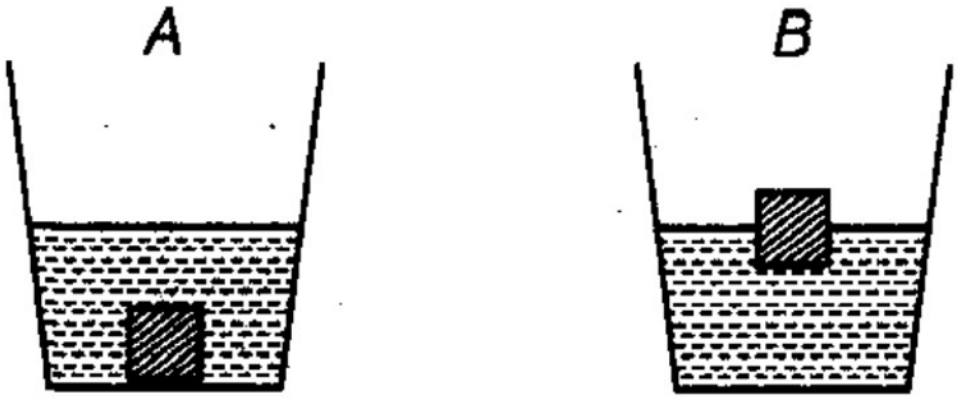
AMUEEE 2019 Question Paper

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Physics

Q.No. 1 A piece of ice is tied using a string to the bottom of bucket A. The bucket is filled with water with ice completely submerged in it.' Another bucket B is filled with water and a piece of ice is released in water. If floats on the surface of water (see Fig.). What would be the impact on the level of water in the two buckets, when



ice pieces melt away completely?

(A) Level of water remain unchanged in both the buckets.

(B) Level of water will go down in bucket A, but will remain unchanged in bucket B.

(C) Level of water will go down in bucket, A but will go up in bucket B.

(D) Level of water will remain unchanged in bucket A, but will go up in bucket B.

Q.No. 2 The wave nature of electron was first experimentally verified by

(A) Louis Victor de-Broglie

(B) James Frank and Gustav Hertz

(C) C.J. Davisson and L.H. Germer

(D) Hans Geiger and Ernst Marsden

Q.No. 3 The air pressure at sea level is 101325 Pa. At the centre of a rarefaction of a sound wave in air, the pressure is 91000 Pa. Which is the most likely pressure at the centres of a compression of the same wave?

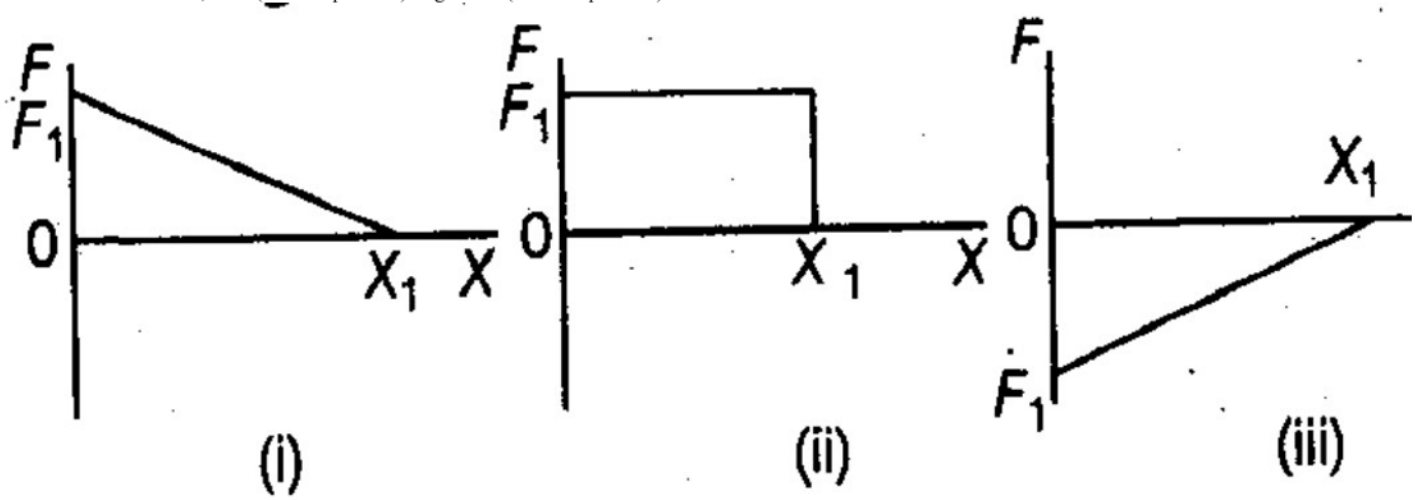
(A) 91000 Pa

(B) 101000 Pa

(C) 111650 Pa

(D) 121000 Pa

Q.No. 4 The graphs below show the magnitude of the force on a particle as it moves along the positive X-axis from the origin to X = X_1. The force is parallel to the X-axis and conservative. The maximum magnitude F_1 has the same value for all graphs. Rank the situations according to the change in the potential energy associated with the force, least (or most positive) to greatest (or most positive)



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

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

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

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

Q.No. 5 A block is released from rest on a 45° smooth incline and slide a distance d. The time taken to slide the same distance is n times as much to slide on a 45° rough incline than on the smooth incline. The coefficients of friction for the rough incline is

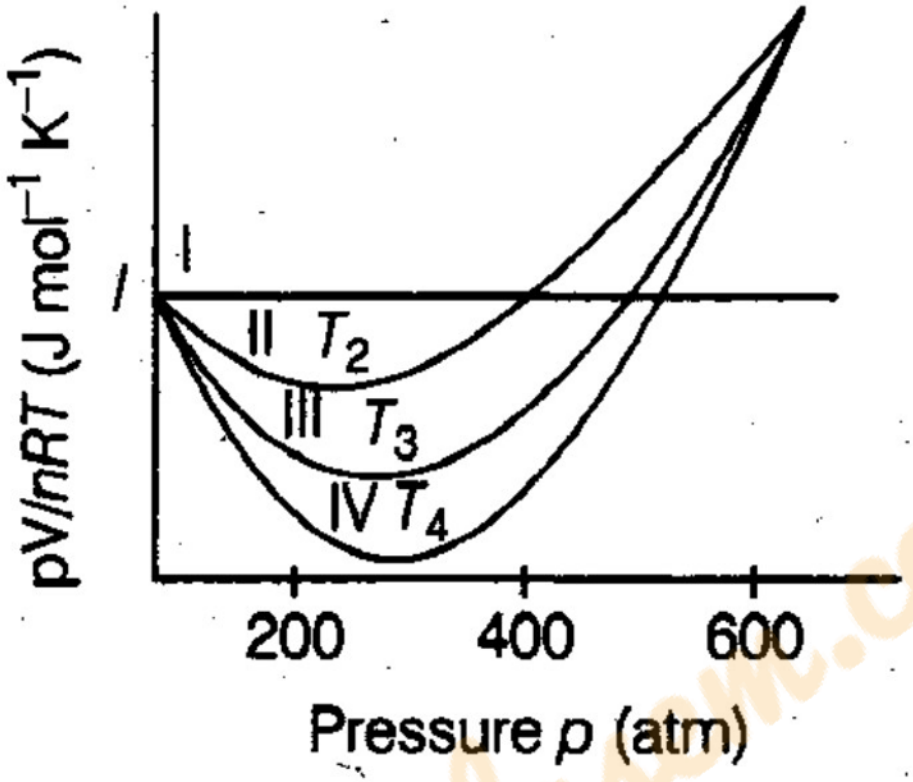
(A) $\sqrt{1-\frac{1}{n^2}}$

(B) $1-\frac{1}{n^2}$

(C) $\sqrt{1-\frac{1}{2n^2}}$

(D) $1-\frac{1}{2n^2}$

Q.No. 6 Different curves in the figures show the behaviour of gases



(i) Curve I represent ideal gas behaviour (ii) Curves II, III and IV also represents ideal gas behaviour at different temperatures T_2, T_3 and T_4 (iii) Curves II, III and IV represents behaviour of a real gas at different temperatures T_2, T_3 and T_4 (iv) $T_2 > T_3 > T_4$ (v) $T_2 < T_3 < T_4$ The correct statements are

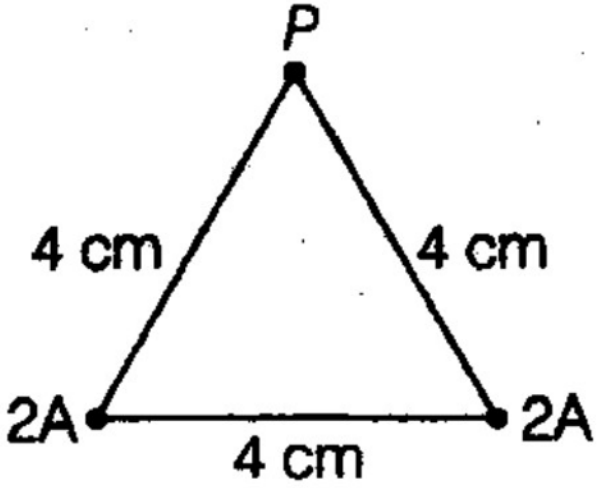
(A) (i), (ii),(iv)

(B) (i). (iii), (iv)

(C) (i) (iii), (v)

(D) (i), (ii), (v)

Q.No. 7 Two long straight wires vertically pierced the plane of the paper at vertices of an equilateral triangle as shown in figure. They each carry 2 A, out of the



paper. The magnetic field at the third vertex P has magnitude.

(A) $10^{-5}T$

(B) 14×10^{-5}T

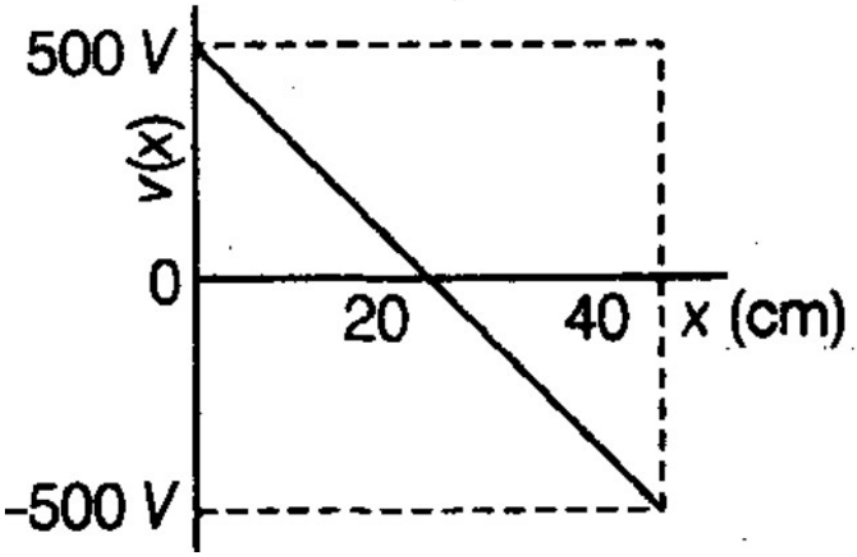
(C) 17×10^{-5}T

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(D) 0.85×10^{-5}T

Q.No. 8 An electron is placed on X-axis where the electric potential depends on x as shown in figures (the potential does not depend on y and z). What is the electric



force on the electron ?

