MHT CET 2020 PCM Oct 12 Shift 2 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 2020**, 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. Three vectors $\vec{A}, \vec{B}$ and $\vec{C}$ are such that $\vec{A} \cdot \vec{B} = \vec{A} \cdot \vec{C} = 0$, then $\vec{A}$ is parallel to $[\cos 90^\circ = 0]$

(A) $\vec{B} \cdot \vec{C}$ (B) $\vec{B} \times \vec{C}$

(C) $\vec{C}$ (D) $\vec{B}$

2. If three vectors have equal magnitude i.e. $A = B = C$, then the angle between $\vec{A}$ and $\vec{C}$ is $'\alpha'$. If $\vec{A} + \vec{B} + \vec{C} = 0$, then the angle between $\vec{A}$ and $\vec{C}$ is $' \beta'$, then $\frac{\alpha}{\beta}$ is

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

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

3. Which one of the following combination of constants has dimensions of time? [G = constant of gravitation, h = Planck's constant, c = velocity of light]

(A) $\left[\frac{Gh}{c^5}\right]^{\frac{1}{2}}$ (B) $\left[\frac{Gh}{c}\right]^{\frac{1}{2}}$

(C) $\left[\frac{Gh}{c^4}\right]^{\frac{1}{2}}$ (D) $\left[\frac{Gh}{c^3}\right]^{\frac{1}{2}}$

4. The dimensions of magnetic intensity are

(A) $\left[\mathrm{L}^1 \quad \mathrm{M}^0 \quad \mathrm{T}^1 \quad \mathrm{I}^1\right]$

(B) $\left[\mathrm{L}^1 \quad \mathrm{M}^0 \quad \mathrm{T}^0 \quad \mathrm{I}^{-1}\right]$

(C) $\left[\mathrm{L}^{-1} \quad \mathrm{M}^0 \quad \mathrm{T}^0 \quad \mathrm{I}^1\right]$

(D) $\left[\mathrm{L}^2 \quad \mathrm{M}^1 \quad \mathrm{T}^0 \quad \mathrm{I}^1\right]$

5. Five objects of different masses are simultaneously released vertically downwards from height 'h' (in air). Which physical quantity associated with the objects will change at the instant they strike the ground ? (Neglect the air resistance.)

(A) Momentum (B) Time

(C) Acceleration (D) Velocity

6. A thin circular ring of mass 'M' and radius 'r' is rotating about its axis with an angular speed $' \omega '$. Two particles each of mass 'm' are now attached at diametrically opposite points. The angular speed of the ring will become

(A) $\frac{\omega M}{M+2m}$ (B) $\frac{\omega M}{M+m}$

(C) $\frac{\omega(M-2m)}{M}$ (D) $\frac{\omega(M-2m)}{M+2m}$

7. A particle is performing uniform circular motion. If $' \theta', '\omega', ' \propto'$ and 'a' are its angular displacement, angular velocity, angular acceleration and centripetal acceleration respectively, then which of the following is 'WRONG'? (' v ' is its linear velocity)

(A) $\vec{v} \perp \vec{a}$ (B) $\vec{\omega} \perp \vec{V}$

(C) $\vec{\omega} \perp \vec{\alpha}$ (D) $\vec{\omega} \perp \vec{a}$

8. Mass of 0.5 kg is attached to a string moving in horizontal circle with angular velocity 10 cycle/min. Keeping the radius constant, tension in the string is made 4 times by increasing angular velocity 'ω'. The value $' \omega '$ of that mass will be

(A) $\frac{1}{3}$ cycle /s (B) $\frac{1}{2}$ cycle /s

(C) $\frac{1}{5}$ cycle /s (D) $\frac{1}{4}$ cycle /s

9. A block of mass 4 kg is placed on a horizontal surface having coefficients of static and kinetic friction as $0 \cdot 5$ and $0 \cdot 4$ respectively. If a force, parallel to horizontal surface of 4 N is applied to the body, then the force of friction acting on the body will be $\left[g = 10\ \mathrm{m/s^2}\right]$

(A) 16 N (B) 20 N

(C) 8 N (D) 4 N

10. A bullet of mass 20 g moving with a velocity of 200 m/s strikes a target and is brought to rest in $\left(\frac{1}{50}\right)^{\text{th}}$ of a second. The impulse and average force of impact are respectively

(A) 2Ns, 100 N (B) 4Ns, 100 N

(C) 2Ns, 200 N (D) 4Ns, 200 N

11. Moment of inertia of a solid sphere about its diameter is 'I'. It is then casted into 27 small spheres of same diameter. The moment of inertia of each new sphere is

(A) $\frac{I}{243}$ (B) $\frac{I}{122}$

(C) $\frac{I}{31}$ (D) $\frac{I}{62}$

12. A wheel of radius 2 cm is at rest on the horizontal surface. A point P on circumference of the wheel is in contact with the horizontal surface. When the wheel rolls without slipping on the surface, the displacement of point P after half rotation of wheel is

(A) $2\left(\pi^2+2\right)^{\frac{1}{2}}$ cm (B) $\left(\pi^2+2\right)^{\frac{1}{2}}$ cm

(C) $\left(\pi^2+4\right)^{\frac{1}{2}}$ cm (D) $2\left(\pi^2+4\right)^{\frac{1}{2}}$ cm

13. Two satellites of masses 'm' and '2m' are revolving in a circular orbit of radius 'r', around the earth. The ratio of their frequencies of revolution will be

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

(C) 1 : 1 (D) 2 : 1

14. Three particles each of mass ' m_1 ' are placed at the corners of an equilateral triangle of side $\frac{L}{3}$ '. A particle of mass 'm $_2$ ' is placed at the mid point of any one side of triangle. Due to the system of particles the force acting on ' m_2 ' is (G = Universal constant of gravitation)

(A) $\frac{12Gm_1\,m_2}{L^2}$ (B) $\frac{2Gm_1\,m_2}{L^2}$

(C) $\frac{4Gm_1\,m_2}{L^2}$ (D) $\frac{8Gm_1\,m_2}{L^2}$

15. An elastic material with Young's modulus 'Y' is subjected to a tensile stress ' S '. The elastic energy stored per unit volume of the material will be

(A) $\frac{s^2}{Y}$ (B) $\frac{s^2}{2Y}$

(C) $\frac{YS}{2}$ (D) $\frac{S}{2Y}$

16. Under isothermal conditions, two soap bubbles of radii ' r_1 ' and ' r_2 ' coalesce to form a big drop. The radius of the big drop is

(A) $(r_1-r_2)^{\frac{1}{2}}$ (B) $(r_1+r_2)^{\frac{1}{2}}$

(C) $\left(r_1^2+r_2^2\right)^{\frac{1}{2}}$ (D) $\left(r_1^2-r_2^2\right)^{\frac{1}{2}}$

17. When a mercury drop of radius 'R', breaks into 'n' droplets of equal size, the radius 'r' of each droplet is

(A) $r=\frac{R}{\sqrt{n}}$ (B) $r=\frac{R}{n}$

(C) $r=\frac{R}{n^{\frac{1}{3}}}$ (D) $r=Rn^{\frac{1}{3}}$

18. About black body radiation, which one of the following is 'WRONG' statement?

(A) For all wavelengths, intensity is same. (B) All wavelengths are emitted by a black body.

