increases by

(A) 44%
(B) 55%
(C) 66%
(D) 77%

6. Seven capacitors each of capacitance 2μ F are connected in a configuration to obtain an effective capacitance $\frac{6}{13}\mu$ F. The combination which will achieve this will have

(A) 5 capacitors in parallel and then 2 capacitors series.
(B) 4 capacitors in parallel and then 3 capacitors series.
(C) 3 capacitors in parallel and then 4 capacitors in series.
(D) 2 capacitors in parallel and then 5 capacitors in series.

7. An e.m.f. $E = E_0 \cos \omega t$ is applied to the $L - R$ circuit. The inductive reactance is equal to the resistance ' R ' of the circuit. The power consumed in the circuit is

(A) $\frac{E_0^2}{\sqrt{2}R}$
(B) $\frac{E_0^2}{2R}$
(C) $\frac{E_0^2}{4R}$
(D) $\frac{E_0^2}{R}$

8. The radius and mean density of the planet are four times as that of the earth. The ratio of escape velocity at the earth to the escape velocity at a planet is

(A) $1 : \sqrt{8}$
(B) 1 : 8
(C) $1 : \sqrt{3}$
(D) 1 : 3

9. A black sphere has radius R whose rate of radiation is E at temperature T . If radius is made half and temperature 4 T , the rate of radiation will be

(A) 64 E
(B) 32 E
(C) 16 E
(D) 8 E

10. If the ionisation energy for the hydrogen atom is 13.6 eV , then the energy required to excite it from the ground state to the next higher state is nearly

(A) 10.2 eV
(B) 13.6 eV
(C) -10.2 eV
(D) -3.4 eV

11. A closed pipe containing a liquid showed a pressure P_1 by gauge. When the valve was opened, pressure was reduced to P_2. The speed of water flowing out of the pipe is (ρ = density of water)

(A) $\left[\frac{4(\mathrm{P}_1-\mathrm{P}_2)}{\rho}\right]^{1/2}$
(B) $\left[\frac{4(P_2-P_1)}{\rho}\right]^{1/2}$
(C) $\left[\frac{2(\mathrm{P}_1-\mathrm{P}_2)}{\rho}\right]^{1/2}$
(D) $\left[\frac{2(\mathrm{P}_2-\mathrm{P}_1)}{\rho}\right]^{1/2}$

12. In a diffraction pattern due to single slit of width ' a ', the first minimum is observed at an angle 30° when light of wavelength $5000\,\mathring{A}$ is incident on the slit. The first secondary maximum is observed at an angle $\left[\sin 30 = \frac{1}{2}\right]$

(A) $\sin^{-1}(\frac{1}{2})$ (B) $\sin^{-1}(\frac{3}{4})$

(C) $\sin^{-1}(\frac{1}{4})$ (D) $\sin^{-1}(\frac{3}{5})$

13. A ray of light is incident on a medium of refractive index ' μ ' at an angle of incidence ' i '. On refraction in the medium ' δ ' is the angle of deviation. Then

(A) $\frac{1}{\mu} = \cos\delta - \frac{\sin\delta}{\tan i}$

(B) $\frac{1}{\mu} = \sin\delta - \frac{\cos\delta}{\tan i}$

(C) $\frac{1}{\mu} = \cos\delta - \sin\delta \cdot \tan i.$

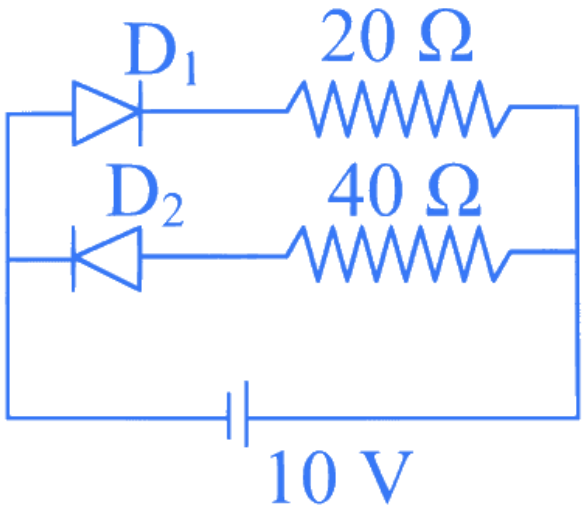
(D) $\frac{1}{\mu} = \sin\delta - \cos\delta \cdot \tan i$

14. The pipe open at both ends and pipe closed at one end have same length and both are vibrating in fundamental mode. Air column vibrating in open pipe has resonance frequency n_1 and air column vibrating in closed pipe has resonance frequency n_2, then

(A) $n_1 = 2n_2$ (B) $n_1 = n_2$

(C) $2n_1 = n_2$ (D) $3n_1 = 4n_2$

15. Two ideal diodes are connected to a battery as shown in the circuit. The current supplied by the battery is



(A) zero (B) 0.25 A

(C) 0.50 A (D) 0.75 A

16. In biprism experiment, if 5^{th} bright band with wavelength λ_1 coincides with 6^{th} dark band with wavelength λ_2 then the ratio (λ_1/λ_2) is

(A) $\frac{7}{9}$ (B) $\frac{10}{11}$

(C) $\frac{11}{10}$ (D) $\frac{9}{7}$

17. Ordinary bodies P and Q radiate maximum energy with wavelength difference 3μ m. The absolute temperature of body P is four times that of Q. The wavelength at which body Q radiates maximum energy is

(A) 2 μm (B) 4 μm

(C) 6 μm (D) 8 μm

18. A lead bullet moving with velocity ' V ' strikes a wall and stops. If 75% of its energy is converted into heat, then the increase in temperature is (s = specific heat of lead, J = mechanical equivalent of heat)

(A) $\frac{3\,V^2}{8Js}$ (B) $\frac{5\,V^2}{8Js}$

(C) $\frac{3\,V^2}{4Js}$ (D) $\frac{5\,V^2}{4Js}$

19. In photoelectric effect, the photocurrent

(A) decreases with increase in frequency of incident photon.

(B) increases with increase in frequency of incident photon.

(C) does not depend on the frequency of photon but depends only on the intensity of incident light.

(D) depends both on intensity and frequency of incident radiation.