(A) 40×10^{-18}N

(B) 80×10^{-16}N

(C) 3.2×10^{-56}N

(D) 40×10^{-16}N

Q.No. 9 In Young's double slit experiment using monochromatic light of wavelength λ, the intensity of light at a point on the screen where the path difference is λ, is k units. The intensity of the light at a point, where path difference is λ/3 is

(A) k/2

(B) k/3

(C) k/4

(D) 2k/3

Q.No. 10 When a beam of 10.6 eV photons of intensity $2.0 \mathrm{W/m^2}$ falls on a metallic surface of area $1 \times 10^{-4} \mathrm{m^2}$, 0.53% of the incident photons eject photoelectrons. What is the number of photoelectrons emitted per second?

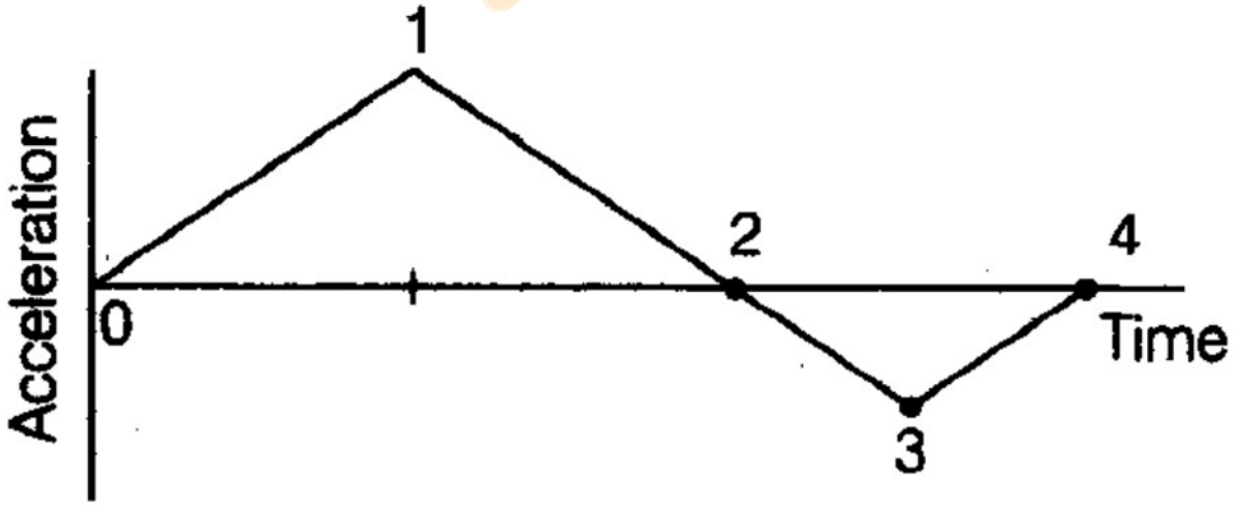
(A) 1.18×10^{16}

(B) 6.25×10^{11}

(C) 6.25×10^{13}

(D) 6.25×10^{15}

Q.No. 11 Acceleration-time graph of a body moving in a straight line is as shown in figure. The body started its motion from rest.



At what point is the body moving with the largest speed?

(A) 1

(B) 2

(C) 3

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(D) 4

Q.No. 12 The displacement of a body is given by $x = 4t + 5t^3$ where x is in metre and t is in second. The difference between the average velocity of the body in the time-interval t =1 s to t= 2 s and its instantaneous- velocity at t=1s is

(A) 20.0 m/s

(B) 22.5 m/s

(C) 27.0 m/s

(D) 39.0 m/s

Q.No. 13 The time period of a physical pendulum is $2\pi\sqrt{I/mgd}$, where I is the moment of inertia of the pendulum about the axis of rotation . and d is perpendicular distance between the axis of rotation and the centre of mass of the pendulum. A circular ring hängs from a nail on a wall. The mass of the ring is 3 kg and its radius is 20 cm. If the ring is slightly displaced, the time of resulting oscillations will be

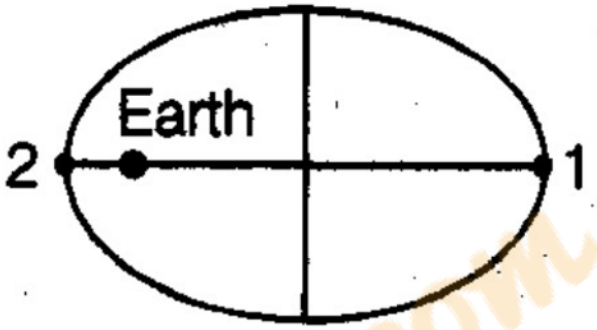
(A) 1.0 s

(B) 1.3 s

(C) 1.8 s

(D) 2.1 s

Q.No. 14 A small satellite is in elliptical orbit around the earth as shown in figure, L denotes the magnitude of its angular momentum and K denotes its kinetic



energy. If 1 and 2 denote two positions of the satellite, then

(A) $L_2 = L_1, K_2 = K_1$

(B) $L_2 = L_1, K_2 > K_1$

(C) $L_2 > L K_2 < K_1$

(D) $L_2 = L_1, K_2 < K_1$

Q.No. 15 An alpha particle accelerated through V volts is fired towards a nucleus. It distance of closest approach is r. If a proton accelerated through the same potential is fired towards the same nucleus, its distance of closest approach will be

(A) r

(B) 2r

(C) r/2

(D) r/4

Q.No. 16 A particle of mass m is moving with a constant velocity along a line parallel to the positive direction of X-axis. The magnitude of its angular momentum with respect to the origin

(A) is zero.

(B) goes on increasing as x increases.

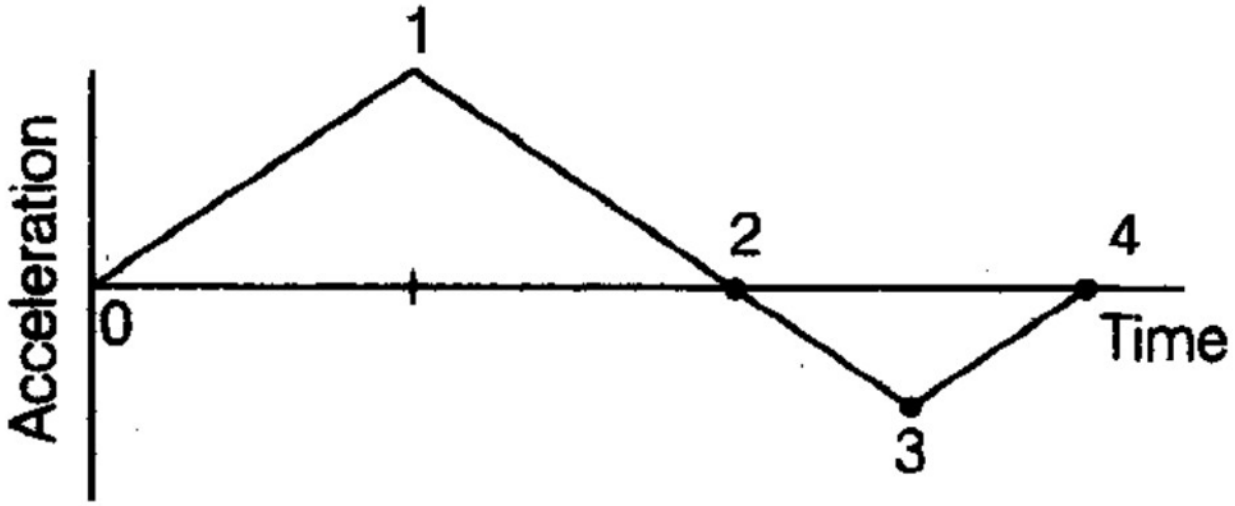
(C) goes on decreasing as x increases.

(D) remains constant for all positions of the particle.

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Q.No. 17 Figure represents the position-time graph of a body of mass 4 kg. Impulse $\left(kgms^{-1}\right)$ imparted to the body at t = 0 is



(A) 6

(B) 4

(C) 3

(D) 0

Q.No. 18 For a CE transistor amplifier the audio signal voltage across the collector resistance of 2kΩ is 2 V. The current amplification factor of the transistor is 100. If the base resistance is 1kΩ, the input signal voltage and base current are respectively

(A) 0.01 V, 10 μA

(B) 0.04 V, 10 μA

(C) 0.01 V, 10 μA

(D) 0.04 V, 10 μA

Q.No. 19 The relation between time t and distance x for a moving particle is $t = ax^2 + \beta x$, where α and β are constants. If v is the velocity at distance X, then the retardation of the particle is

(A) $20v^3$

(B) $2\beta v^3$

(C) $2\alpha\beta v^3$

(D) $2\beta^2 v^2$

Q.No. 20 Consider the following (i) Submarine communications (ii) A.M. radio (iii) Shortwave ratio (iv) Radar Arrange the above in increasing frequency of the waves associated with them

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

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

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

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

Q.No. 21 An alternating voltage $V = 200\sqrt{2}\sin(100n)$ volt is connected to a $\mathbf{1}\mu\mathrm{F}$ capacitor through an AC ammeter. The reading of the ammeter

(A) 40 mA

(B) $20\sqrt{2}\mathrm{mA}$

(C) 20 mA

(D) $10\sqrt{2}\mathrm{mA}$

Q.No. 22 The only force acting on a 2 kg body that is moving in xy-plane has a magnitude of 5 N. The body initially has a velocity of 4 m/s in the positive x-direction. Some time later, the body has a velocity of 6 m/s in the positive y-direction. The work done on the body by the 5 N force during this time is

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(A) 20 J

(B) 40 J

(C) 52 J

(D) 72 J

Q.No. 23 Two seconds after projection, a projectile is moving at 30° above the horizontal, after one more second, it is moving horizontally. The initial speed of the projectile is (Take $g = 10\mathrm{ms}^{-2}$)