(C) For longer wavelengths, intensity is less. (D) For shorter wavelengths, intensity is more.

19. Two black spheres 'P' and 'Q' have radii in the ratio 3 : 2. The wavelengths of maximum intensity radiation are in the ratio 3 : 4 respectively. The ratio of radiated power by 'P' to 'Q' is

(A) $\frac{74}{9}$ (B) $\frac{64}{9}$

(C) $\frac{16}{9}$ (D) $\frac{25}{9}$

20. A simple pendulum of length 'L' is suspended from a roof of a trolley. A trolley moves in horizontal direction with an acceleration 'a'. What would be the period of oscillation of a simple pendulum? [g is acceleration due to gravity]

(A) $2\pi\sqrt{L}\left(a^2+g^2\right)^{-\frac{1}{4}}$ (B) $2\pi\sqrt{L}\left(a^2+g^2\right)^{-\frac{1}{2}}$

(C) $2\pi\sqrt{\frac{L}{g+a}}$ (D) $2\pi\sqrt{\frac{L}{g-a}}$

21. The displacements of two particles executing simple harmonic motion are represented as $y_1=2\sin(10t+\theta)$ and $y_2=3\cos 10t$. The phase difference between the velocities of these waves is

(A) $\left(\theta+\frac{\pi}{2}\right)$ (B) $-\theta$

(C) $\left(\theta-\frac{\pi}{2}\right)$ (D) θ

22. The period of seconds pendulum on a planet, whose mass and radius are three times that of earth, is

(A) $3\sqrt{2}$ second (B) $\sqrt{3}$ second

(C) $2\sqrt{3}$ second (D) $2\sqrt{2}$ second

23. A stationary wave is represented by $y=10\sin\frac{\pi x}{4}\cos 20\pi t$ where ' x ' and ' y ' are expressed in cm and $'t'$ in second. Distance between two consecutive nodes is

(A) 4 cm (B) 1 cm

(C) 8 cm (D) 2 cm

24. Two strings of same material having lengths as 'L', '2L', and radii '2r', 'r' respectively, are vibrating in the fundamental mode. Tension applied to both the strings is same. The ratio of their respective fundamental frequencies is

(A) $4:3$ (B) $1:2$

(C) $1:1$ (D) $3:4$

25. Two waves with same amplitude and frequency superpose at a point. The ratio of resultant intensities when they arrive in phase to that when they arrive 90° out of phase is $\left[\cos\frac{\pi}{2}=0\right]$

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

(C) $4:1$ (D) $1:2$

26. A pipe open at both ends has length 1 m. The air column in the pipe can not resonate for a frequency (Neglect end correction, speed of sound in air $= 340$ m/s)

(A) 510 Hz (B) 85 Hz

(C) 170 Hz (D) 340 Hz

27. A bus is moving with a velocity of 5 m/s towards a wall. The driver blows the horn of frequency 165 Hz. If the speed of sound in air is 335 m/s, then after reflection of sound wave, the number of beats per second heard by the passengers in the bus will be

(A) 4 (B) 5

(C) 6 (D) 2

28. A metal sphere of radius 'R' cm is charged with $4\pi\mu$C situated in air. If ' σ ' is surface density of charge , 'E' is electric intensity at a distance 'r' from the centre of sphere then 'r' is (ϵ_0 = permittivity of free space)

(A) $R\sqrt{\frac{\epsilon_0 E}{\sigma}}$ (B) $R\sqrt{\frac{\sigma}{\epsilon_0 E}}$

(C) $\sqrt{\frac{\epsilon_0 E}{R\sigma}}$ (D) $\sqrt{\frac{R\sigma}{\epsilon_0 E}}$

29. Two capacitors of same capacity are first joined in series and then in parallel. The ratio of resultant capacity in series to that in parallel combination will be

(A) $2:1$ (B) $1:4$

(C) $4:1$ (D) $1:2$

30. A stray magnetic field does ' NOT' affect the deflection of moving coil galvanometer because

(A) magnetic field inside galvanometer is zero. (B) magnetic field is equal to earth's magnetic field.

(C) magnetic field inside galvanometer is very strong. (D) magnetic field inside galvanometer is very weak.

31. Sensitivity of a given potentiometer can be decreased by

(A) increasing the current through the wire. (B) decreasing the current through the wire.

(C) decreasing the potential gradient along the wire. (D) increasing the potential gradient along the wire.

32. Kirchhoff's current law and voltage law respectively are based on the law of conservation of

(A) charge, energy. (B) charge, momentum.

(C) energy, charge. (D) momentum, charge.

33. Two particles A and B have equal charges but different masses M_A and M_B. After being accelerated through same potential difference enter the region of uniform magnetic field and describe the path of radii R_A and R_B respectively. Then $M_A : M_B$ is

(A) $\frac{R_A}{R_B}$ (B) $\frac{R_B}{R_A}$

(C) $\left(\frac{R_A}{R_B}\right)^2$ (D) $\left(\frac{R_B}{R_A}\right)^2$

34. A straight wire of length $0\cdot5$ m and carrying current of $1\cdot2$ A is placed in a uniform magnetic field of induction 2 T. The magnetic field is perpendicular to the length of the wire. What is the force acting on the wire? $[\sin 90^\circ = 1]$

(A) $2\cdot0$ N (B) $2\cdot4$ N

(C) $1\cdot2$ N (D) $3\cdot0$ N

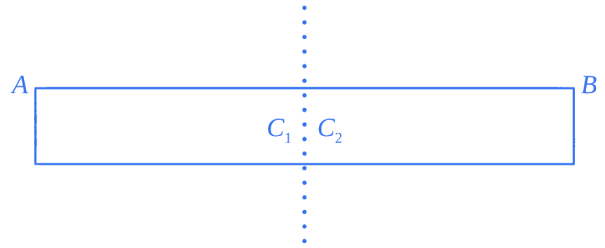
35. The susceptibility of tungsten is $6\cdot8\times10^{-5}$ at temperature 300 K. The susceptibility at temperature 400 K is