20. The average force applied on the wall of a closed container depends as T^x where T is the temperature of an ideal gas. The value of x is

(A) 0.5 (B) 1

(C) 2 (D) 1.5

21. Four electric charges $+q, +q, -q$ and -q are placed in order at the corners of a square of side 2 L. The electric potential at point midway between the two positive charges is

(A) $\frac{1}{4\pi\epsilon_0}\frac{2q}{L}(1+\frac{1}{\sqrt{5}})$ (B) $\frac{1}{4\pi\epsilon_0}\frac{2q}{L}(1-\frac{1}{\sqrt{5}})$

(C) $\frac{1}{4\pi\epsilon_0}\frac{2q}{L}(1-\sqrt{5})$ (D) $\frac{1}{4\pi\epsilon_0}\frac{2q}{L}(1+\sqrt{5})$

22. Electron of mass ' m ' and charge ' q ' is travelling with speed ' v ' along a circular path of radius ' R ' at right angles to a uniform magnetic field of intensity ' B '. If the speed of the electron is halved and the magnetic field is doubled, the resulting path would have radius

(A) $\frac{R}{2}$ (B) $\frac{R}{4}$

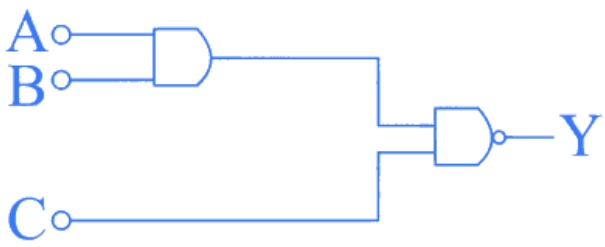
(C) 2R (D) 4R

23. Two coils have a mutual inductance 0.003 H . The current changes in the first coil according to equation $I = I_0 \sin \omega t$, where $I_0 = 8$ A and $\omega = 100\pi \text{rads}^{-1}$. The maximum value of e.m.f. in the second coil is

(A) 2π V (B) 2.4π V

(C) 5π V (D) 7.2π V

24. What is the output Y in the following circuit, when all the three inputs A, B, C are first 'zero' and then 'one'?



(A) 0, 0 (B) 0, 1

(C) 1, 0 (D) 1, 1

25. Two sound waves having displacements $x_1 = 2\sin(1000\pi t)$ and $x_2 = 3\sin(1006\pi t)$, when interfere, produce

(A) 5 beats/s with maximum intensity 25 units (B) 6 beats/s with maximum intensity 16 units

(C) 3 beats/s with maximum intensity 25 units (D) 1 beats/s with maximum intensity 5 units

26. A completely filled water tank of height ' h ' has a hole at the bottom. The total pressure of the bottom is 4 H and atmospheric pressure is H . The velocity of water flowing out of the hole is ($\rho =$ density of water)

(A) $\sqrt{\frac{3H}{\rho}}$ (B) $\sqrt{\frac{5H}{\rho}}$

(C) $\sqrt{\frac{6H}{\rho}}$ (D) $\sqrt{\frac{9H}{\rho}}$

27. A series resonant circuit consists of inductor ' L ' of negligible resistance and a capacitor ' C ' which produces resonant frequency ' f '. If L is changed to 3 L and ' C ' is changed to 6 C , the resonant frequency will become.

(A) $\frac{f}{6}$ (B) $\frac{f}{3}$

(C) $\frac{f}{2\sqrt{2}}$ (D) $\frac{f}{3\sqrt{2}}$

28. Let ' l_1 ' be the length of simple pendulum. Its length changes to ' l_2 ' to increase the periodic time by 20%. The ratio $\frac{l_2}{l_1} =$

(A) 1.22 (B) 1.33

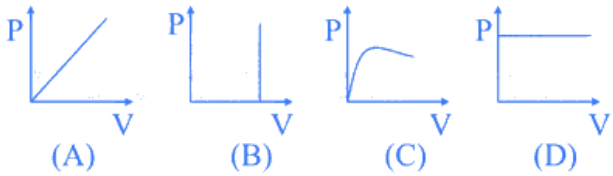
(C) 1.44 (D) 1.55

29. When the listener moves towards stationary source with velocity ' V_1 ', the apparent frequency of emitted note is ' F_1 '. When observer moves away from the source with velocity ' V_1 ', apparent frequency is ' F_2 '. If V is the velocity of sound in air and $\frac{F_1}{F_2} = 2$ then $\frac{V}{V_1}$ is

(A) ,2 (B) 3

(C) 4 (D) 5

30. Which of the following graphs between pressure and volume correctly show isochoric process?



(A) D (B) A

(C) C (D) B

31. A ring and a disc roll on horizontal surface without slipping with same linear velocity. If both have same mass and total kinetic energy of the ring is 6 J then total kinetic energy of the disc is

(A) $\frac{3}{2}$ J (B) $\frac{5}{2}$ J

(C) $\frac{7}{2}$ J (D) $\frac{9}{2}$ J

32. In potentiometer experiment, cells of e.m.f. E_1 and E_2 are connected in series ($E_1 > E_2$) the balancing length is 80 cm of the wire. If the polarity of E_2 is reversed, the balancing length becomes 20 cm. The ratio E_1/E_2 is

(A) 1 : 2 (B) 2 : 3

(C) 3 : 4 (D) 5 : 3

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33. A solid metallic sphere of radius ' R ' having moment of inertia 'I' about diameter is melted and recast into a solid disc of radius ' r ' of a uniform thickness. The moment of inertia of a disc about an axis passing through its edge and perpendicular to its plane is also equal to 'I'. The ratio $\frac{r}{R}$ is

(A) $\frac{1}{\sqrt{2}}$ (B) $\frac{2}{\sqrt{5}}$

(C) $\frac{2}{\sqrt{10}}$ (D) $\frac{2}{\sqrt{15}}$

34. In young's double slit experiment, the n^{th} maximum of wavelength λ_1 is at a distance of y_1 from the central maximum. When the wavelength of the source is changed to λ_2, $\left(\frac{\mathrm{n}}{3}\right)^{\mathrm{th}}$ maximum is at a distance of y_2 from its central maximum. The ratio $\frac{y_1}{y_2}$ is

(A) $\frac{3\lambda_1}{\lambda_2}$ (B) $\frac{3\lambda_2}{\lambda_1}$

(C) $\frac{\lambda_1}{3\lambda_2}$ (D) $\frac{\lambda_2}{3\lambda_1}$

35. For a particle in uniform circular motion

(A) linear velocity always radial to the circular path, without change in its magnitude

(B) linear velocity always tangential to the circular path, without change in its magnitude

(C) linear acceleration always tangential to the circular path

(D) linear acceleration always along the axis of the circular path

36. Using Bohr's model, the orbital period of electron in hydrogen atom in n^{th} orbit is (m = mass of electron, h = Planck's constant, e = electronic charge, ε_0 = permittivity of free space)

(A) $\frac{2\epsilon_0^2 n^2 h^2}{me^4}$ (B) $\frac{4\epsilon_0^2 \mathrm{n}^2\ \mathrm{h}^2}{\mathrm{me}^2}$