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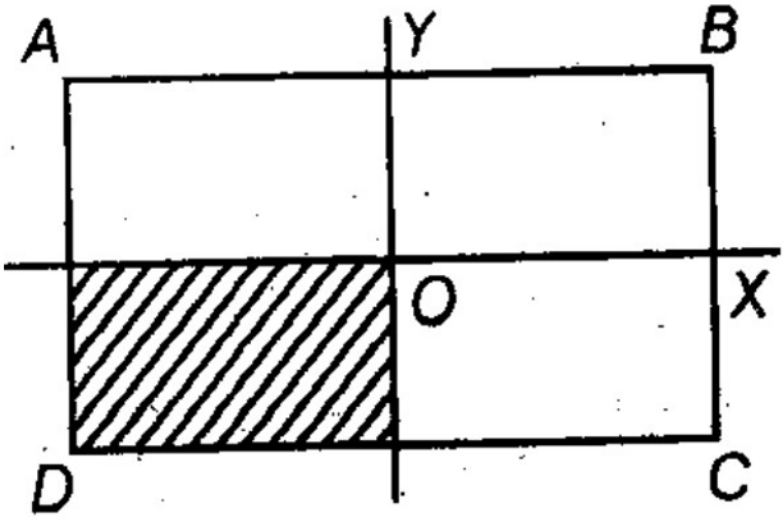
(A) 10 m/s

(B) 10/3 m/s

(C) 20 m/s

(D) 2013 m/s

Q.No. 24 Figure shows a rectangular copper plate with is centre of mass at the origin O and side AB = 2BC = 2 m. If a quarter part of the plate (shown as shaded) is



removed, the centre of mass of the remaining plate would lie at

(A) $\frac{1}{12}m, \frac{1}{6}m$

(B) $\frac{1}{6}m, \frac{1}{12}m$

(C) $\frac{1}{3}m, \frac{1}{6}m$

(D) $\frac{1}{3}m, \frac{1}{2}m$

Q.No. 25 A rocket is moving at a speed of 200 m/s towards a stationary target. While moving it emits a wave of frequency 1000 Hz. Some of the sound reaching the target gets reflected back to the rocket as an echo. The frequency of the echo as detected by the rocket is (velocity of sound = 330 m/s)

(A) 1000 Hz

(B) 1580 Hz

(C) 2540 Hz

(D) 4080 Hz

Q.No. 26 Sound waves from a loudspeaker reach a point P via two paths which differ in length by 1.8 m. When the frequency of sound is gradually increased, the resultant intensity at P is found to be maximum the frequency is 1000 Hz. At what next higher frequency will a maximum be detected? (velocity of sound= 360 m/s)

(A) 1200 Hz

(B) 1400 Hz

(C) 1600 Hz

(D) 1800 Hz

Q.No. 27 In a stack of three polarising sheets, the first and the third are crossed while the middle one has its axis at 45° to the axes of the other two. The fraction of intensity of an incident unpolarised beam of light that is transmitted by the stack is

(A) ½

(B) ⅓

(C) ¼

(D) ⅛

Q.No. 28 Two identical conducting spheres A and B carry equal charge. They are initially separated by a distance much larger than their diameters and the force between them is F. A third identical conducting sphere C is uncharged. Sphere C is first touched to A, then to C and removed. As a result, the force between A and B now is

(A) F/16

(B) F/4

(C) 3F/8

(D) F/2

Q.No. 29 A magnetic field cannot

(A) change the velocity of a charged particle.

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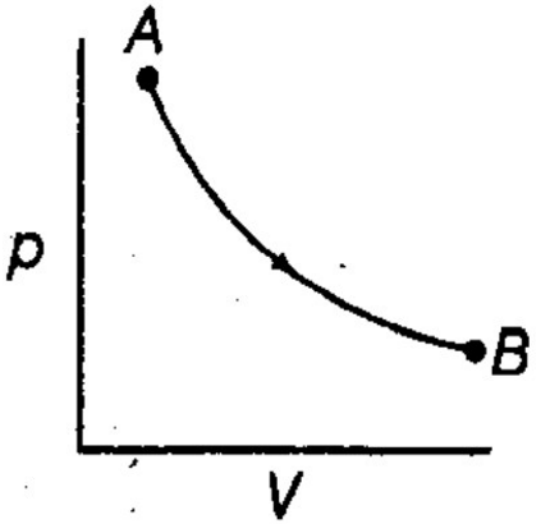
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(B) change the momentum of a charged particle.

(C) change the kinetic energy of a charged particle.

(D) change the trajectory of a charged particle.

Q.No. 30 A sample of an ideal gas undergoes an isothermal process as shown by the curve AB in the pV diagram. If ΔQ, ΔU and ΔW represent the amount of heat absorbed the change in internal energy and the work done respectively, then which of the following statement is correct?



(A) $\Delta Q = +$ ve, $\Delta U = 0, \Delta W = -ve$

(B) $\Delta Q = +v\theta, \Delta U = 0, \Delta W = +ve$

(C) $\Delta Q = +v\theta, \Delta U = 0, \Delta W = 0$

(D) $\Delta Q = +ve, \Delta U = +ve, \Delta W = +ve$

Q.No. 31 One end of massless spring of spring constant 100 N/m and natural length 0.49 m is fixed and other end is connected to a body of mass 0.5 kg lying on a frictionless horizontal table. The spring remains horizontal. If the body is made to rotate at an angular velocity of 2 rad/s, then the elongation of the spring will be

(A) 2 cm

(B) 1 cm

(C) 0.5 cm

(D) 0.25 cm

Q.No. 32 The angle of prism and refractive index of the material of the prism are A and $\cot \frac{A}{2}$, respectively. The angle of minimum deviation of the prism is

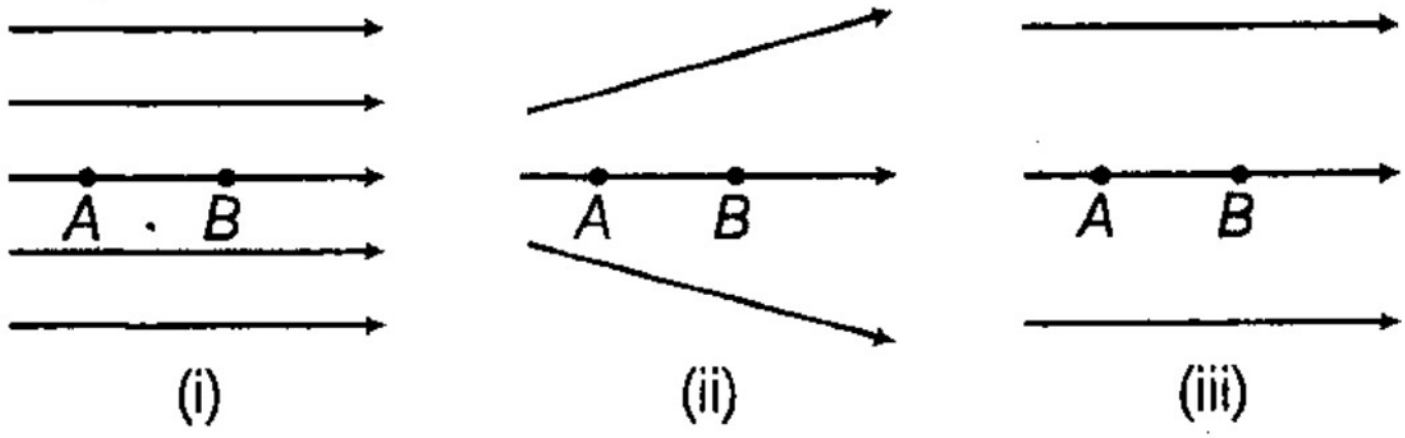
(A) $\frac{\pi}{2} - A$

(B) $\pi - A$

(C) $\pi - \frac{A}{2}$

(D) $\pi - 2A$

Q.No. 33 Figure shows three arrangements of electric field lines. In each arrangement, a proton is released from rest at point A and then i accelerated through point B by the electric field. Points A and B have equal separations in the three arrangements. If p_1, p_2 and p_3 are linear momentum of the proton at point B in the three arrangement respectively, then



(A) $p_1 > p_3 > p_2$

(B) $p_1 > p_2 > p_3$

(C) $p_2 > p_1 > p_3$

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(D) $\rho_1 = p_2 = \rho_3$

Q.No. 34 In electromagnetic waves travelling in vacuum (i) The electric field E is always perpendicular to the magnetic field B. (ii) The cross product Ex B always gives the direction in which the waves travel. (iii) The field E and B vary sinusoidally. (iv) There is a phase difference of $\frac{\pi}{2}$ between E and B. The correct statement(s) (are)

(A) (i), (iii)

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

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

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

Q.No. 35 Consider the following thermodynamical variables (i) Pressure (ii) Internal Energy (ii) Volume (iv) Temperature Out of these, the intensive variable(s) is (are)

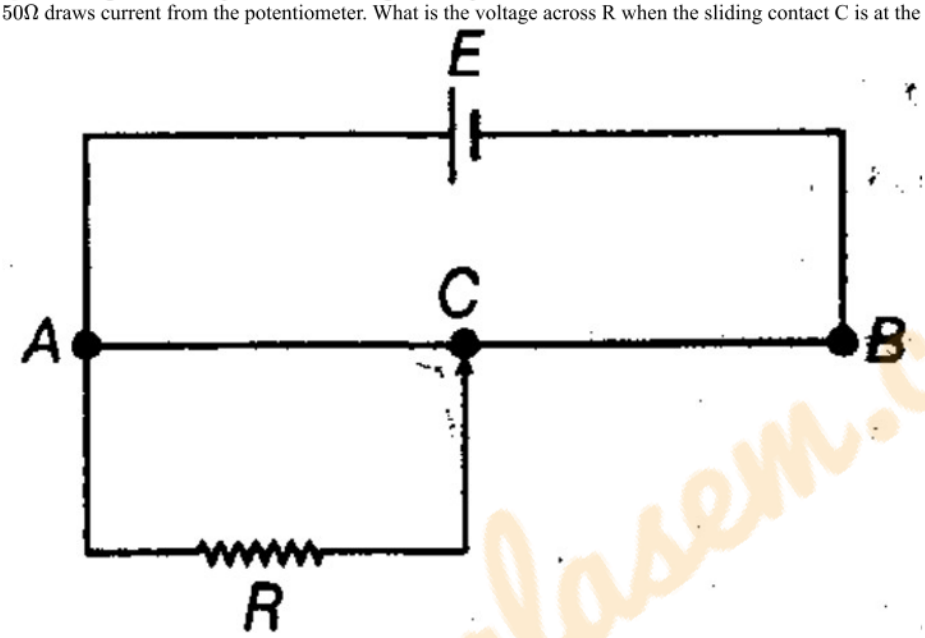
(A) (i) only

(B) (i), (iv)

(C) (i), (ii)

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

Q.No. 36 Figure shows a potentiometer. Length of the potentiometer wire AB is 100 cm and its resistance is 100Ω. EMF of the battery E is 2V. A resistance R of 50Ω draws current from the potentiometer. What is the voltage across R when the sliding contact C is at the mid-point of AB?