(A) $5\cdot1\times10^{-5}$ (B) $6\cdot8\times10^{-5}$

(C) $3\cdot4\times10^{-5}$ (D) $4\cdot8\times10^{-5}$

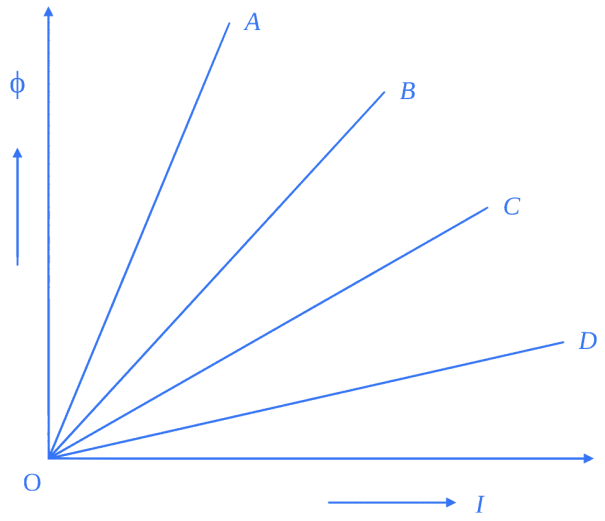
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36. A bar magnet AB is cut into two equal parts. (as shown in figure). One part is kept over the other so that the pole C_2 is above C_1. If M is the magnetic moment of the original magnet, the magnetic moment of the combination so formed is



(A) M
(B) $\frac{M}{2}$
(C) Zero
(D) 2M

37. A graph of magnetic flux ($\oint$) versus current (I) is shown for four inductors A, B, C and D. Larger value of self-inductance is for inductor



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

38. The resonant frequency of a series LCR circuit is ' f '. The circuit is now connected to the sinusoidally alternating e.m.f. of frequency ' 2f'. The new reactance X'_L and X'_C are related as

(A) $X'_C = \frac{1}{4}X'_L$
(B) $X'_C = 2X'_L$
(C) $X'_C = X'_L$
(D) $X'_C = \frac{1}{2}X'_L$

39. An electromagnetic wave of wavelength ' λ ' is incident on a photosensitive surface of negligible work function. If the photoelectrons emitted from this surface have the de-Broglie wavelength ' λ_1' then

(A) $\lambda \propto \frac{1}{\lambda_1}$
(B) $\lambda \propto \lambda_1$
(C) $\lambda \propto \lambda_1^2$
(D) $\lambda \propto \frac{1}{\lambda_1^2}$

40. A light ray of frequency ' v ' and wavelength ' λ ' enters a liquid of refractive index $\frac{3}{2}$ The ray travels in the liquid with

(A) frequency v and wavelength $\left(\frac{1}{2}\right)\lambda$
(B) frequency v and wavelength $\left(\frac{2}{3}\right)\lambda$
(C) frequency $\left(\frac{3}{2}\right)v$ and wavelength λ.
(D) frequency v and wavelength $\left(\frac{3}{2}\right)\lambda$

41. In a biprism experiment, monochromatic light of wavelength (λ) is used. The distance between two coherent sources is kept constant. If the distance between slit and eyepiece (D) is varied as D_1, D_2, D_3 and D_4, the corresponding measured fringe widths are z_1, z_2, z_3 and z_4 then

(A) $\frac{z_1}{D_1} = \frac{z_2}{D_2} = \frac{z_3}{D_3} = \frac{z_4}{D_4}$
(B) $z_1D_1 = z_2D_2 = z_3D_3 = z_4D_4$
(C) $z_1\sqrt{D_1} = z_2\sqrt{D_2} = z_3\sqrt{D_3} = z_4\sqrt{D_4}$
(D) $z_1D_1^2 = z_2D_2^2 = z_3D_3^2 = z_4D_4^2$

42. A plane wavefront is incident on a water surface at an angle of incidence 60° then it gets refracted at 45°. The ratio of width of incident wavefront to that of refracted wavefront will be $\left[\sin\frac{\pi}{4} = \cos\frac{\pi}{4} = \frac{1}{\sqrt{2}}, \sin 60^\circ = \frac{\sqrt{3}}{2}, \cos 60^\circ = \frac{1}{2}\right]$

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

43. If the frequency of incident light falling on a metallic surface is doubled, maximum kinetic energy of emitted photoelectrons

(A) increases to slightly more than double.
(B) remains the same.
(C) becomes twice.
(D) decreases to slightly more than double.

44. If $'\lambda_1$ ' and ' λ_2 ' are the wavelengths of de-Broglie waves for electrons in first and second Bohr orbits in hydrogen atom, then $\left(\frac{\lambda_1}{\lambda_2}\right)$ is equal to (Energy in 1^{st} Bohr orbit $= -13.6\text{eV}$)

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

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

45. If T is the half-life of a radioactive substance then its instantaneous rate of change of activity is proportional to

(A) $\sqrt{\text{T}}$ (B) T

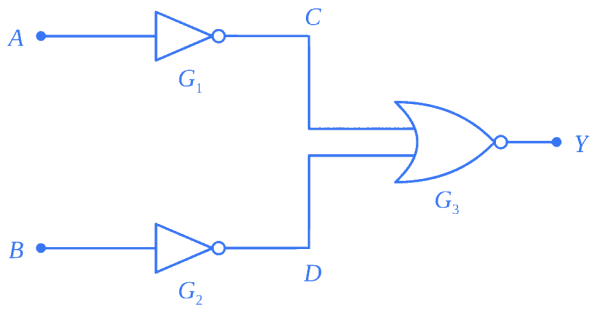
(C) T^2 (D) T^{-2}

46. The region near the junction of an unbiased $\text{p}-\text{n}$ junction diode is known as depletion layer. The layer is depleted of

(A) only negative ions. (B) electrons and holes.

(C) both positive and negative ions. (D) only positive ions.

47. The resultant gate and its Boolean expression for the given circuit is



(A) OR, $\text{A}+\text{B}$ (B) NAND, $\overline{\text{A}\cdot\text{B}}$

(C) NOR, $\overline{\text{A}+\text{B}}$ (D) AND, $\text{A}\cdot\text{B}$

48. In communication system, what is used to extend the range of a communication?

(A) Transducer (B) Attenuation

(C) Repeater (D) Modulation

49. In Searle's method to find Young's modulus of a wire, when a force of $1\cdot5$ kg -wt is applied at its free end, the length of wire is ' a '. When force of $2\cdot5$ kg-wt is applied, the length of wire is 'b'. What would be its original length?