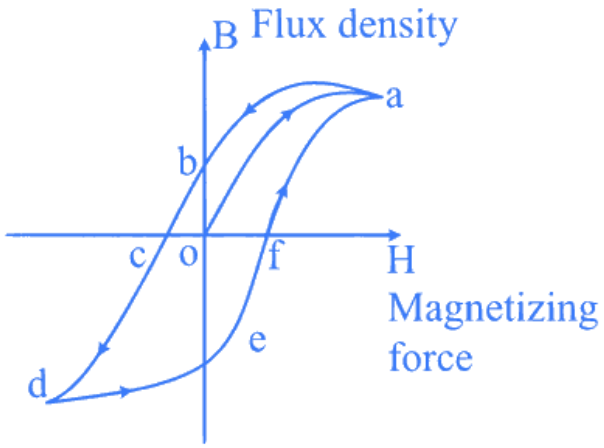
(C) $\frac{4\epsilon_0^2 \mathrm{n}^3\ \mathrm{h}^3}{\mathrm{me}^4}$ (D) $\frac{4\epsilon_0 \mathrm{n}^2\ \mathrm{h}^2}{\pi \mathrm{me}^2}$

37. Initial pressure and volume of a gas are ' P ' and ' V ' respectively. First its volume is expanded to ' 4 V ' by isothermal process and then again its volume is reduced to ' V ' by adiabatic process then its final pressure if $\left(\gamma = \frac{3}{2}\right)$

(A) P (B) 2P

(C) 3P (D) 4P

38. In the following graph of flux density versus magnetizing force, coercivity and retentivity are respectively represented by the points



(A) c, b (B) a, o

(C) d, c (D) f, e

39. Two identical capacitors have the same capacitance ' C '. One of them is charged to potential V_1 and other to V_2. The negative ends of capacitors are connected together. When positive ends are also connected, the decrease in energy of the combined system is

(A) $\frac{1}{4}\mathrm{C}(\mathrm{V}_1^2 + \mathrm{V}_2^2)$ (B) $\frac{1}{4}\mathrm{C}(\mathrm{V}_1^2 - \mathrm{V}_2^2)$

(C) $\frac{1}{4}C(V_1 + V_2)^2$ (D) $\frac{1}{4}\mathrm{C}(\mathrm{V}_1 - \mathrm{V}_2)^2$

40. A small planet is revolving around a very massive star in a circular orbit of radius ' R ' with a period of revolution ' T '. If the gravitational force between the planet and the star were proportional to '$R^{-5/2}$', then 'T' would be proportional to

(A) $\mathrm{R}^{3/2}$ (B) $\mathrm{R}^{3/5}$

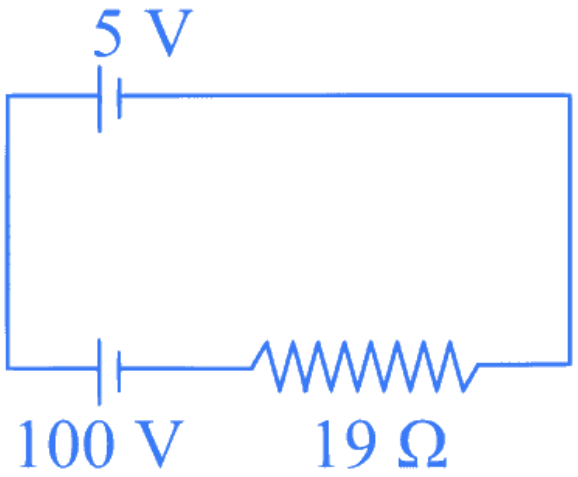
(C) $\mathrm{R}^{7/2}$ (D) $\mathrm{R}^{7/4}$

41. A metal sphere of radius R, density ρ_1 moves with terminal velocity V_1 through a liquid of density σ. Another sphere of same radius but density ρ_2 moves through same liquid. Its terminal velocity is V_2. The ratio $\mathrm{V}_1 : \mathrm{V}_2$ is

(A) $(\rho_2 + \sigma) : (\rho_1 - \sigma)$ (B) $(\rho_1 + \sigma) : (\rho_2 - \sigma)$

(C) $(\rho_2 - \sigma) : (\rho_1 - \sigma)$ (D) $(\rho_1 - \sigma) : (\rho_2 - \sigma)$

42. In the circuit, current flowing through the circuit is



(A) 2A (B) 3A

(C) 4A (D) 5A

43. Two point charges +10 q and -4 q are located at x = 0 and x = L respectively. What is the location of a point on the x-axis from the origin, which the net electric field due to these two point charges is zero?(r = required distance)

(A) r = $\frac{\sqrt{2}}{\sqrt{5}-\sqrt{2}}$ right to pt. B (B) r = $\frac{\sqrt{2}}{\sqrt{5}-\sqrt{2}}$ left to pt.A

(C) r = $\frac{\sqrt{2}}{\sqrt{5}+\sqrt{2}}$ right to pt.B (D) r = $\frac{\sqrt{2}}{\sqrt{5}+\sqrt{2}}$ left to pt.A

44. If the potential difference used to accelerate electrons is increased four times, by what factor does the de-Broglie wavelength associated with the electrons change?

(A) Wavelength increased two times (B) Wavelength decreased to half

(C) Wavelength increased four times (D) Wavelength remains the same

45. When the string is stretched between two rigid supports, under certain tension and vibrated

(A) antinodes at both ends and at least one node in between (B) Nodes at both ends and at least one antinode in between

(C) Nodes at both ends and no antinode in between (D) antinodes at both ends and no node in between

46. Simple microscope is used to see the object first in blue light and then a red light. Due to the change from blue to red light, its magnifying power

(A) decreases (B) increases

(C) remains same (D) first increases and then decreases

47. The inductive reactance of a coil is ' R ' Ω. If inductance of a coil is tripled and frequency of a.c supply is also tripled, then new inductive reactance will be

(A) $\frac{R}{9}$ (B) $\frac{R}{3}$

(C) 3R (D) 9R

48. A musical instrument X produces sound waves of frequency n and amplitude A. Another musical instrument Y produces sound waves of frequency $\frac{n}{3}$. The waves produced by x and y have equal energies. The amplitude of waves produced by Y will be

(A) 3A (B) 4A

(C) 2A (D) A

49. In the block diagram of simple rectifier circuit, from a variable a.c. voltage, constant d.c. voltage is obtained. The correct order of operation is

(A) voltage regulator, diode rectifier, filter. (B) diode rectifier, voltage regulator, filter.

(C) diode rectifier, filter, voltage regulator. (D) filter, voltage regulator, diode rectifier.