(A) 2/3v

(B) 1 V

(C) 4/3V

(D) 3/2V

Q.No. 37 A man throws a ball of mass 3.0 kg with a speed of 5.0 m/s. His hand is in contact with the ball for 0.2 s. If he throws 4 balls in 2 seconds, the average force exerted by him in 1 second is:

(A) 15 N

(B) 30 N

(C) 150 N

(D) 75 N

Q.No. 38 Two solid spheres of the same metal but of mass M and 8 M fall simultaneously in a viscous liquid. If their terminal velocities are v and nv, then the value of n will be

(A) 16

(B) 8

(C) 4

(D) 2

Q.No. 39 The nearest star to our solar system is 4.3 light years away. The distance of this star in Parsec is (Mean distance between the earth and the sun = 5×10^{11}m and one light year = 9.46×10^{15}m)

(A) 3

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(B) 8.0

(C) 13.0

(D) 33×10^4

Q.No. 40 Four charges each equal to (-Q) are placed at the four corners of a square and a charge q is placed at its centre. If the system of charges is in equilibrium, the value of q is

(A) $\frac{Q}{4}(2\sqrt{2}-1)$

(B) $\frac{Q}{4}(2\sqrt{2}+1)$

(C) $\frac{Q}{2}Q\sqrt{2}-1)$

(D) $\frac{Q}{2}R\sqrt{2}+1$

Q.No. 41 In a certain mass spectrometer, an ion beam passes through a velocity filter consisting of mutually perpendicular fields E and B. The beam then enters a region of another magnetic field B', perpendicular to the beam. The radius of curvature of the resulting ion beam is proportional to

(A) EB'/B

(B) EB/B'

(C) BB'/E

(D) E/BB'

Q.No. 42 An inverter battery operated on 24 V and has negligible internal resistance. It is rated at 140 ampere-hour. What external resistance would have to be connected to the battery, if it were to be discharged in 14 hours.

(A) 1.6Ω

(B) 2.4Ω

(C) 5.9Ω

(D) 10.0Ω-

Q.No. 43 The combination of gates shown in figure yields



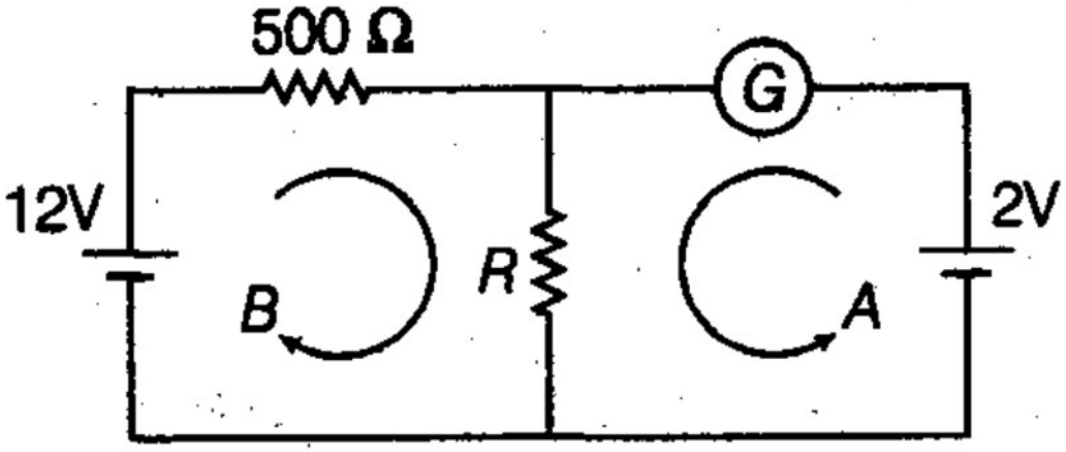
(A) NAND gate

(B) OR gate

(C) NOT gate

(D) XOR gate

Q.No. 44 In the circuit, the galvanometer G shows zero deflection. If the batteries A and B have negligible internal resistance, then the value of R is



(A) 100Ω

(B) 200Ω

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(C) 500Ω

(D) 1000Ω

Q.No. 45 Two different coils have self-inductance $L_1 = 9\text{mH}$ and $L_2 = 3\text{mH}$. At a certain instant, the current in the two coils is increasing at the same rate and the power supplied to the coils is also the same. The ratio of the energy stored in the two coils \(\left(U _ { 1 } / U _ { 2 } \right) at that instant is

(A) ⅓

(B) 1

(C) 3

(D) 27

Q.No. 46 Identify the correct statement(s) from among the following (i) The constancy of the binding energy per nucleon in the range 30 < A < 170 is a consequence of the fact that the nuclear force is short ranged (ii) The nuclear force does not depend on the charge of nucleons (ii) The nuclear force is replusive when distance between two nucleons is less than 0.8 fm

(A) (i) only

(B) (i), (iii)

(C) (i), (ii)

(D) (i), (i), (ii)

Q.No. 47 Consider the following statements about the four fundamental forces in nature. (i) The strong nuclear force binds protons and neutrons in a nucleus. (ii) The strong nuclear force is about 10 times the electromagnetic force in strength. (iii) The weak nuclear force is the weakest of all the four fundamental forces. (iv) The range of the weak nuclear is about 10^{-16}m The correct statement(s) is (are)

(A) (i) only

(B) (ii) and (ii)

(C) (iii) and (iv)

(D) (i), (ii) and (iv)

Q.No. 48 Assume that the light of wavelength is 6000 Å coming from a star. What is the time resolution of a telescope whose objective has a diameter of 100 inch?

(A) $3.66 \times 10^{-7}\text{rad}$

(B) $1.44 \times 10^{-7}\text{rad}$

(C) $2.9 \times 10^{-7}\text{rad}$

(D) $5.8 \times 10^{-7}\text{rad}$

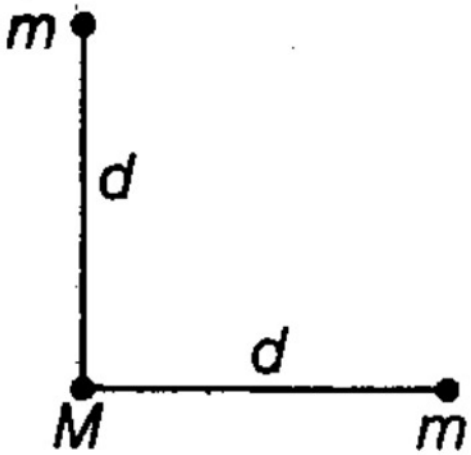
Q.No. 49 Three particles, two with masses m and one with mass M, might be arranged in any of the four configurations shown below. Rank the configurations according to the magnitude of the gravitational force on M, least to greatest



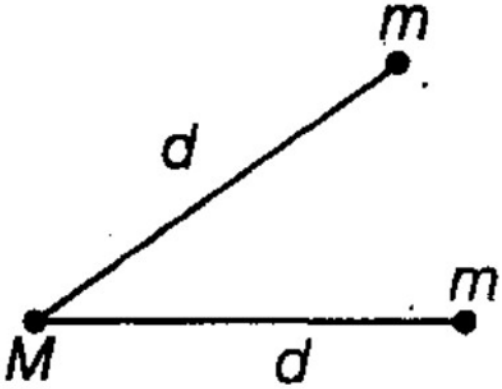
(i)



(ii)



(iii)



(iv)

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

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

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

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

Q.No. 50 A cyclotron's oscillator frequency is 10 MHz. What should be the operating magnetic field for accelerating protons? (mass of the proton = 167 x 10-27 kg)

(A) 0.33 T

(B) 0.66 T

(C) 1.5 T

(D) 3.0 T

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Chemistry

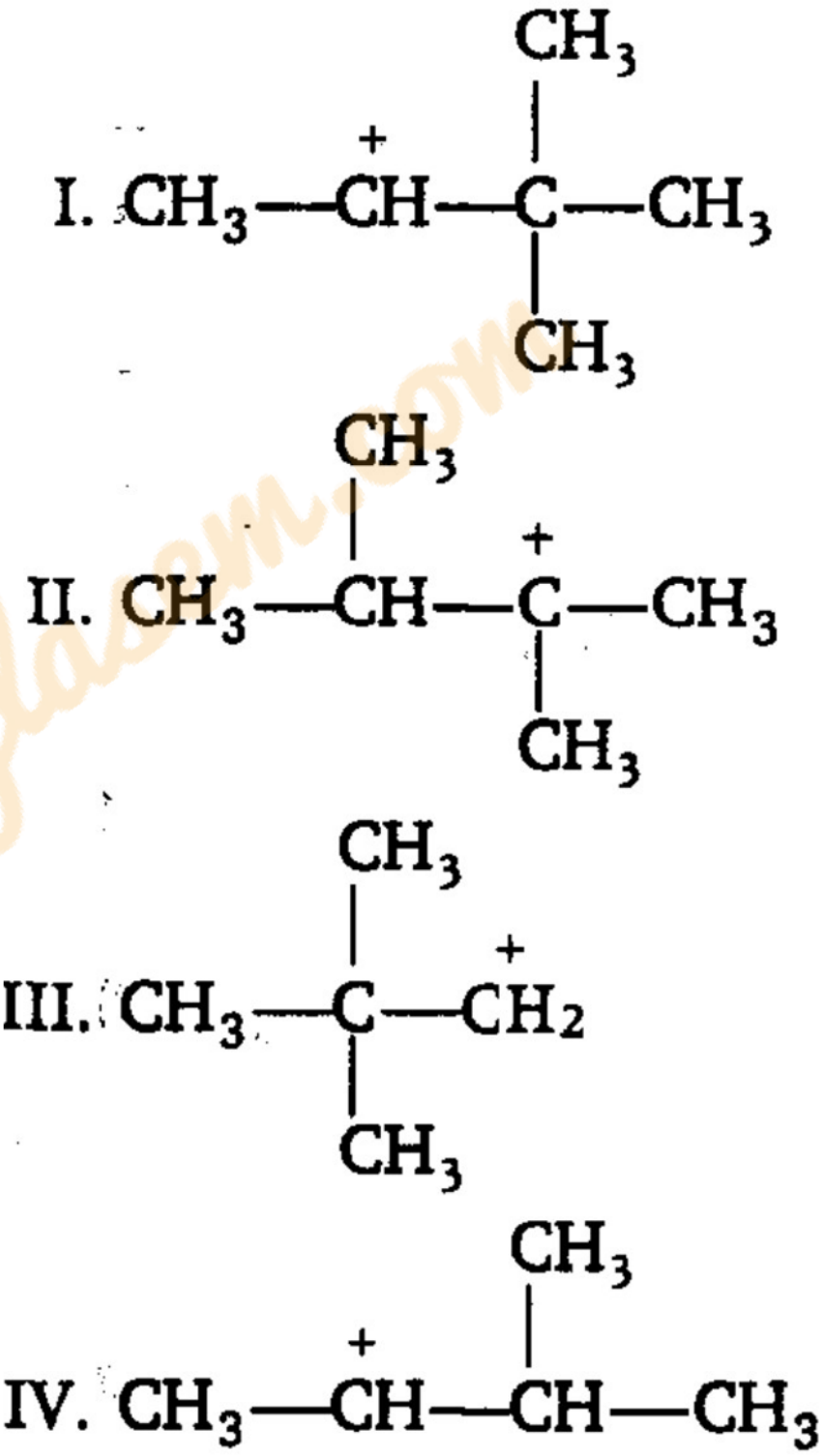
Q.No. 1 For the reaction, $\frac{1}{2}H_2(g) + \frac{1}{2}Cl_2(g) \longrightarrow H^+(aq) + Cl^-(aq)\ \Delta G^\circ_{\text{recation}} = -131.23\text{kJmol}^{-1}$ The value of $\Delta G^\circ_{\text{formation}}$ of $Ag^+(aq)$ shall be given by ,(if $\Delta G^\delta_f(H^+aq) = 0$

(A) -54.12kJmol^{-1}

(B) -131.23kJmol^{-1}

(C) $+77.11\text{kJmol}^{-1}$

(D) $+5412\text{kJmol}^{-1}$



Q.No. 2 Which of the following carbocations is most stable?