(A) $\text{b}-\text{a}$ (B) $\frac{\text{b}-\text{a}}{4}$

(C) $2\cdot5\text{a}-1\cdot5\text{ b}$ (D) $2\cdot5\text{ b}-1\cdot5\text{a}$

50. Focal length of a convex lens will be maximum for

(A) yellow light. (B) violet light.

(C) blue light. (D) red light.

51. Which gas among the following contains maximum number of molecules at STP? (Molar masses in $\mathrm{gmol}^{-1} \mathrm{CO}_2 = 44,\ \mathrm{Ar} = 39 \cdot 9, \mathrm{CH}_4 = 16, \mathrm{O}_2 = 32$)

(A) $24 \cdot 0$ g of O_2
(B) $16 \cdot 0$ g of CH_4
(C) $13 \cdot 3$ g of Ar
(D) 11 g of CO_2

52. Which among the following is a heaviest isotope of water?

(A) $\mathrm{T}_2{}^{17}\mathrm{O}$
(B) $\mathrm{T}_2{}^{16}\mathrm{O}$
(C) $\mathrm{HD}^{18}\mathrm{O}$
(D) $\mathrm{T}_2{}^{18}\mathrm{O}$

53. What is the position of elements $\mathrm{La}(\mathrm{Z} = 57)$ and $\mathrm{Ce}(\mathrm{Z} = 58)$ respectively in the long form of periodic table?

(A) La = Group-3, Period-6 Ce = Group-3, Period-6
(B) La = Group -4, Period-7 Ce = Group-5, Period-7
(C) La = Group -3, Period-7 Ce = Group-3, Period-6
(D) La = Group-3, Period-6 Ce = Group-3, Period-7

54. What is the formal charge on hydrogen atom in water molecule?

(A) 1
(B) 0
(C) $-\frac{1}{2}$
(D) $+\frac{1}{2}$

55. If two moles of an ideal gas at 546 K occupy a volume of 44.8 L. What is the pressure of ideal gas at 546 K? $\left(\mathrm{R} = 0 \cdot 0821\ \mathrm{L\ atm\ mol}^{-1}\ \mathrm{K}^{-1}\right)$

(A) 20 atm
(B) $0 \cdot 2$ atm
(C) $0 \cdot 5$ atm
(D) $2 \cdot 0$ atm

56. Which of the following eations has $\Delta_f \mathrm{H}^\circ$ and $\Delta \mathrm{H}^\circ$ same?

(A) $\mathrm{H}_{2(\mathrm{g})} + \frac{1}{2}\mathrm{O}_{2(\mathrm{g})} \longrightarrow \mathrm{H}_2\mathrm{O}_{(\mathrm{l})}$
(B) $\mathrm{N}_{2(\mathrm{l})} + \mathrm{O}_{3(\mathrm{g})} \longrightarrow \mathrm{N}_2\mathrm{O}_{3(\mathrm{g})}$
(C) $\mathrm{CH}_{4(\mathrm{g})} + 2\mathrm{Cl}_{2(\mathrm{g})} \longrightarrow \mathrm{CH}_2\mathrm{Cl}_{2(\mathrm{g})} + 2\mathrm{HCl}_{(\mathrm{g})}$
(D) $\mathrm{CO}_{(\mathrm{g})} + \mathrm{O}_{2(\mathrm{g})} \longrightarrow 2\mathrm{CO}_{2(\mathrm{g})}$

57. Which of the following eations is correct for heat of sublimation?

(A) $\Delta_{\text{vap}}\,\mathrm{H} = \Delta_{\text{sub}}\,\mathrm{H} + \Delta_{\text{fus}}\,\mathrm{H}$
(B) $\Delta_{\text{sub}}\,\mathrm{H} = \Delta_{\text{fus}}\,\mathrm{H} - \Delta_{\text{vap}}\,\mathrm{H}$
(C) $\Delta_{\text{fus}}\,\mathrm{H} = \Delta_{\text{sub}}\,\mathrm{H} \times \Delta_{\text{vap}}\,\mathrm{H}$
(D) $\Delta_{\text{sub}}\,\mathrm{H} = \Delta_{\text{fus}}\,\mathrm{H} + \Delta_{\text{vap}}\,\mathrm{H}$

58. When 2 moles of an ideal gas are expanded isothermally from a volume of 12.5 L to 15.0 L against constant external pressure of 760 mmHg. Calculate the amount of work done in joule?

(A) $-253 \cdot 25$ J
(B) $-190 \cdot 0$ J
(C) $-1924 \cdot 0$ J
(D) $-25 \cdot 325$ J

59. The sum of oxidation number of all atoms in $\mathrm{S}_2\mathrm{O}_3^{2-}$ ion is

(A) $+2$
(B) $+5$
(C) -2
(D) $+7$

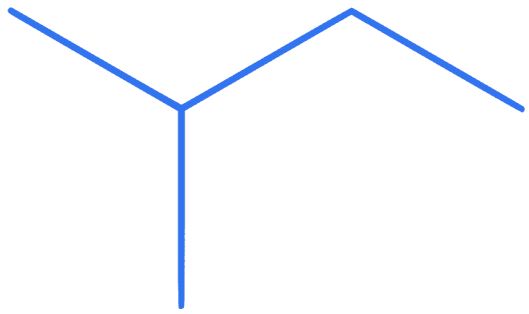
60. What is the formula of lithium imide?

(A) LiNO_3
(B) $\mathrm{Li}_2\mathrm{NH}$
(C) $\mathrm{Li}_3\ \mathrm{N}$
(D) LiNH_2

61. Identify the ore of magnesium from following?

(A) Siderite
(B) Calamine
(C) Limonite
(D) Dolomite

62. How many isomers of monobromoderivaties are obtained on bromination of following compound?

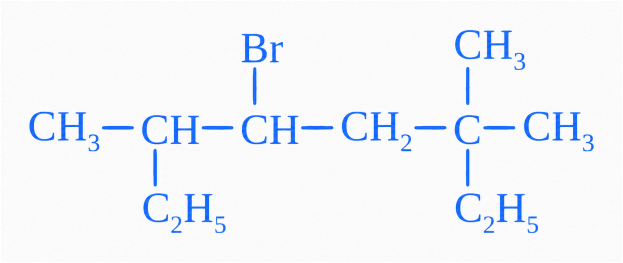


(A) 4
(B) 3
(C) 2
(D) 5

63. Separation of Acetone and Benzene from their mixture is carried out by

(A) Fractional distillation
(B) Simple distillation
(C) Fractional distillation using fractionating column
(D) Distillation under reduced pressure