50. The current in LR circuit if reduced to half What will be the energy stored in it?

(A) 4 times (B) 2 times

(C) half times (D) $(\frac{1}{4})^{th}$ times

51. Which from following is NOT a dihydric compound?

(A) Crotonyl alcohol (B) Resorcinol
(C) Ethylene glycol (D) Quinol

52. Calculate the volume of unit cell if an element having molar mass $92\ g\ mol^{-1}$ that forms bcc structure $\left[\rho \times N_A = 5.0 \times 10^{24}\ g\ cm^{-3}\ mol^{-1}\right]$

(A) $2.44 \times 10^{-23}\ cm^3$ (B) $5.86 \times 10^{-23}\ cm^3$
(C) $3.68 \times 10^{-23}\ cm^3$ (D) $4.76 \times 10^{-23}\ cm^3$

53. Which of the following ethers is gaseous at room temperature?

(A) 1-Methoxypropane (B) 1-Ethoxypropane
(C) Methoxyethane (D) Ethoxyethane

54. A gas occupies $11.2\ dm^3$ at 105 kPa What is the volume if pressure is increased to 210 kPa ?

(A) $5.6\ dm^3$ (B) $16.8\ dm^3$
(C) $22.4\ dm^3$ (D) $33.6\ dm^3$

55. For a zero order reaction, A $\longrightarrow$ product, concentration of A decreases from $1.2\ mol\ dm^{-3}$ to $0.4\ mol\ dm^{-3}$ in 240 second. What is rate constant of the reaction?

(A) $0.1\ mol\ dm^{-3}$ minute $^{-1}$ (B) $0.2\ mol\ dm^{-3}$ minute $^{-1}$
(C) $0.3\ mol\ dm^{-3}$ minute $^{-1}$ (D) $0.4\ mol\ dm^{-3}$ minute $^{-1}$

56. What is the volume of oxygen required for complete combustion of 0.25 mole of methane at S.T.P.?

(A) $22.4\ dm^3$ (B) $5.6\ dm^3$
(C) $11.2\ dm^3$ (D) $7.46\ dm^3$

57. What type of solution the alloy is?

(A) Solid in liquid (B) Gas in liquid
(C) Solid in gas (D) Solid in solid

58. Which from following is NOT a salient feature of Watson and Crick model for DNA?

(A) Polynucleotide strands wind into a right handed double helix.
(B) Sugar-phosphate back bone lies inside and bases lie outside of helix.
(C) Double helix is stabilized by hydrogen bonding formed in two strands.
(D) A = T and G = C are complementary base pairs.

59. Which of the following is NOT true about order of a reaction?

(A) It is sum of power of concentration terms in rate law equation.
(B) It may be integer, fraction or zero.
(C) It is theoretical quantity
(D) It is experimentally determined quantity.

60. Calculate solubility $\left(moldm^{-3}\right)$ of a sparingly soluble electrolyte AB at 298 K if its solubility product is 1.6×10^{-5} ?

(A) 1.6×10^{-3} (B) 2.5×10^{-3}
(C) 4.0×10^{-3} (D) 8.0×10^{-3}

61. Which from following alkyl substituted alkenes is most stable?

(A) $R_2C = CR_2$ (B) $R_2C = CHR$
(C) $R_2C = CH_2$ (D) $RCH = CH_2$

62. In an ionic solid equal number of cations and anions are missing from their regular positions in the crystal lattice creating vacancies is called-

(A) Vacancy defect (B) Self interstitial defect
(C) Schottky defect (D) Frenkel defect

63. Which from following compounds is a trihydric alcohol?

(A) Quinol (B) Catechol
(C) Propylene glycerol (D) Resorcinol

64. Which of the following compounds is recovered in solvay's process when NH_4Cl is treated with slaked lime?

(A) NaCl (B) NH_4HCO_3

(C) NH_3 (D) CO_2

65. What is the shape of bromine pentafluoride?

(A) Trigonal pyramidal (B) Square pyramidal

(C) Square planar (D) Distorted octahedral

66. What type of colloid is the soap lather?

(A) Solid sol (B) Emulsion

(C) Foam (D) Aerosol

67. Which compound from following has highest boiling point?

(A) $n - C_4H_9OH$ (B) $(CH_3)_3C - NH_2$

(C) $C_2H_5\ N(CH_3)_2$ (D) C_2H_5COOH

68. Which from following statements is NOT true for nucleic acids?

(A) $5^{'}$ end of polynucleotide has free phosphate group.

(B) Nucleic acids contain back bone formed of $-C-O-C-$ linkage.

(C) Polynucleotide has free -OH group at $3^{'}$ end.

(D) Neighbouring nucleotides are bonded through phosphate diester linkage.

69. Which of the following units of electrical measurement is not equivalent to 1 Siemen?

(A) Ω^{-1} (B) AV^{-1}

(C) $CV^{-1}\ s^{-1}$ (D) Ω

70. What is the oxidation number of carbon in $K_2C_2O_4$?

(A) -2 (B) -3

(C) $+3$ (D) $+4$

71. What type of isomerism is exhibited by $[Cr\,(H_2O)_6]\,Cl_3$ and $[Cr\,(H_2O)_5\,Cl]\,Cl_2 \cdot H_2O$

(A) Coordinate (B) Solvate

(C) Ionization (D) Linkage

72. Which of the following groups exhibits (+)R effect?

(A) $-NHR$ (B) $-CN$

(C) $-NO_2$ (D) $-COOR$

73. Identify the product 'B' obtained in following reaction.

$$R - C \equiv N \xrightarrow[HCl]{SnCl_2} A \xrightarrow{H_3O^+} B$$

(A) $R - NH_2$ (B) $R - CONH_2$

(C) $R - CHO$ (D) $R - COOH$

74. Which of the following is radius of first orbit of He^+ ?

(A) 52.90 pm (B) 78.90 pm

(C) 26.45 pm (D) 13.35 pm

75. Identify heteroleptic complex from following.

(A) $Na_3[Co(NO_2)_6]$ (B) $[Fe(H_2O)_5(NSC)]^{2+}$

(C) $[Cu(NH_3)_4]^{2+}$ (D) $[Co(C_2O_4)_3]^{3-}$

76. Calculate rate constant of first order reaction if concentration of reactant decreases by 90% in 30 minute?

(A) $2.16 \times 10^{-2}\ min^{-1}$ (B) $3.52 \times 10^{-2}\ min^{-1}$

(C) $4.81 \times 10^{-2}\ min^{-1}$ (D) $7.67 \times 10^{-2}\ min^{-1}$

77. Identify the correct decreasing order of pK_b values of compounds from following.

(A) $NH_3 > R - NH_2 > R_2NH$

(B) $R_2NH > R - NH_2 > NH_3$

(C) $R - NH_2 > R_2NH > NH_3$

(D) $R_2NH > NH_3 > R - NH_2$

78. Identify the instrument used to find the structure of surface of material.

(A) Scanning electron microscope (B) X ray difractometer

(C) Transmission electron microscope (D) UV-visible spectrophotometer

79. Which of the following equations indicates increase in entropy?

(A) $CaO_{(s)} + CO_{2(g)} \longrightarrow CaCO_{3(s)}$

(B) $NaCl_{(aq)} \longrightarrow NaCl_{(s)}$

(C) $NaNO_{3(s)} \longrightarrow Na^+_{(aq)} + NO^-_{3(aq)}$

(D) $N_{2(g)} + 3H_{2(g)} \longrightarrow 2NH_{3(g)}$

80. Which from following statements is true about internal energy?

(A) It increases with increase in temperature.
(B) It decreases with increase in temperature.
(C) Remain constant on changing temperature.
(D) It is not a state function.