(A) I

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(B) II

(C) III

(D) IV

Q.No. 3 The solubility of pure oxygen in water at 20°C and 1.0 atmosphere pressure is 138×10^{-3} mol/litre. What will be the concentration of oxygen at 20°C and partial pressure of 0.21 atmosphere?

(A) 2.9×10^{-4} mol/litre

(B) 5.8×10^{-4} mol/litre

(C) 7.6×10^{-4} mol/litre

(D) 11.6×10^{-4} mol/litre

Q.No. 4 Which of the following complexes is optically active?

(A) $[Co(NH_3)_5Cl]^+$

(B) $[Co\,(NH_3)C_5]^{3-}$

(C) $cis - [Co(en)_2Cl_2]$

(D) tans $- [Co(en)_2Cl_2]$

Q.No. 5 Structure anions of acids HNO_3, H_3PO_4 and H_2SO_4 are, respectively

(A) tetrahedral, tetrahedral and trigonal bipyramidal

(B) angular, tetrahedral and trigonal bipyramidal

(C) tetrahedral, tetrahedral and angular

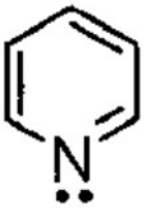
(D) planar, tetrahedral and tetrahedral

Q.No. 6 The strongest base in the following is

(A)



(B)



(C)



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(D)

Q.No. 7 Which one of the following is not the use of SO_2?

(A) Preservative

(B) Anti-chlor

(C) Disinfectant

(D) Insecticide

Q.No. 8 On heating an aldehyde with Fehling's reagent, a reddish brown precipitate is obtained due to the formation of

(A) $RCOO^-$

(B) CuO

(C) Cu_2O

(D) RCH_2OH

Q.No. 9 The reaction quotient (Q) for the reduction of O_2 to H_2O in acid solution, $O_2(g) + 4H^+(aq) + 4e^- \longrightarrow 2H_2O(l)$ is, [where, α_{H^+}= activity of H^+, p_{O_2} = pressure of O_2, when it is present in the reaction, p^0 = pressure of O_2 at standard state)].

(A) $Q = \frac{p^\circ}{\alpha_{H^+}^4 + p_{O_2}}$

(B) $Q = \frac{P_{O_2}}{\alpha_{H^+}^4 + \rho^\circ}$

(C) $Q = \frac{\alpha_{H^+}^4 + \rho_{O_2}}{p^\circ}$

(D) $Q = \frac{\alpha_{H^+}^4 + p^0}{p_{O_2}}$

Q.No. 10 An ideal gas initially at temperature, pressure and volume, 27°C, 1.00bar and 10L respectively is heated at constant volume until pressure is 10.0 bar ,it then undergoes a reversible isothermal expansion until pressure is 1.00 bar what is the total work W during the process?

(A) -23.02×10^3J

(B) $-14.0 \times 10^3 J$

(C) 14.0×10^3J

(D) $Zero$

Q.No. 11 A β - hydroxy carbonyl compound is obtained by the action of NaOH on

(A) R_3CCHO

(B) C_6H_5CHO

(C) CH_3CHO

(D) HCHO

Q.No. 12 The best reducing agent among the following is

(A) NH_3

(B) SbH_3

(C) PH_3

(D) AsH_3

Q.No. 13 The K_{sp} of $PbCO_3$ and $MgCO_3$, are 1.5×10^{-15} and 1×10^{-15} respectively at 298 K. The concentration of Pb^{2+} ions in a saturated reactants solution containing $MgCO_3$ and $PbCO_3$ is

(A) 1.5×10^{-4}M

(B) 3×10^{-8}M

(C) 2×10^{-8}M

(D) 2.5×10^{-8}M

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Q.No. 14 The intermediate product (X) formed in the following reaction is $B_2H_6 + 6NH_3 \rightarrow 3X \xrightarrow{\text{Heat}} 2B_3N_3H_6 + 12H_2$

(A) $[BH(NH_3)_3]^+[BH_4]^-$

(B) $[BH_2OH_3)_4]^+[BH_4]$

(C) $[BH(NH_3)_4]^+[BH_4]$

(D) $[BH_2(NH_3)_2]^+ \cdot [BH_4]$

Q.No. 15 A compound $C_5H_{10}O$ (A) forms a phenyl hydrazone and gives negative Tollen's test and a positive Iodoform reaction. It also gives n-pentane on reduction. The compound (A) is

(A) pentanal

(B) 2-pentanone

(C) 3-pentanone

(D) allyl alcohol

Q.No. 16 The difference between $\overline{C}_p$ and $\overline{C}_V$ is [$\overline{C}_p$ and $\overline{C}_V$ signify molar quantities]

(A) larger in case of gases in comparison to solids and liquids

(B) larger in case of liquids in comparison to gases and solids

(C) larger in case of solids in comparison to gases liquids

(D) equal in solids, liquids and gases

Q.No. 17 If χ_1 and χ_2 represent the mole fractions of a component A in the vapour phase and liquid mixture respectively, and p_A^0 and $|p_B^\circ$ represent vapour pressures of pure A and pure B, then total vapour pressure of liquid mixture is

(A) $\frac{p_A^\circ \chi_1}{\chi_2}$

(B) $\frac{p_A^\circ x_2}{\chi_1}$

(C) $\frac{p_B^\circ \chi_1}{\chi_2}$

(D) $\frac{p_B^\circ \chi_2}{\chi_1}$

Q.No. 18 Which one of the following set of metals deposits an anode mud during the process of electrolytic refining of copper?

(A) Sn and Ag

(B) Pb and Zn

(C) Ag and Au

(D) Fe and Ni

Q.No. 19 Which of the following is most soluble in water?

(A) $CsClO_4$

(B) $NaClO_4$

(C) $kClO_4$

(D) $LiClO_4$

Q.No. 20 Which one acts as refrigerant?

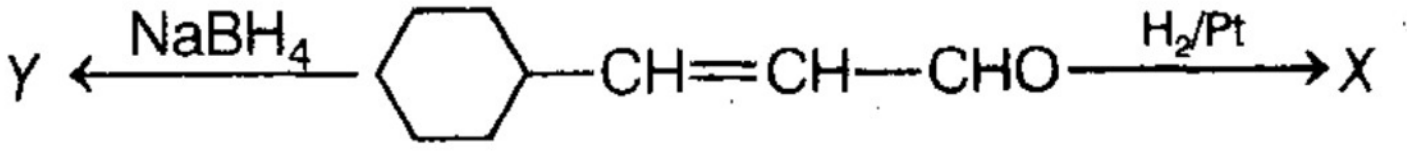
(A) CF_2Cl_2

(B) CF_4

(C) $CFCl_3$

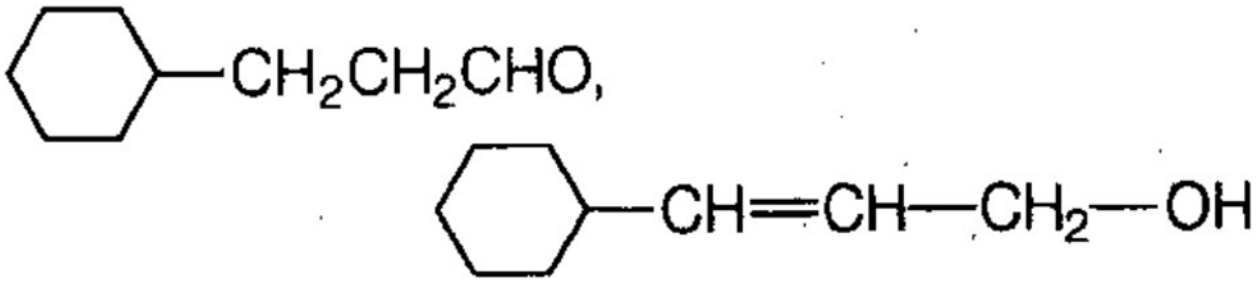
(D) CF_3Cl

Q.No. 21

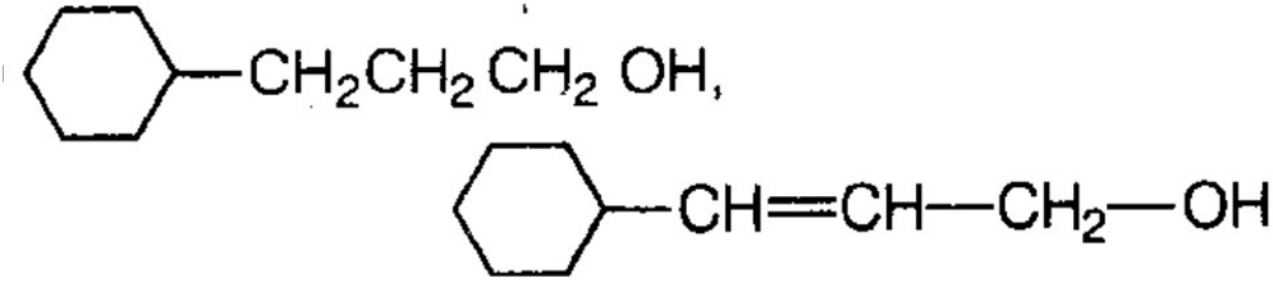


What are 'X' and 'Y ?