64. I.U.P.A.C. name of the following compound is



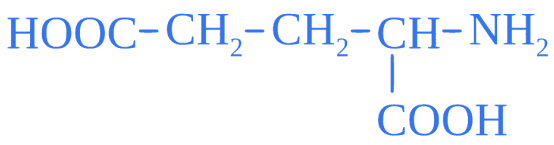
(A) 4 -bromo-2-ethyl-2, 5 -dimethylheptane
(B) 5 -bromo-3, 3,6 - trimethyloctane
(C) 3-bromo-2, 5-diethyl-5-methylhexane
(D) 4 -bromo- 3, 6, 6 - trimethyloctane

65. IUPAC name of benzylamine is

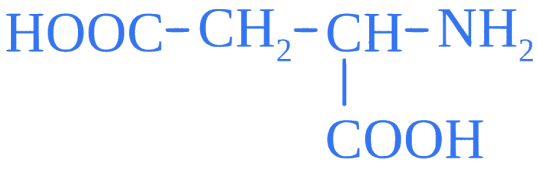
(A) phenylethanamine
(B) phenylmethanamine
(C) benzenamine
(D) N-methylbenzenamine

66. Which among the following formulae represents glycollic acid

(A) $CH_3 - CH(OH) - COOH$



(B)



(C)

(D) $HO - CH_2 - COOH$

67. Which among the following substituent groups decreases the acidic strength of aromatic carboxylic acid?

(A) $-NH_2$
(B) $-CN$
(C) $-Cl$
(D) $-NO_2$

68. Which of the following compounds is obtained when aternary ammonium hydroxide is strongly heated?

(A) Alkane
(B) Alkyne
(C) Alkene
(D) Amide

69. Which of the following compounds on heating with potassium permanagnate and dilute sulphuric acid forms adipic acid?

(A) Methylbenzene
(B) Phenylethene
(C) Cyclohexene
(D) n-butylbenzene

70. What is the number of carbon atoms in alkanes found in diesel?

(A) C_{29} to C_{31}
(B) C_6 to C_8
(C) C_1 to C_4
(D) C_{15} to C_{18}

71. What is the type of hole occupied if limiting value of $\frac{r+}{r-}$ is in the range of 0.225 to 0.414?

(A) Octahedral
(B) Cubic
(C) Planar triangular
(D) Tetrahedral

72. What is the percentage of void space in bcc type of in unit cell?

(A) 68%
(B) 26%
(C) 74%
(D) 32%

73. What is the mass of an fcc unit cell if mass of one atom of an element is 6×10^{-23} g ?

(A) 24×10^{-22} g
(B) 4×10^{-23} g
(C) $2 \cdot 4 \times 10^{-22}$ g
(D) $2 \cdot 4 \times 10^{-23}$ g

74. If $2 \cdot 0$ g of NaOH is dissolved in 500 cm^3 of water, what is molarity of solution?

(A) $0 \cdot 25$ $moldm^{-3}$
(B) $0 \cdot 1$ $moldm^{-3}$
(C) $0 \cdot 4$ $moldm^{-3}$
(D) $0 \cdot 50$ $moldm^{-3}$

75. The Henry's law constant for oxygen is $1 \cdot 3 \times 10^{-3}$ $moldm^{-3}$ atm^{-1}. If partial pressure of oxygen is 0.46 atmosphere what is the concentration of dissolved oxygen at 25°C and 1 atm pressure?

(A) 5.98×10^{-4} $moldm^{-3}$
(B) 3.53×10^{-4} $moldm^{-3}$
(C) 5.98 $moldm^{-3}$
(D) $2 \cdot 82 \times 10^{-3}$ $moldm^{-3}$

76. According to Raoult's law, relative lowering of vapour pressure for a solution containing a non volatile solute is eal to

(A) mole fraction of solvent
(B) moles of solute
(C) moles of solvent
(D) mole fraction of solute

77. What is the conductivity of 0.01 M NaCl solution if resistance and cell constant of NaCl solution are 375 ohms and $0.5\ cm^{-1}$ respectively at 298 K ?

(A) $7.50 \times 10^{-3} \Omega^{-1}\ cm^{-1}$

(B) $1 \cdot 333 \times 10^{-3} \Omega^{-1}\ cm^{-1}$

(C) $1 \cdot 333 \times 10^{-4} \Omega^{-1}\ cm^{-1}$

(D) $1 \cdot 875 \times 10^{-3} \Omega^{-1}\ cm^{-1}$

78. Which of the following statements is true for electrolytic cell?

(A) Oxidation occurs at positive electrode

(B) Oxidation occurs at negative electrode

(C) Anode is negative and cathode is positive electrode

(D) Reduction occurs at positive electrode

79. Half life of first order reaction is 20 minutes. What is the time taken to reduce the initial concentration of the reactant to $\frac{1}{10}$ th ?

(A) 6.6 min

(B) 66.56 min

(C) 150 min

(D) $79 \cdot 68$ min

80. Which among the following is correct when energy of activation, Ea of the catalyzed reaction decreases at constant temperature and for same concentration?

(A) Ea/RT decreases

(B) K decreases

(C) $e^{-Ea/RT}$ decreases

(D) $-Ea/RT$ decreases

81. When soap is added to an oily part of cloth, the hydrocarbon part of soap dissolves in

(A) Water, keeping the tail away from the oil

(B) Oil, keeping the head away from the oil

(C) Water, keeping the head away from the oil

(D) Oil, keeping the tail away from the oil

82. Which of the following ionic species has highest precipitating power?

(A) Cu^{+2}

(B) $SO4^{-2}$

(C) Na^{+}

(D) Al^{+3}

83. Which oxide formation according to Ellingham diagram shows a graph with sudden change in slope?

(A) CO_2

(B) Ag_2O

(C) Al_2O_3

(D) MgO

84. Which of the following oxyacid of sulphur contain both S = S and S = 0 bonds?

(A) $H_2\ S_2O_5$

(B) $H_2\ S_2O_4$

(C) $H_2\ S_2O_2$

(D) $H_2\ S_2O_3$

85. How many lone pair of electrons are present on chlorine atom in chlorus acid?

(A) 4

(B) 2

(C) 1

(D) 3

86. Which of the following formula represents laughing gas?

(A) N_2O

(B) N_2O_5

(C) N_2O_4

(D) N_2O_3

87. Identify the correct statement from following

(A) Lanthanoids have greater tendency to form complexes than actinoids.

(B) Actinoid contraction is greater than lanthanoid contraction.

(C) Hydroxides of actinoids are less basic than Lathanoid hydroxides.

(D) Binding energy of 4f - orbitals is lower that 5f - orbitals.