81. What is the molar mass of product hydrocarbon when 2 moles of methyl bromide reacts with large excess of sodium in dry ether?

(A) $15.0\ g\ mol^{-1}$
(B) $30.0\ g\ mol^{-1}$
(C) $7.5\ g\ mol^{-1}$
(D) $40.0\ g\ mol^{-1}$

82. What is the order of ease of dehydrohalogenation of alkyl halides?

(A) $3^\circ > 2^\circ > 1^\circ$
(B) $2^\circ > 1^\circ > 3^\circ$
(C) $3^\circ > 1^\circ > 2^\circ$
(D) $1^\circ > 2^\circ > 3^\circ$

83. Identify the product obtained in following reaction.

$$C_6H_6 \xrightarrow[\text{Anhyd. } AlCl_3 \text{ pressure}]{CO,HCl} \text{product}$$

(A) C_6H_5COOH
(B) C_6H_5CHO
(C) $C_6H_5CHCl_2$
(D) C_6H_5Cl

84. Which of the following molecule has bond order 2 ?

(A) N_2
(B) H_2
(C) O_2
(D) F_2

85. Identify rare earth element from following.

(A) Sm
(B) Hg
(C) Zn
(D) W

86. 0.2 molal aqueous solution of KCl freezes at $-0.680^\circ C$. Calculate van't Hoff factor for this solution. $\left(K_f = 1.86\ K\ kg\ mol^{-1}\right)$

(A) 1.22
(B) 1.32
(C) 1.42
(D) 1.83

87. 0.1 molal aqueous solution of glucose boils at $100.16^\circ C$. What is boiling point of 0.5 molal aqueous solution of glucose?

(A) $100.80^\circ C$
(B) $100.16^\circ C$
(C) $100.10^\circ C$
(D) $20.8^\circ C$

88. Identify a polymer obtained from β-hydroxybutyric acid and β-hydroxyvaleric acid.

(A) PHBV
(B) Nylon 2-nylon 6
(C) Buna-N
(D) Thermocol

89. A conductivity cell dipped in 0.05 MKCl has resistance 600 ohm. If conductivity is $0.0012 ohm^{-1}\ cm^{-1}$. What is the value of cell constant?

(A) $0.50\ cm^{-1}$
(B) $0.72\ cm^{-1}$
(C) $1.5\ cm^{-1}$
(D) $2.0\ cm^{-1}$

90. 2 moles of an ideal gas are expanded isothermally and reversibly from 20 L to 40 L at 300 K . Calculate work done. ($R = 8.314\ J\ K^{-1}\ mol^{-1}$).

(A) $-3457.97\ J$
(B) $-11.526\ J$
(C) $-16.939\ J$
(D) $-21.242\ J$

91. Identify the product P of following reaction.

$$CH_3OH + CH_3MgX \longrightarrow P + MgX(OCH_3)$$

(A) C_2H_5OH
(B) $CH_2 = CH_2$
(C) CH_4
(D) C_2H_6

92. Calculate number of atoms per unit cell of an element having molar mass $92.0\ g\ mol^{-1}$ and density $8.6\ g\ cm^{-3}$ forming cubic unit cell structure. $\left[a^3 \times N_A = 21.5\ cm^3\ mol^{-1}\right]$

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

93. What is the product obtained when phenylethene is treated with $KMnO_4$ in dilute H_2SO_4 ?

(A) $C_6H_5CH_2CHO$
(B) $C_6H_5CH_2COOH$
(C) C_6H_5COOH
(D) $C_6H_5COCH_3$

94. What is the pH of 10^{-8}M HCl solution?

(A) 8
(B) 7
(C) <7
(D) >8

95. What is the oxidation state of iodine in I_2Cl_6 ?

(A) +7
(B) −3
(C) +3
(D) −2

96. Chlorine exists in two isotopic forms $^{35}Cl, ^{37}Cl$. If average atomic mass of chlorine is 35.5 , what is the percentage abundance of these isotopes respectively?

(A) $25\%, 75\%$ (B) $75\%, 25\%$

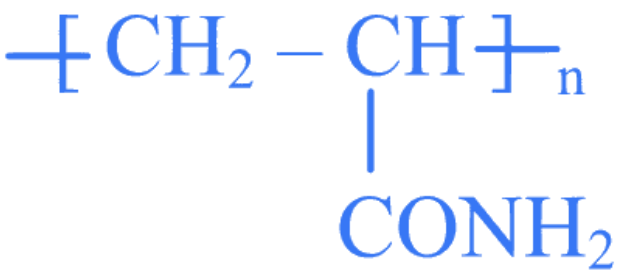
(C) $50\%, 50\%$ (D) $35\%, 65\%$

97. Which element from following has completely filled f-orbital in observed and expected electronic configuration?

(A) Sm (B) Pr

(C) Lu (D) Dy

98. Which from following monomers is used to obtain polymer represented as



(A) Acrylamide (B) Urea and Formaldehyde

(C) Bisphenol (D) Methylmethacrylate

99. What is the conductivity of 0.05 M KCl solution if cell constant is 1.32 cm^{-1} and resistance is 528 ohm?

(A) 0.0401 ohm^{-1} cm^{-1} (B) 0.0051 ohm^{-1} cm^{-1}

(C) 0.0025 ohm^{-1} cm^{-1} (D) 0.0691 ohm^{-1} cm^{-1}

100. Which of the following substances conducts electricity?

(A) Diamond (B) Sulphur (solid)

(C) Molten NaCl (D) Crystalline NaCl

101. $\int_0^{\frac{\pi}{2}} |\sin x - \cos x| dx$ has the value

(A) $2\sqrt{2}+1$ (B) $2(\sqrt{2}+1)$

(C) $2(\sqrt{2}-1)$ (D) $2\sqrt{2}-1$

102. Negation of the statement "The payment will be made if and only if the work is finished in time." is

(A) The work is finished in time and the payment is not made.

(B) The payment is made and the work is not finished in time.