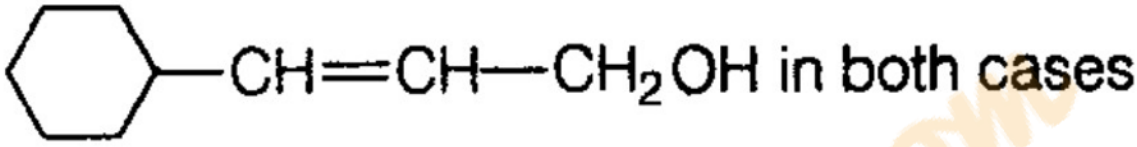
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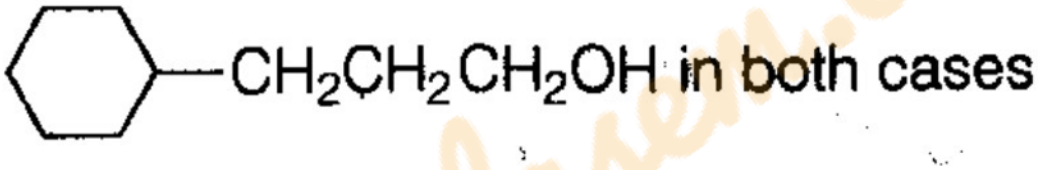
(A)



(B)



(C) in both cases



(D) in both cases

Q.No. 22 0.002 M solution of a weak acid has an equivalent conductance $(\Lambda)60$ ohm $^{-1}\mathrm{cm}^2$ eq^{-1} What will be the pH ? (Given $\Lambda^\circ = 400$ ohm $^{-1}\mathrm{cm}^2\mathrm{eq}^{-1}$])

(A) 3.52

(B) 2.52

(C) 1.87

(D) 2.7

Q.No. 23 The standard emf of the cell (E°_{cell} and equilibrium constant (K_{eq}) of the following reaction of 298 K $\mathrm{Cd}^{2+} + 4\mathrm{NH}_3 \rightleftharpoons \mathrm{Cd}(\mathrm{NH}_3)_4^{2+}$

(A) $E^\circ_{\text{cell}} = 1.0\mathrm{V}, K_{\text{eq}} = 1.26 \times 10^7$

(B) $E^\circ_{\text{cell}} = 0.21\mathrm{V}, K_{\text{eq}} = 1.26 \times 10^7$

(C) $E^\circ_{\text{cell}} = 1.0\mathrm{V}_1\mathrm{K}_{\text{eq}} = 6.60 \times 10^{33}$

(D) $E^\circ_{\text{cell}} = 021\mathrm{V}, K_{\text{eq}} = 6.60 \times 10^{33}$

Q.No. 24 The following reactions show the $\mathrm{H}_2\mathrm{O}_2$ behaviour in I and II reactions as: 1. $\mathrm{PbS}(s) + 4\mathrm{H}_2\mathrm{O}_2(aq) \longrightarrow \mathrm{PbSO}_4(s) + 4\mathrm{H}_2\mathrm{O}(l)$ 2. $\mathrm{HOCl} + \mathrm{H}_2\mathrm{O}_2 \longrightarrow \mathrm{H}_3\mathrm{O}^+ + \mathrm{Cl}^- + \mathrm{O}_2$

(A) Oxidising in acidic medium and reducing in basic medium

(B) Reducing in acidic medium and oxidising in basic medium

(C) Oxidising in acidic medium and reducing in acidic medium

(D) Reducing in acidic medium and oxidising in acidic medium

Q.No. 25 Which of the following has the maximum vapour pressure?

(A) HCI

(B) HBr

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(C) Hf

(D) HI

Q.No. 26 The ratio of the half-life time $\left(t_{1/2}\right)$ to the three quarter life-time, $\left(t_{3/4}\right)$, for a reaction that is second order

(A) depends directly on concentration of reactants

(B) is independent of concentration of reactant

(C) depends inversely on the concentration of reactants

(D) depends directly to the square of concentration of reactants

Q.No. 27 The rate constant, the activation energy and the Arrhenius parameter of a chemical reaction at $25^{\circ}\mathrm{C}$ are $3.0 \times 10^{-4}\mathrm{s}^{-1}$,$104.4\mathrm{kJmol}^{-1}$ and $6.0 \times 10^{14}\mathrm{s}^{-1}$ respectively. The value of the rate constant at $T \rightarrow \infty$ is

(A) $2.0 \times 10^{18}\mathrm{s}^{-1}$

(B) $60 \times 10^{14}\mathrm{s}^{-1}$

(C) $3.6 \times 10^{30}\mathrm{s}^{-1}$

(D) Infinity

Q.No. 28 Products (X and Y) of the following reactions (I and II) are : 1. $\underset{\text{(Cold and di.)}}{2\mathrm{NaOH} + \mathrm{Cl}_2 \longrightarrow \mathrm{NaCl} + X + \mathrm{H}_2\mathrm{O}}$ 2. $\underset{\text{(Hot and conc.)}}{6\mathrm{NaOH} + 3\mathrm{Cl}_2 \longrightarrow \mathrm{NaCl} + Y + 3\mathrm{H}_2\mathrm{O}}$

(A) $X = \mathrm{NaClO}_3$ and $Y = \mathrm{NaOCl}$

(B) $X = NaClO$ and $Y = NaOCl_3$

(C) $X = \mathrm{NaHClO}_3$ and $Y = \mathrm{NaOCl}$

(D) $X = \mathrm{NaClO}_3$ and $Y = \mathrm{NaHClO}_3$

Q.No. 29 The EAN value $y[\mathrm{Ti}(\sigma - \mathrm{C}_6\mathrm{H}_5)_2(\pi - \mathrm{C}_5\mathrm{H}_5)_2]^{\circ}$ is

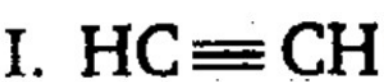
(A) 32

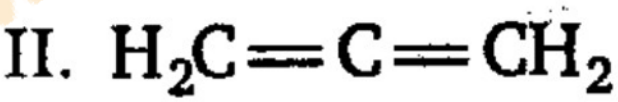
(B) 33

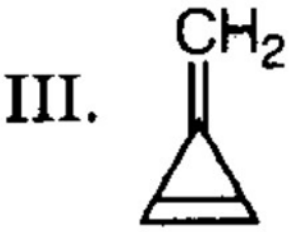
(C) 34

(D) 35

Q.No. 30 Which of the following structures contain sp-hybridised carbon atom(s)?

I. 

II. 

III. 

IV. 

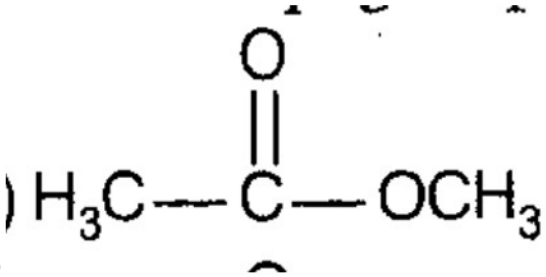
(A) I, II and III

(B) I, III and IV

(C) II, III and IV

(D) I, II and IV

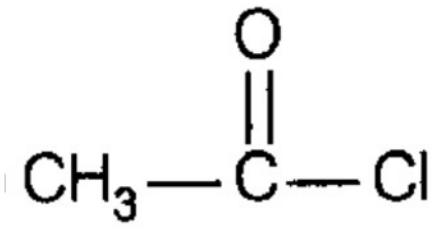
Q.No. 31 The most reactive to nucleophilic attack at the carbonyl group is



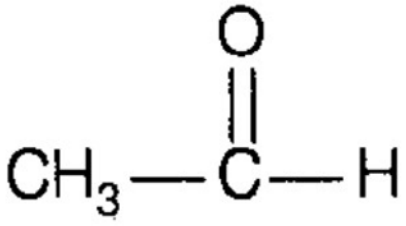
(A)

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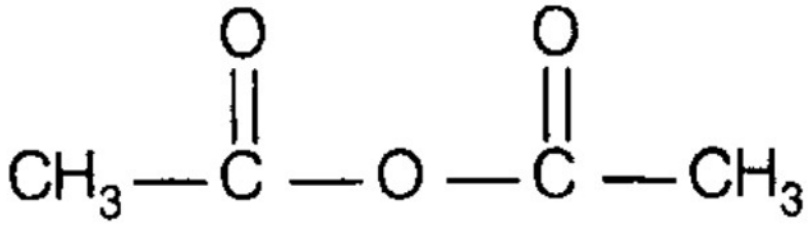
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(B)



(C)



(D)

Q.No. 32 Name the end product in the following series of reactions $CH_3COOH \xrightarrow{NH_3} A \xrightarrow{\Delta} B \xrightarrow{P_2O_5} C$

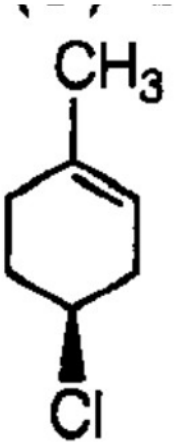
(A) Methane

(B) Methanol

(C) Acetonitrile

(D) Acetamide

Q.No. 33 Which of the following compounds is $(S)-4-chloro-1-methylcyclohexene$?

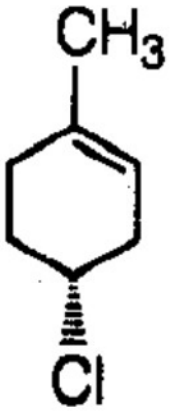


(A)

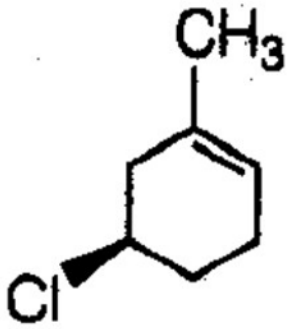
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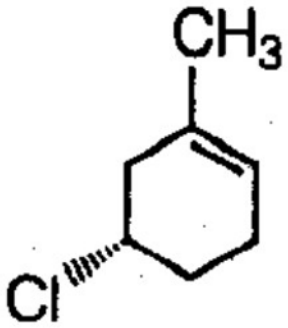
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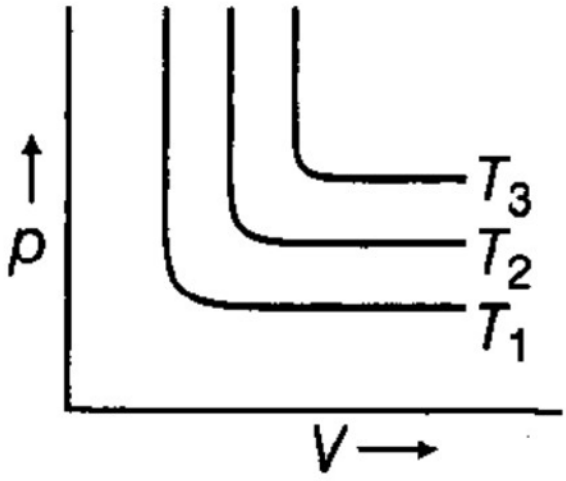
(B)



(C)



(D)



Q.No. 34 For the given pV isotherms, which of the following is correct for T_1, T_2, T_3?