88. Which among the following orbitals form Delta (δ) molecular orbitals?

(A) d_{xy} and d_{yz} orbitals

(B) d_{z^2} and $d_{x^2-y^2}$ orbitals

(C) d_{yz} and $d_{x^2-y^2}$ orbitals

(D) d_{xy} and $d_{x^2-y^2}$ orbitals

89. What is the type of hybridisation and the geometry respectively found in $[CoF_6]^{3-}$?

(A) d^3sp^3 and pentagonal bipyramidal

(B) $sp^3\ d^2$ and octahedral

(C) dsp^3 and trigonal bipyramidal

(D) dsp^2 and pentagonal bipyramidal

90. What is the value of primary valence of Co in $CoCl_3$?

(A) 2

(B) 4

(C) 3

(D) 1

91. Which of the following is a major product obtained in the reaction of isobutylene with hydrogen bromide?

(A) tert - butyl bromide (B) sec-butyl bromide
(C) n - butyl bromide (D) Iso butyl bromide

92. How many hydroxy groups are present in hydroxyinol?

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

93. Identify product 'C' in following reaction $C_2H_5OH \xrightarrow[\text{Pyridine}]{SOCl_2} A \xrightarrow{C_2H_5ONa} B \xrightarrow[\Delta\text{ , Pressure}]{\text{dil } H_2SO_4} C$

(A) Ethyl ethanoate (B) Ethanol
(C) Ethanoic acid (D) But-2-ene

94. Which of the following alcohols is prepared by acid catalysed hydration of alkenes?

(A) Ethanol (B) Methanol
(C) Propan-1-ol (D) Butan-1-ol

95. Which of the following is a solid trimer of formaldehyde?

(A) Metaldehyde (B) Paraformaldehyde
(C) Paraldehyde (D) Trioxane

96. Sodium salt of α - halogen carboxylic acid when heated with sodium nitrite and followed by hydrolysis forms

(A) nitroalkane (B) amine
(C) alcohol (D) amide

97. Identify basic amino acid from following

(A) Phenylalanine (B) Histidine
(C) Alanine (D) Serine

98. When one mole of lactose is hydrolysed, the hydrolysate contains

(A) $1 \cdot 0$ mol Galactose $+1 \cdot 0$ mol Glucose (B) $1 \cdot 0$ mol Glucose $+2 \cdot 0$ mol Galactose
(C) $1 \cdot 0$ mol Glucose $+1 \cdot 0$ mol Fructose (D) $2 \cdot 0$ mol Glucose

99. Identify addition polymer from following

(A) Nylon-6, 6 (B) Polyester
(C) Orlon (D) Urea formaldehyde polymer

100. Identify the type of drug used to reduce pain and irritation of stomach?

(A) Tranilizer (B) antibiotic
(C) antiseptic (D) antacid

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101. If $f(x) = \frac{4x+7}{7x-4}$, then the value of $f\{f[f(2)]\} =$

(A) $\frac{3}{2}$ (B) $\frac{2}{3}$
(C) $\frac{35}{39}$ (D) $\frac{39}{35}$

102. Domain of the real valued function $f(x) = \frac{x+2}{9-x^2}$ is

(A) $-3 \leq x \leq 3$ (B) $R - \{-3, 3\}$
(C) R (D) $R - \{3\}$

103. If $\tan A = \frac{5}{6}$, $\tan B = \frac{1}{11}$, then $A + B =$

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

104. $\sec 2\theta - \tan 2\theta =$

(A) $\tan\left(\frac{\pi}{4} - \theta\right)$ (B) $\tan 2\theta$
(C) $\cot 2\theta$ (D) $\cot\left(\frac{\pi}{4} - \theta\right)$

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

(A) $x = n\pi + \frac{\pi}{2}, n \in Z$

(B) $x = n\left(\frac{\pi}{2}\right) + \pi, n \in Z$

(C) $x = n\left(\frac{\pi}{2}\right) + \frac{\pi}{3}, n \in Z$

(D) $x = (2n+1)\pi, n \in Z$

106. If $2\sin^2 x + 7\cos x = 5$, then permissible value of $\cos x$ is

(A) $\frac{1}{2}$ (B) 0
(C) 1 (D) $-\frac{1}{2}$

107. If A, B, C are the angles of a ΔABC, then with usual notations, $\frac{c^2-a^2+b^2}{a^2-b^2+c^2} =$

(A) $\frac{\cos B}{\cos A}$ (B) $\frac{\cot B}{\cot A}$
(C) $\frac{\sin B}{\sin A}$ (D) $\frac{\tan B}{\tan A}$

108. With usual notations in ΔABC, a = 3, c = 2 and $\sin C = \frac{2}{3}$, then $\angle A =$

(A) $\frac{\pi^c}{4}$ (B) $\frac{\pi^c}{3}$
(C) $\frac{\pi^c}{2}$ (D) $\frac{\pi^c}{6}$

109. $5^2 + 6^2 + 7^2 + \ldots\ldots\ldots\ldots\ldots + 20^2 =$

(A) 2860 (B) 2840
(C) 2830 (D) 2850

110. The line cuts X and Y axes at the points A and B respectively. The point $(5, 6)$ divides the line segment AB internally in the ratio 3 : 1, then equation of line is

(A) $2x + y = 16$ (B) $2x + 5y = 40$
(C) $2x - y = 4$ (D) $2x - 5y = -20$

111. The locus of a point of intersection of two lines $x\sqrt{3} - y = k\sqrt{3}$ and $\sqrt{3}kx + ky = \sqrt{3}, k \in R$, describes

(A) a parabola (B) a hyperbola
(C) an ellipse (D) a pair of lines

112. If the acute angle between the lines $x^2 - 4xy + y^2 = 0$ is $\tan^{-1}(k)$, then k =

(A) $\frac{1}{\sqrt{3}}$ (B) $\sqrt{3}$
(C) $\frac{1}{6}$ (D) $\frac{1}{3}$

113. The joint equation of two lines through the origin, each of which making an angle of 30° with line $x + y = 0$ is

(A) $x^2 + 4xy - y^2 = 0$ (B) $x^2 - 4xy + y^2 = 0$
(C) $x^2 + 4xy + y^2 = 0$ (D) $x^2 - 4xy - y^2 = 0$

114. If A $(3, -2, 2)$, B$(2, \lambda + 1, 5)$ are the end points of the diameter of the circle and if the point $(5, 6, -1)$ lies on the circle, then $\lambda =$

(A) 6 (B) 8
(C) 7 (D) 5

115. The eccentricity of the ellipse given by the equation $9x^2 + 16y^2 = 144$ is

(A) $\frac{\sqrt{7}}{4}$ (B) $\frac{1}{4}$
(C) $\frac{\sqrt{3}}{4}$ (D) $\frac{\sqrt{5}}{4}$