(C) The work is finished in time and the payment is not made, or the payment is made and the work is finished in time.

(D) Either the work is finished in time and the payment is not made, or the payment is made and the work is not finished in time.

103. If

$$y = \frac{\sin x}{1 + \frac{\cos x}{1 + \frac{\sin x}{1 + \frac{\cos x}{\cdots}}}}$$

, then $\frac{dy}{dx}$ is given by

(A) $\frac{y\sin x+(1+y)\cos x}{1+2y+\cos x-\sin x}$ (B) $\frac{y\cos x+(1+y)\sin x}{1+2y+\cos x-\sin x}$

(C) $\frac{y\sin x-(1+y)\cos x}{1+2y+\cos x-\sin x}$ (D) $\frac{y\cos x-(1+y)\sin x}{1+2y+\cos x-\sin x}$

104. If $\overline{a} = \hat{i} - \hat{k}, \overline{b} = x\hat{i} + \hat{j} + (1-x)\hat{k}$ and $\overline{c} = y\hat{i} + x\hat{j} + (1+x-y)\hat{k}$ then $\overline{a} \cdot (\overline{b} \times \overline{c})$ depends on

(A) only x (B) only y

(C) neither x nor y (D) both x and y

105. Let a line intersect the co-ordinate axes in points A and B such that the area of the triangle OAB is 12 sq. units. If the line passes through the point $(2, 3)$, then the equation of the line is

(A) $x + y = 5$ (B) $3x + 2y = 12$

(C) $2x + y = 7$ (D) $2x + 3y = 13$

106. If for certain $x, 3\cos x \neq 2\sin x$, then the general solution of, $\sin^2 x - \cos 2x = 2 - \sin 2x$, is

(A) $(2n+1)\frac{\pi}{2}, n \in \mathbb{Z}$ (B) $(2n+1)\frac{\pi}{4}, n \in \mathbb{Z}$

(C) $n\pi + (-1)^n \frac{\pi}{3}, n \in \mathbb{Z}$ (D) $\frac{n\pi}{2} + 1, n \in \mathbb{Z}$

107. In a game, 3 coins are tossed. A person is paid ₹ 100$, if he gets all heads or all tails; and he is supposed to pay ₹ 40 , if he gets one head or two heads. The amount he can expect to win/lose on an average per game in (₹) is

(A) 10 loss (B) 5 loss

(C) 5 gain (D) 10 gain

108. The curve $x^4 - 2xy^2 + y^2 + 3x - 3y = 0$ cuts the X -axis at $(0, 0)$ at an angle of

(A) $\frac{\pi}{4}$ (B) $\frac{\pi}{2}$

(C) 0 (D) $\frac{\pi}{6}$

109. The abscissae of the two points A and B are the roots of the equation $x^2 + 2ax - b^2 = 0$ and their ordinates are roots of the equation $y^2 + 2py - q^2 = 0$. Then the equation of the circle with AB as diameter is given by

(A) $x^2 + y^2 - 2ax - 2py + (b^2 + q^2) = 0$

(B) $x^2 + y^2 - 2ax - 2py - (b^2 + q^2) = 0$

(C) $x^2 + y^2 + 2ax + 2py + (b^2 + q^2) = 0$

(D) $x^2 + y^2 + 2ax + 2py - (b^2 + q^2) = 0$

110. Water is running in a hemispherical bowl of radius 180 cm at the rate of 108 cubic decimeters per minute. How fast the water level is rising when depth of the water level in the bowl is 120 cm ? (1 decimeter = 10 cm)

(A) 16π cm/s (B) $\frac{16}{\pi}$ cm/s

(C) $\frac{1}{16\pi}$ cm/s (D) $\frac{\pi}{16}$ cm/s

111. $S_1 = \sum_{r=1}^{n} r, S_2 = \sum_{r=1}^{n} r^2$ and $S_3 = \sum_{r=1}^{n} r^3$, then the value of $\lim_{n\to\infty} \frac{s_1\left(1+\frac{s_3}{4}\right)}{s_2^2}$ is

(A) $\frac{9}{16}$ (B) $\frac{9}{2}$

(C) $\frac{9}{32}$ (D) $\frac{9}{8}$

112. The numerical value of $\tan\left(2\tan^{-1}\left(\frac{1}{5}\right) + \frac{\pi}{4}\right)$

(A) $\frac{-7}{17}$ (B) $\frac{-17}{7}$

(C) $\frac{17}{7}$ (D) $\frac{7}{17}$

113. Let $\bar{a}, \bar{b}$ and $\bar{c}$ be three vectors having magnitudes 1,1 and 2 respectively. If $\overline{a} \times (\overline{a} \times \overline{c}) + \overline{b} = \overline{0}$, then the acute angle between $\overline{a}$ and $\overline{c}$ is

(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{6}$

(C) $\frac{\pi}{4}$ (D) $\frac{\pi}{12}$

114. Area (in sq.units) lying in the first quadrant and bounded by the circle $x^2 + y^2 = 4$ and the lines $x = 0$ and $x = 2$ is

(A) π (B) $\frac{\pi}{2}$

(C) $\frac{\pi}{3}$ (D) $\frac{\pi}{4}$

115. If $A + B = \begin{bmatrix} 1 & \tan\frac{\theta}{2} \\ -\tan\frac{\theta}{2} & 1 \end{bmatrix}$ where A is symmetric and B is skew-symmetric matrix, then the matrix $\left(A^{-1}B + AB^{-1}\right)$ at $\theta = \frac{\pi}{6}$ is given by

(A) $\begin{bmatrix} 1 & 2\sqrt{3} \\ 2\sqrt{3} & 1 \end{bmatrix}$ (B) $\begin{bmatrix} -1 & -2\sqrt{3} \\ 2\sqrt{3} & 1 \end{bmatrix}$

(C) $\begin{bmatrix} 0 & 2\sqrt{3} \\ 2\sqrt{3} & 0 \end{bmatrix}$ (D) $\begin{bmatrix} 0 & -2\sqrt{3} \\ 2\sqrt{3} & 0 \end{bmatrix}$

116. If, $\int \frac{d\theta}{\cos^2\theta(\tan 2\theta + \sec 2\theta)} = \lambda \tan\theta + 2\log_e|f(\theta)| + c$ (where c is a constant of integration), then the ordered pair $(\lambda, |f(\theta)|)$ is equal to

(A) $(1, |1 + \tan\theta|)$ (B) $(1, 1 - 1 - \tan\theta|)$

(C) $(-1, |1 + \tan\theta|)$ (D) $(-1, |1 - \tan\theta|)$

117. The domain of definition of the function $y(x)$ is given by the equation $2^x + 2^y = 2$, is

(A) $0 < x \leq 1$ (B) $0 \leq x \leq 1$

(C) $-\infty < x \leq 0$ (D) $-\infty < x < 1$

118. If $\cos x \frac{dy}{dx} - y\sin x = 6x, 0 < x < \frac{\pi}{2}$, then general solution of the differential equation is

(A) $y = \cos x + 3x^2 + c$, where c is a constant of integration.