(A) $T_1 < T_2 < T_3$

(B) $T_3 < T_2 < T_1$

(C) $T_2 < T_3 < T_1$

(D) $T_1 < T_3 < T_2$

Q.No. 35 The electrode potential, E° for the reduction of MnO_4^- to Mn^{2+} in acidic medium is +1.51 V .Which of the following metal(s) will be oxidised? The reduction reaẽtions and standard electrode potentials for Zn^{2+}, Ag^+ and Au^+ are given as $Zn^{2+}(aq) + 2e \longrightarrow Zn(s), E^\circ = -0.762V$

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$Ag^{+}(aq) + e \rightleftarrows Ag(s), E^{\circ} = +0.80V\ Au^{+}(aq) + e \rightleftharpoons Au(s), E^{\circ} + 1.69V$

(A) Zn and Au

(B) Ag and Au

(C) Au

(D) Zn and Ag

Q.No. 36 Which of the following is used for the estimation of halogens in organic compounds?

(A) Carius method

(B) Duma's method

(C) Kjeldahl's method

(D) Newman method

Q.No. 37 The emf of the cell, $|CdCl_2$ (solution) (1 atm)| AgCl $(s)|Ag$ is 0.675 at $25^{\circ}C$ .The temperature coefficient of the cell is -6.5×10^{-4}V degree $^{-1}$.Find the change in the heat content $\left(kJmol^{-1}\right)$ and entropy $\left(V\ deg^{-1}\right)$ for the electrochemical reaction that occurs when 1 F of electricity is drawn for it

(A) $78.34, 83.83$

(B) $+62.43, 83.83$

(C) $-62.73, -83.83$

(D) $-78.34, +83.83$

Q.No. 38 Amongst the following interhalogen compounds which one is used for the production of UF_6 during ^{235}U enrichment process?

(A) ClF_3

(B) ClF_5

(C) IF_3

(D) IF_5

Q.No. 39 The crystal field splitting energy (CFSE) for $[CoCl_6]^{4-}$ is about $18000cm^{-1}$ What would be the CFSE value of $[CoCl_4]^{2-}$?

(A) $18000cm^{-1}$

(B) $8000cm^{-1}$

(C) $16000cm^{-1}$

(D) $2000cm^{-1}$

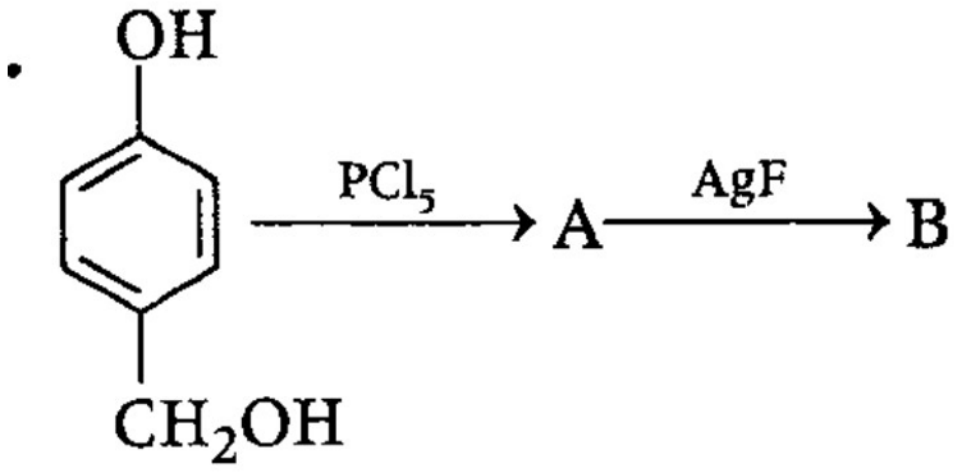
Q.No. 40 An example of non-stoichiometric hydride is

(A) sodium hydride

(B) beryllium hydride

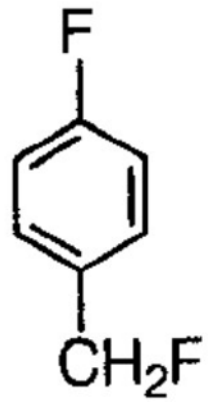
(C) lanthanum hydride

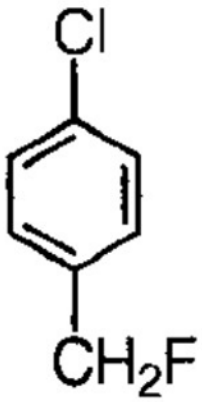
(D) diborane

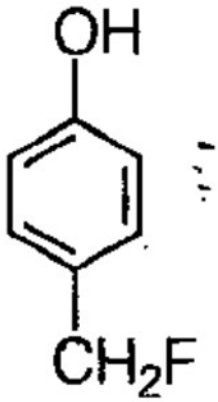


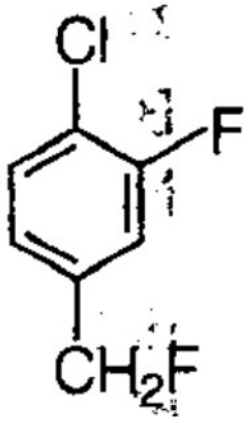
Q.No. 41 What is B in the above scheme?

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(A) 

(B) 

(C) 

(D) 

Q.No. 42 For the reaction $A + B \rightarrow P = -\frac{d[A]}{dt} = -\frac{d[B]}{dt} = k[A][B]$ $kt = \frac{1}{[A]_0 - [B]_0} \ln \frac{[A][B]_0}{[B][A]_0}$ when , $[A]_0 \neq [B]_0$ and when, $[A]_0 \neq [B]_0$. If, $[A]_0 = [B]_0$ then the integrated rate law will be

(A) $kt = \ln \frac{[A]}{[B]}$

(B) $\frac{1}{[B]} = \frac{1}{[A]_0} + kt$

(C) $\frac{1}{[A]} = \frac{1}{[B]_0} + kt$

(D) $\frac{1}{[A]} = \frac{1}{[A_b} + kt$ or $\frac{1}{[B]} = \frac{1}{[B]_0} + kt$

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Q.No. 43 Which of the following metal ions is expected to be coloured?

(A) Zn^{2+}

(B) Ti^{3+}

(C) Sc^{3+}

(D) Ti^{4+}

Q.No. 44 What will be the pH of solution formed by mixing 10 mL 0.1 M NaH_2PO_4 and 15 mL 0.1 M Na_2HPO_4. [Given: $pK_1 = 2.12, pK_2 = 7.2$]

(A) 7.0

(B) 6.9

(C) 7.4

(D) 7.5

Q.No. 45 Aspartame is an

(A) alkaloid

(B) insecticide

(C) artificial sweetener

(D) antiseptic

Q.No. 46 Catalytic converters are generally made from

(A) transition metals

(B) alkaline metals

(C) carbon

(D) hydrogen

Q.No. 47 Which of the following cations has the strongest tendency towards complex formation?

(A) Sm^{3+}

(B) Lu^{3+}

(C) Gd^{3+}

(D) Yb^{3+}

Q.No. 48 Which of the following radioactive element is used in the treatment of cancer?

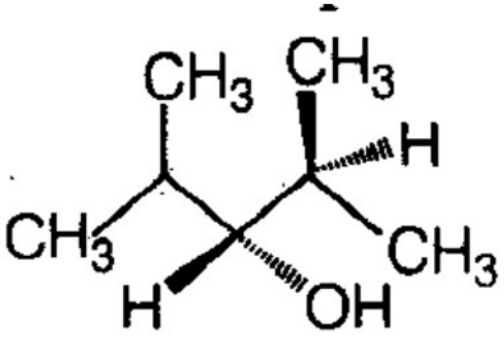
(A) Uranium

(B) Thorium

(C) Cerium

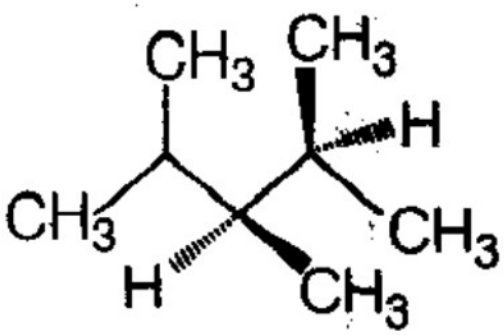
(D) Plutonium

Q.No. 49 Which of the following structures represents a chiral compound?

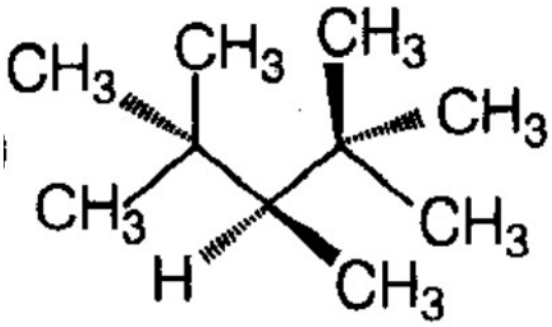


(A)

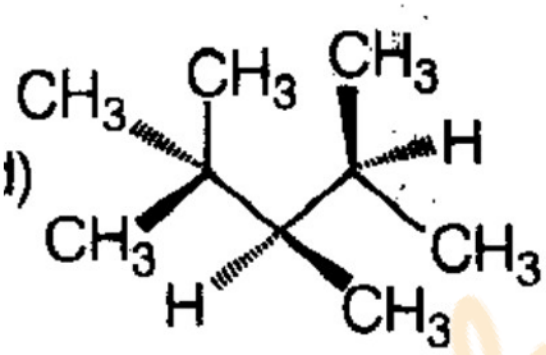
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(B)



(C)



(D)

Q.No. 50 Which of the following is an example of thermosetting polymers?