116. Which of the following statement pattern is a contradiction?

$S_1 \equiv (p \to q) \wedge (p \wedge \sim q)$
$S_2 \equiv [p \wedge (p \to q)] \to q$
$S_3 \equiv (p \vee q) \to \sim p$
$S_4 \equiv [p \wedge (p \to q)] \leftrightarrow q$

(A) S_4 (B) S_1
(C) S_2 (D) S_3

117. The negation of the statement, $\exists x \in A$ such that $x + 5 > 8$ is

(A) $\forall x \in A, x + 5 \geq 8$ (B) $\forall x \in A, x + 5 \leq 8$

(C) $\forall x \in A, x + 5 > 8$ (D) $\exists x \in A$ such that $x + 5 < 8$

118. If $A = \begin{bmatrix} \cos\theta & -\sin\theta \\ -\sin\theta & -\cos\theta \end{bmatrix}$, then $A^{-1} =$

(A) $\begin{bmatrix} -\sin\theta & -\cos\theta \\ -\cos\theta & \sin\theta \end{bmatrix}$ (B) $\begin{bmatrix} \sin\theta & -\cos\theta \\ \cos\theta & -\sin\theta \end{bmatrix}$

(C) $\begin{bmatrix} -\cos\theta & \sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$ (D) $\begin{bmatrix} \cos\theta & -\sin\theta \\ -\sin\theta & -\cos\theta \end{bmatrix}$

119. If $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}, B = \begin{bmatrix} 1 & 0 \\ 3 & 1 \end{bmatrix}$, then $(AB)^{-1} =$

(A) $\begin{bmatrix} 2 & -3 \\ -7 & 11 \end{bmatrix}$ (B) $\begin{bmatrix} 2 & -3 \\ 7 & 11 \end{bmatrix}$

(C) $\begin{bmatrix} 2 & -3 \\ -7 & -11 \end{bmatrix}$ (D) $\begin{bmatrix} -2 & -3 \\ -7 & 11 \end{bmatrix}$

120. If $f(x) = \frac{\left(e^{2x}-1\right)\sin x^0}{x^2}, x \neq 0$ is continuous at $x = 0$, then $f(0) =$

(A) $\frac{90}{\pi}$ (B) $\frac{180}{\pi}$

(C) $\frac{\pi}{90}$ (D) $\frac{\pi}{180}$

121. If $y = \cot^{-1}\left(\sqrt{\frac{1-\sin x}{1+\sin x}}\right)$, then $\frac{dy}{dx} =$

(A) $\frac{1}{2}$ (B) -1

(C) $\frac{1}{3}$ (D) 1

122. If $\sqrt{x} + \sqrt{y} = \sqrt{xy}$, then $\frac{dy}{dx} =$

(A) $-\left(\frac{y}{x}\right)^{\frac{3}{2}}$ (B) $\left(\frac{x}{y}\right)^{\frac{3}{2}}$

(C) $-\left(\frac{x}{y}\right)^{\frac{3}{2}}$ (D) $\left(\frac{y}{x}\right)^{\frac{3}{2}}$

123. If $\sin\left(\frac{x+y}{x-y}\right) = \tan\frac{\pi}{5}$, then $\frac{dy}{dx} =$

(A) $\frac{x}{y}$ (B) $\frac{y}{x}$

(C) $-\frac{y}{x}$ (D) $-\frac{x}{y}$

124. The displacement of a particle at time 't' is $s = t^3 - 4t^2 - 5t$, then the velocity of the particle at $t = 2$ sec. is

(A) $\left(\frac{1}{9}\right)$ units / sec. (B) -9 units / sec

(C) 9 units / sec. (D) $\left(\frac{-1}{9}\right)$ units / sec.

125. The perimeter of a triangle is 10 cm. If one of its side is 4 cm, then remaining sides of the triangle, when area of triangle is maximum are