(B) $y + \cos x = 3x^2 + c$, where c is a constant of integration.

(C) $y = 3x^2\cos x + \cos x$, where c is a constant of integration.

(D) $y \cdot \cos x = 3x^2 + c$, where c is a constant of integration.

119. Equation of the plane, through the points $(-1, 2, -2)$ and $(-1, 3, 2)$ and perpendicular to yz - plane, is

(A) $4y + z = 10$ (B) $4y - z + 10 = 0$

(C) $4y - z = 10$ (D) $4y + z + 10 = 0$

120. The values of a and b, so that the function

$$f(x) = \begin{cases} x + a\sqrt{2}\sin x & , 0 \leq x \leq \frac{\pi}{4} \\ 2x\cot x + b & , \frac{\pi}{4} \leq x \leq \frac{\pi}{2} \\ a\cos 2x - b\sin x & , \frac{\pi}{2} < x \leq \pi \end{cases}$$

is continuous for $0 \leq x \leq \pi$, are respectively given by

(A) $+\frac{\pi}{12}, -\frac{\pi}{6}$ (B) $-\frac{\pi}{6}, -\frac{\pi}{12}$

(C) $\frac{\pi}{6}, \frac{\pi}{12}$ (D) $\frac{\pi}{6}, -\frac{\pi}{12}$

121. If $\overline{a}$ and $\overline{c}$ are unit vectors inclined at $\frac{\pi}{3}$ with each other and $(\overline{a} \times (\overline{b} \times \overline{c})) \cdot (\overline{a} \times \overline{c}) = 5$, then the value of $5[\overline{a}\overline{b}\overline{c}] =$

(A) -10 (B) 10

(C) 50 (D) -50

122. If the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-1}{4}$ and $\frac{x-3}{-1} = \frac{y-k}{2} = \frac{z}{1}$ intersect, then k is equal to

(A) $\frac{-5}{6}$ (B) $\frac{5}{6}$

(C) $\frac{6}{5}$ (D) $\frac{-6}{5}$

123. A point moves along the arc of parabola $y = 2x^2$. Its abscissa increases uniformly at the rate of 2 units /sec. At the instant, the point is passing through (1,2), its distance from origin is increasing at the rate of

(A) $\frac{36}{\sqrt{5}}$ units/sec. (B) $\frac{18}{\sqrt{5}}$ units /sec.

(C) $\frac{36}{5}$ units/sec. (D) $\frac{18}{5}$ units /sec.

124. If

$$\int (2x+4)\sqrt{x-1}\ dx = a(x-1)^{\frac{5}{2}} + b(x-1)^{\frac{3}{2}} + c$$

, (where c is a constant of integration), then the value of $a + b$ is

(A) $\frac{46}{5}$ (B) $\frac{16}{15}$

(C) $\frac{24}{5}$ (D) $\frac{13}{15}$

125. If the angles A, B and C of a triangle ABC are in the ratio 2 : 3 : 7 respectively, then the sides a, b and c are respectively in the ratio

(A) $2 : \sqrt{2} : (\sqrt{3}+1)$ (B) $\sqrt{2} : 2 : (\sqrt{3}+1)$

(C) $(\sqrt{3}+1) : \sqrt{2} : 2$ (D) $2 : (\sqrt{3}+1) : \sqrt{2}$

126. The value of $\left(1+\cos\frac{\pi}{8}\right)\left(1+\cos\frac{3\pi}{8}\right)\left(1+\cos\frac{5\pi}{8}\right)\left(1+\cos\frac{7\pi}{8}\right)$ is

(A) $\frac{1}{8}$ (B) $\frac{-1}{8}$

(C) $\frac{1}{16}$ (D) $\frac{-1}{16}$

127. The value of $\tan^{-1}\left(\tan\frac{7\pi}{6}\right)$ is

(A) $\frac{-\pi}{6}$ (B) $\frac{\pi}{6}$

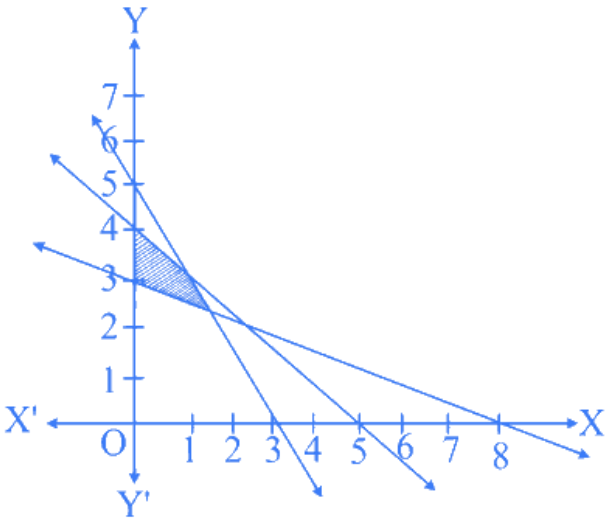
(C) $\frac{-\pi}{3}$ (D) $\frac{\pi}{3}$

128. In a Binomial distribution consisting of 5 independent trials, probabilities of exactly 1 and 2 successes are 0.4096 and 0.2048 respectively, then the probability, of getting exactly 4 successes, is

(A) $\frac{80}{243}$ (B) $\frac{40}{243}$

(C) $\frac{32}{625}$ (D) $\frac{4}{625}$

129. The function to be maximized is given by $Z = 3x + 2y$. The feasible region for this function is the shaded region given below, then the linear constraints for this region are given by



(A) $3x + 8y \leq 24, 4x + 5y \leq 20, 5x + 3y \geq 15x \geq 0, y \geq 0$

(B) $3x + 8y \geq 24, 4x + 5y \geq 20, 5x + 3y \leq 15, x \geq 0, y \geq 0$

(C) $3x + 8y \leq 24, 4x + 5y \geq 20, 5x + 3y \geq 15x \geq 0, y \geq 0$

(D) $3x + 8y \geq 24, 4x + 5y \leq 20, 5x + 3y \leq 15x \geq 0, y \geq 0$

130. If the line, $\frac{x-3}{2} = \frac{y+2}{1} = \frac{z+4}{3}$ lies in the plane, $\ell x + my - z = 9$, then $\ell^2 + m^2$ is equal to

(A) $\frac{124}{49}$ (B) $\frac{123}{49}$

(C) $\frac{121}{49}$ (D) $\frac{122}{49}$

131.

$$\int \frac{\sqrt{x}}{x+1}dx =$$

(A) $(2\sqrt{x} - \tan^{-1}\sqrt{x}) + c$, where c is a constant of integration.