(A) 5 cm, 1 cm (B) $3 \cdot 6$ cm, $2 \cdot 4$ cm

(C) 3 cm, 3 cm (D) 2 cm, 4 cm

126. If the L. M. V. T. holds for the function $f(x) = x + \frac{1}{x}, x \in [1, 3]$, then c=

(A) $\sqrt{3}$ (B) 3

(C) 2 (D) $-\sqrt{3}$

127. $\int \frac{5^x}{\sqrt{5(-2x)-5^{(2x)}}}dx =$

(A) $\sin^{-1}\left(5^{2x}\right) + c$

(B) $\frac{\sin^{-1}\left(5^{2x}\right)}{\log 25} + c$

(C) $\tan^{-1}(5^x) + c$

(D) $\tan^{-1}\left(5^{2x}\right) \cdot \log 25 + c$

128. If $f'(x) = k(\cos x + \sin x)$ and $f(0) = 9, f\left(\frac{\pi}{2}\right) = 15$, then $f(x) =$

(A) $3(\sin x - \cos x) + 12$

(B) $3(\sin x - \cos x) - 12$

(C) $3(\sin x + \cos x) + 12$

(D) $3(\cos x + \sin x) - 12$

129. $\int \frac{dx}{(x+2)\sqrt{x+1}} =$

(A) $\tan^{-1}(\sqrt{x+1}) + c$

(B) $2\tan^{-1}(\sqrt{x+1}\ ) + c$

(C) $2\tan^{-1}(\sqrt{x+2}) + c$

(D) $\tan^{-1}(\sqrt{x+2}) + c$

130. $\int_2^3 \frac{dx}{x^2+x} =$

(A) $\log\left(\frac{3}{4}\right)$ (B) $\log\left(\frac{3}{2}\right)$

(C) $\log\left(\frac{9}{8}\right)$ (D) $\log\left(\frac{8}{9}\right)$

131. $\int_{\frac{-\pi}{2}}^{\frac{\pi}{2}} \sin^2 x dx =$

(A) $\frac{\pi}{4}$ (B) $\frac{\pi}{3}$

(C) $\frac{\pi}{2}$ (D) $\frac{3\pi}{4}$

132. $\int_0^a (a-x)^{\frac{3}{2}} \cdot x^2 dx =$

(A) $\frac{-16a^{\frac{9}{2}}}{315}$ (B) $\frac{16a^{\frac{9}{2}}}{315}$

(C) $\frac{16a^{\frac{7}{2}}}{315}$ (D) $\frac{-16a^{\frac{7}{2}}}{315}$

133. The area bounded by the curve $y = x^3$, the X -axis and the lines $x = 1$ and $x = 4$ is

(A) $\frac{127}{4}$ sq. units (B) 64 sq. units

(C) 27 sq. units (D) $\frac{255}{4}$ sq. units

134. The differential equation of the family of lines having x - intercept ' a ' and y - intercept ' b ' is

(A) $\frac{d^2y}{dx^2} = -1$ (B) $\frac{d^2y}{dx^2} = 10$

(C) $\frac{d^2y}{dx^2} = 1$ (D) $\frac{d^2y}{dx^2} = 0$

135. The differential equation obtained by eliminating the arbitrary constants from the equation $y^2 = (2x + c)^5$ is

(A) $\left(\frac{dy}{dx}\right)^4 - 625y^4 = 0$

(B) $\left(\frac{dy}{dx}\right)^5 - 3125y^3 = 0$

(C) $\left(\frac{dy}{dx}\right)^3 - 125y^3 = 0$

(D) $xy\frac{dy}{dx} = 5$

136. A body cools according to Newton's law from 100°C to 60°C in 20 minutes. The temperature of the surrounding being 20°C then the temperature of the body after one hour is

(A) 15°C (B) 30°C

(C) 40°C (D) 20°C

137. The differential equation whose solution is $y = e^{ax}$ is

(A) $y\frac{dy}{dx} = x\log y$ (B) $\frac{dy}{dx} = x\log x$

(C) $\frac{dy}{dx} = y\log x$ (D) $x\frac{dy}{dx} = y\log y$

138. The rate of growth of bacteria is proportional to the bacteria present. If it is found that the number doubles in 3 hours, then the number of times the bacteria are increased in 6 hours is

(A) 6 times the original (B) 4 times the original

(C) 8 times the original (D) 5 times the original

139. If P$(3, 2, 6)$, Q$(1, 4, 5)$ and R$(3, 5, 3)$ are the vertices of ΔPQR, then m$\angle$PQR is

(A) 90° (B) 50°

(C) 70° (D) 30°

140. If $\bar{u} = \hat{\imath} - 2\hat{\jmath} + \hat{k}, \bar{v} = 3\hat{\imath} + \hat{k}$ and $\bar{w} = \hat{\jmath} - \hat{k}$, then the volume of the parallelopiped with $\bar{u} \times \bar{v}, \bar{u} + \bar{w}$ and $\bar{v} + \bar{w}$ as coterminus edges is

(A) 12 cubic units (B) 10 cubic units

(C) 24 cubic units (D) 20 cubic units

141. If $\bar{a}, \bar{b}, \bar{c}, \bar{d}$ are the position vectors of the points A, B, C, D respectively such that $3\bar{a} - \bar{b} + 2\bar{c} - 4\bar{d} = \bar{0}$, then the position vector of the point of intersection of the line segments AC and BD is

(A) $\frac{\bar{b}+3\bar{d}}{4}$ (B) $\frac{3\bar{a}+\bar{c}}{4}$

(C) $\frac{\bar{a}+\bar{c}}{2}$ (D) $\frac{\bar{b}+4\bar{d}}{5}$

142. The vector equation of the line $\frac{x+3}{2} = \frac{2y-3}{5}; z = -1$ is

(A) $\bar{r} = \left(3\hat{\imath} - \frac{3}{2}\hat{\jmath} - \hat{k}\right) + \lambda(4\hat{\imath} + 5\hat{\jmath})$

(B) $\bar{r} = \left(-3\hat{\imath} + \frac{3}{2}\hat{\jmath} - \hat{k}\right) + \lambda(4\hat{\imath} + 5\hat{\jmath})$

(C) $\bar{r} = \left(-3\hat{\imath} + \frac{3}{2}\hat{\jmath} + \hat{k}\right) + \lambda(4\hat{\imath} + 5\hat{\jmath})$

(D) $\bar{r} = \left(3\hat{\imath} + \frac{3}{2}\hat{\jmath} - \hat{k}\right) + \lambda\left(4\hat{\imath} + \frac{5}{2}\hat{\jmath}\right)$

143. The length of the perpendicular to the plane $\bar{r} \cdot (\hat{\imath} - 2\hat{\jmath} + 3\hat{k}) = 14$ from the origin is

(A) $\sqrt{7}$ units (B) 7 units

(C) 14 units (D) $\sqrt{14}$ units

144. If the lines $\frac{1-x}{2} = \frac{y-8}{\lambda} = \frac{z-5}{2}$ and $\frac{x-11}{5} = \frac{y-3}{3} = \frac{z-1}{1}$ are perpendicular, then $\lambda =$

(A) 4 (B) -4

(C) $\frac{8}{3}$ (D) $\frac{-8}{3}$

145. The acute angle between the line $\bar{r} = (\hat{\imath} + 2\hat{\jmath} + \hat{k}) + \lambda(\hat{\imath} + \hat{\jmath} + \hat{k})$ and the plane $\bar{r} \cdot (2\hat{\imath} - \hat{\jmath} + \hat{k}) = 5$ is

(A) $\sin^{-1}\left(\frac{\sqrt{2}}{3}\right)$ (B) $\sin^{-1}\left(\frac{2}{3}\right)$

(C) $\sin^{-1}\left(\sqrt{\frac{2}{3}}\right)$ (D) $\sin^{-1}\left(\frac{2}{\sqrt{3}}\right)$

146. The feasible region of L. P. P. Maximize z $= 70x + 50$y subject to $8x + 5y \leq 60, 4x + 5y \leq 40$ and $x \geq 0, y \geq 0$ is

(A) a triangle (B) a square

(C) a pentagon (D) a quadrilateral

147. A multiple choice examination has 5 questions. Each question has three alternative answers of which exactly one is correct. The probability that a student will get at least one correct answer is

(A) $\frac{80}{243}$ (B) $\frac{32}{243}$

(C) $\frac{163}{243}$ (D) $\frac{211}{243}$

148. The probability mass function of a random variable X is $P(X = x) = \frac{5}{2^5}$ if $x = 0, 1, 2, 3, 4, 5$ $= 0$ otherwise then, $P(X \leq 2) =$

(A) $P(X > 3)$ (B) $P(X \geq 3)$

(C) $P(X \geq 2)$ (D) $P(X > 4)$

149. An urn contains 4 red and 5 white balls. Two balls are drawn one after the other without replacement, then the probability that both the balls are red is

(A) $\frac{5}{6}$ (B) $\frac{1}{6}$

(C) $\frac{2}{9}$ (D) $\frac{4}{9}$

150. The p.d.f. of a random variable X is given by $f(x) = \frac{k}{\sqrt{x}}$ if $0 \leq x \leq 4$ $= 0$ otherwise, then $\mathrm{P}(1 < X < 4) =$

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

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

- End of Question Paper -