(B) $2(\sqrt{x} - \tan^{-1}\sqrt{x}) + c$, where c is a constant of integration.

(C) $(2\sqrt{x} + \tan^{-1}\sqrt{x}) + c$, where c is a constant of integration.

(D) $2(\sqrt{x} + \tan^{-1}\sqrt{x}) + c$, where c is a constant of integration.

132. The equation of the normal to the curve $y = x\log x$, which is parallel to the line $2x - 2y + 3 = 0$, is

(A) $x + y = 3e^{-2}$ (B) $x - y = 3e^{-2}$

(C) $x - y = 3e^{2}$ (D) $x + y = 3e^{2}$

133.

$$\int \frac{1 + \sin(\log x)}{1 + \cos(\log x)}dx =$$

(A) $x^2\tan(\frac{\log x}{2}) + c$, where c is a constant of integration.

(B) $x\tan(\log(\frac{x}{2})) + c$, where c is a constant of integration.

(C) $x^3\log(\frac{\tan x}{2}) + c$, where c is a constant of integration.

(D) $x \cdot \tan(\frac{\log x}{2}) + c$, where c is a constant of integration.

134. If $w = \frac{-1+i\sqrt{3}}{2}$, where $i = \sqrt{-1}$, then the value of $\left(3 + w + 3w^2\right)^4$ is

(A) 16 (B) -16

(C) 16w (D) $16w^2$

135. If $|\bar{a}| = 2, |\bar{b}| = 3$ and $\bar{a}, \bar{b}$ are mutually perpendicular vectors, then the area of the triangle whose vertices are $0, a + 2b, a - 2b$ is

(A) 6 sq.units (B) 12 sq.units

(C) 24 sq.units (D) 8 sq.units

136. If y is a function of x and $\log(x + y) = 2xy$, then the value of $y'(0)$ is

(A) 1 (B) -1

(C) 2 (D) 0

137. A random variable X has the following probability distribution

X	1	2	3	4	5	6	7	8
P(X=x)	0.15	0.23	0.12	0.10	0.20	0.08	0.07	0.05

For the events E = {X is prime number }
F = {X < 4}
Then $P(E \cup F) =$

(A) 0.87 (B) 0.77
(C) 0.35 (D) 0.50

138. If $y = ax^{n+1} + bx^{-n}$, then $x^2 \frac{d^2y}{dx^2} =$

(A) $n(n+1)y$ (B) $(n+1)(n-2)y$
(C) $n(n-2)y$ (D) $(n+1)y$

139. Let $\bar{A}, \bar{B}, \bar{C}$ be vectors of lengths 3 units, 4 units, 5 units respectively. let $\bar{A}$ be perpendicular to $\overline{B} + \overline{C}, \overline{B}$ be perpendicular to $\overline{C} + \overline{A}$ and $\overline{C}$ be perpendicular to $\bar{A} + \bar{B}$, then the length of vector $\overline{A} + \overline{B} + \overline{C}$ is

(A) $2\sqrt{5}$ (B) $\sqrt{30}$
(C) $\sqrt{45}$ (D) $5\sqrt{2}$

140. The approximate value of $x^3 - 2x^2 + 3x + 2$ at $x = 2.01$ is

(A) 8.07 (B) 8.27
(C) 8.007 (D) 8.17

141. The general solution of $\frac{dy}{dx} = \frac{x+y+1}{x+y-1}$ is

(A) $y = x + \log(x + y) + c$, where c is a constant of integration.

(B) $y = x - \log(x + y) + c$, where c is a constant of integration.

(C) $y = x - \log(2x + y) + c$, where c is a constant of integration.

(D) $y = x^2 + \log(x + y) + c$, where c is a constant of integration.

142. There are three events A, B, C, one of which must and only one can happen. The odds are 8:3 against A, 5 : 2 against B and the odds against C is 43 : 17k, then value of k is

(A) $\frac{1}{2}$ (B) 2
(C) $\frac{1}{3}$ (D) $\frac{1}{4}$

143. Let $\bar{a}, \bar{b}$ and $\bar{c}$ be three non-zero vectors such that no two of them are collinear and $(\overline{a} \times \overline{b}) \times \overline{c} = \frac{1}{3}|\overline{b}||\overline{c}|\overline{a}$. If θ is the angle between vectors $\bar{b}$ and $\bar{c}$, then the value of $\operatorname{cosec}\theta$ is

(A) $\frac{3\sqrt{3}}{2}$ (B) $\frac{2\sqrt{2}}{3}$
(C) $\frac{2}{\sqrt{3}}$ (D) $\frac{3}{2\sqrt{2}}$

144. If $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = \pi$ and $x^2 + y^2 + z^2 + kxyz = 1$, then k is

(A) -1 (B) 1
(C) -2 (D) 2

145. A radio-active substance has a half-life of h days, then its initial decay rate is given by (where radio-active substance has initial mass m_0)

(A) $\frac{m_0}{h}(\log 2)$ (B) $(m_0\ h)(\log 2)$
(C) $-\frac{m_0}{h}(\log 2)$ (D) $-(m_0 h)(\log 2)$

146. The inverse of $p \to (q \to r)$ is logically equivalent to

(A) $p \to (q \to r)$ (B) $(q \to r) \to \sim p$
(C) $(p \vee q) \to r$ (D) $(q \to r) \to p$

147. If the line $\frac{x-2}{3} = \frac{y-1}{-5} = \frac{z+2}{2}$ lies in the plane $x + 3y - \alpha z + \beta = 0$, then $(\alpha, \beta) =$

(A) $(6, -7)$ (B) $(-6, 7)$
(C) $(5, -15)$ (D) $(-5, 15)$

148. Mean and variance of six observations are 6 and 12 respectively. If each observation is multiplied by 3, then new variance of the resulting observations is

(A) 288 (B) 36
(C) 18 (D) 108

149. Words of length 10 are formed by using the letters A, B, C, D, E, F, G, H, I, J. Let x be number of such words where no letter is repeated and y be number of such words where exactly two letters are repeated twice and no other letter is repeated, then the value of $\frac{y}{x}$ is

(A) 45 (B) 415
(C) 315 (D) 215

150. $\triangle$OAB is formed by the lines $x^2 - 4xy + y^2 = 0$ and the line AB. The equation of line AB is $2x + 3y - 1 = 0$. Then the equation of the median of the triangle drawn from the origin is

(A) $7x + 8y = 0$ (B) $7x - 8y = 0$

(C) $8x + 7y = 0$ (D) $8x - 7y = 0$

- End of Question Paper -