(A) Bakelite

(B) PVC

(C) Nylon 6, 6

(D) Buna-S

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Maths

Q.No. 1 If R is the set of real numbers and f:R → R is a function defined by f(x) = sin x, then $f^{-1}([-1,1])$ is

(A) {x{ x = nt, n is an integer}

(B) {xl x = 1/2 + 2nt, n is an integer}

(C) R

(D) null set ϕ

Q.No. 2 The minimum value of $z = 2x_1 + 3x_2$ subject to the constraints $2x_1 + 7x_2 \geq 22x_1 + x_2 \geq 6, 5x_1 + x_2 \geq 10$ and $x_1, x_2 \geq 0$ is

(A) 14

(B) 20

(C) 10

(D) 16

Q.No. 3 If $A = \begin{pmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & \alpha & 1 \end{pmatrix}$ $A^{-1} = \begin{pmatrix} \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} \\ -4 & 3 & \hat{\beta} \\ \frac{5}{2} & -\frac{3}{2} & \frac{1}{2} \end{pmatrix}$ then

(A) $\alpha = 2, \beta = -\frac{1}{2}$

(B) $\alpha = 1, \beta = -1$

(C) $\alpha = -1, \beta = 1$

(D) $\alpha = \frac{1}{2}, \beta = \frac{1}{2}$

Q.No. 4 Let $0 < \alpha < \pi, 0 < \beta < \pi$ and $\cos\alpha + \cos\beta - \cos(\alpha + \beta) = \frac{3}{2}$ .Then the relation between α and β will be

(A) $\alpha = \beta$

(B) $\alpha > \beta$

(C) $\alpha < \beta$

(D) $\alpha = \frac{\beta}{3}$

Q.No. 5 Consider the following relations in the real numbers $R_1 = \{(x,y)|x^2 + y^2 \leq 25\}$ $R_2 = \left\{(x,y)y \geq \frac{4x^2}{9}\right\}$ then the range of $R_1 \cap R_2$ is

(A) [0,5]

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(B) [-3,3]

(C) [-5,5]

(D) [-3,5]

Q.No. 6 Let $a_1, a_2, a_3, \ldots . a_n$ be in AP. If $\frac{1}{a_1 a_n} + \frac{1}{a_2 a_{n-1}} + \ldots + \frac{1}{a_n a_1} = \frac{K}{a_1 + a_n}\left[\frac{1}{a_1} + \frac{1}{a_2} + \ldots + \frac{1}{a_n}\right]$ then K is equal to

(A) 1

(B) 2

(C) 3

(D) 5

Q.No. 7 If four whole numbers taken at random are multiplied together, then the probability that the last digit in the product is 1, 3, 7, or 9, is

(A) 81/625

(B) 8/625

(C) 32/625

(D) 16/625

Q.No. 8 The angle between the line $x - 2y + z = 0 = x + 2y - 2z$ and the plane 5x – 2y – 2 +17 = 0 is

(A) 30°

(B) 60°

(C) 90°

(D) 0°

Q.No. 9 The value of $\sin\left(2\sin^{-1} 0.8\right)$ is

(A) 0.96

(B) 0.80

(C) 0.64

(D) 0.18

Q.No. 10 If $g(x) = x^2 + x - 2$ and $\frac{1}{2}(gof)x = 2x^2 - 5x + 2$ then f(x) is equal to

(A) 2x-3

(B) 2x + 3

(C) 3x -2

(D) 2x-2

Q.No. 11 The points $z_1 = x + iy$ and $z_2 = \frac{1}{-x+iy}$ in the complex plane lie on

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(A) a circle with centre origin

(B) a straight line through origin

(C) axis of X

(D) axis of Y

Q.No. 12 If $\lim_{x\to 0} |x|^{|\cos x|} = 1$ where [.] denotes the greatest integer function, then the value of l is

(A) 1

(B) -1

(C) 0

(D) does not exist

Q.No. 13 If $A_i (i = 1, 2, \ldots, n)$ are n independent events, with $P(A_i) = 1 - \frac{1}{2^i}$ then the probability that at least one of the n events occurs, is

(A) $\frac{1}{2^{n(n+1)/2}}$

(B) $\frac{1}{2^{(n+1)/2}}$

(C) $1 - \frac{1}{2^{n(n+1)/2}}$

(D) $1 - \frac{1}{2^{(n+1)/2}}$

Q.No. 14 If $\int_0^\infty [3e^{-x}]dx = l$ where [.] denotes the greatest integer function, then the value of l is

(A) 0

(B) In3

(C) e^3

(D) $3e^{-1}$

Q.No. 15 The area of the region defined by $||x| - |y|| \leq 1$ and $x^2 + y^2 \leq 1$ in the xy-plane is

(A) a

(B) 1

(C) 2

(D) None of these

Q.No. 16 A ray of light passing through the point (1, 2) reflects on the X-axis at point A and the reflected ray passes through the point (5, 3). The coordinate of A is

(A) $\left(\frac{5}{13}, 0\right)$

(B) $\left(\frac{13}{5}, 0\right)$

(C) $\left(\frac{-5}{13}, 0\right)$

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(D) $\left(\frac{-13}{5}, 0\right)$

Q.No. 17 The graph $y^2 + 2xy + 50|x| = 625$ divides the plane into regions. Then, the area of bounded regions is

(A) 500 sq units

(B) 1250 sq units

(C) 2500 sq units

(D) 800 sq units

Q.No. 18 Leta, be the rth term of an AP, whose first term is a and common difference is d. If for some positive integers $m, n, m \neq n, \alpha_m = \frac{1}{n}$ and $\alpha_n = \frac{1}{m}$ then a – d equals

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

(B) 1

(C) 0

(D) $\frac{1}{m} + \frac{1}{n}$

Q.No. 19 The image of the point (1,-1,1) in the plane $x - 2y + 3z + 1 = 0$ is

(A) (2, -3,4)

(B) $\left(0, \frac{-1}{2}, \frac{-2}{3}\right)$

(C) $\left(\frac{-1}{6}, \frac{4}{3}, \frac{-5}{2}\right)$

(D) $\left(\frac{-7}{3}, \frac{-5}{6}, \frac{2}{3}\right)$

Q.No. 20 Let R and S be any two equivalence relations on a set X. Then which of the following is incorrect statement

(A) R U S is an equivalence relation on X

(B) R^{-1} is an equivalence relation prix

(C) $R^{-1} \cap S^{-1}$ is an equivalence relation on X

(D) Δ is an equivalence relation on X, where Δ is the diagonal relation on X.

Q.No. 21 The coefficient of x^{53} in the expansion $\sum_{m=0}^{100} 10^0 C_m (x-3)^{100-m} \cdot 2^m$

(A) ${}^{100}\mathrm{C}_{47}$

(B) ${}^{10}\mathrm{C}_{53}$

(C) $-100\mathrm{C}_{53}$

(D) $-100C_{100}$

Q.No. 22 Let $\frac{\sin(\theta-\alpha)}{\sin(\theta-\beta)} = \frac{a}{b}, \frac{\cos(\theta-\alpha)}{\cos(\theta-\beta)} = \frac{c}{d}$ .Then the value of $\cos(\alpha - \beta)$ equals

(A) $\frac{ac-bd}{ad+bc}$

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(B) $\frac{ac+bd}{ad+bc}$

(C) $\frac{ac+bd}{ab+cd}$

(D) $\frac{ac-bd}{ab+cd}$

Q.No. 23 The equation $||x| + \left|\frac{x}{x-1}\right| = \frac{x^2}{|x-1|}$ will be always true for x, belonging to

(A) $[0, 1)$

(B) $\{0\} \cup (1, \infty)$

(C) $(-1, 1)$

(D) $(-\infty, \infty)$

Q.No. 24 y = acos(log x) + bsin(log x) is a solution of the differential equation

(A) $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 0$

(B) $x\frac{d^2y}{dx^2} + \frac{dy}{dx} + y = 0$

(C) $\frac{d^2y}{dx^2} + \frac{dy}{dx} + y = 0$

(D) $x\frac{d^2y}{dx^2} + x^2\frac{dy}{dx} + y = 0$

Q.No. 25 If a,b,c are the integers between 1 and 9 and a51, b41, c31 are three-digit numbers and the value of determinant $D = \begin{vmatrix} \vdots 5 & 4 & 3 \\ a51 & b41 & c31 \\ a & b & i \end{vmatrix}$ is zero, then a,b,c are

(A) in GP

(B) in AP

(C) equal

(D) None of the above

Q.No. 26 The amplitude of the complex number $1 + \sin\alpha - i\cos\alpha$is

(A) π/4

(B) $\alpha - \frac{\pi}{4}$

(C) $\frac{\alpha}{2} - \frac{\pi}{4}$

(D) $\frac{\pi}{4} - \alpha$

Q.No. 27 If Sand S' are the foci of the ellipse $\frac{x^2}{25} + \frac{y^2}{26} = 1$ and P is any point on it then range of values of SP.S'P is

(A) $9 \leq f(\theta) \leq 16$

(B) $9 \leq f(\theta) \leq 25)$

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(C) $16 \leq f(\theta) \leq 25$

(D) $1 \leq f(\theta) \leq 16$

Q.No. 28 The shortest distance between the parabolas $2y^2 = 2x - 1, 2x^2 = 2y - 1$

(A) $2\sqrt{2}$

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

(C) 4

(D) $\sqrt{\frac{36}{5}}$

Q.No. 29 If both roots of the equation $x^2 - 2(a-1)x + (2a+1) = 0$ are positive, where a is a real number, then

(A) $a \in (4, \infty)$

(B) $a \in (-\infty, 0] \cup [4, \infty]$

(C) $a \in (1, \infty)$

(D) a $\in [4, \infty)$

Q.No. 30 The solution of the differential equation $\frac{dy}{dx} = \frac{2xy-y^2}{2xy-x^2}$,

(A) $xy(x+y) = C$

(B) $xy(x-y) = C$

(C) $x^2y(x-y) = C$

(D) $x^3y(x-y) = C$

Q.No. 31 The distance of the point of intersection of the line x - 3 = (1/2)(y - 4) = (1/2)(z - 5) and the plane x + y + z=17 from the point (3,4,5) is

(A) 2

(B) 3

(C) 1/3

(D) 1/2

Q.No. 32 Area of one loop formed by $|y| = |\sin x|$ is

(A) 0

(B) 2

(C) 4

(D) 2π

Q.No. 33 Let A be an event that a family has children of both sexes and B be the event that the family has at most one boy. If the family has 3 children then the events A and B are

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(A) dependent

(B) independent

(C) mutually exclusive

(D) None of these

Q.No. 34 The function $\left(x^2-9\right)\left|x^2-7x+12\right|+\cos(|x|)$ is not differentiable at

(A) 4

(B) 3

(C) -3

(D) 0

Q.No. 35 The solution of the inequality $\left|x^2-4x\right|<5$ is

(A) (-1,5)

(B) (-4,5)

(C) (-5,4)

(D) (- 1,4)

Q.No. 36 The area bounded by the curve $y=\begin{cases}x^{1/\ln x} & x\neq 1\\ e, & x=1\end{cases}$ and $y=|x-e|$ is

(A) $e^2/2$

(B) e^2

(C) $2e^2$

(D) 1

Q.No. 37 Let * be a binary operation on the set R of real numbers defined by $a^*b=\frac{3ab}{7}$ then the identity element in R for '*' is

(A) 3/7

(B) 3/14

(C) 2/3

(D) None of these

Q.No. 38 The solution set of the in equality $\log_{\tan(x/3)}\left(x^2-3x+2\right)\geq 2$ is

(A) $\left(\frac{1}{2},2\right)$

(B) $\left[\frac{1}{2},2\right])$

(C) $\left[\frac{1}{2},1\right)\cup\left(2,\frac{5}{2}\right]$

(D) $\left(\frac{1}{2},\frac{5}{2}\right)$

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Q.No. 39 Which statement is true for the line $\frac{x-4}{8} = \frac{y-2}{2} = \frac{z-3}{3}$ and plane having intercepts -4,2 and 3 of the following

(A) line is orthogonal to the plane

(B) line lies in the plane

(C) line makes an acute angle $(\neq 0^\circ)$ with the plane

(D) None of the above

Q.No. 40 A region in the xy-plane is bounded by the curve $y = \sqrt{25 - x^2}$ and the line y = 0. If the point (a, a + 1) lies in the interior of the region, then

(A) $a \in (-4, 3)$

(B) $a \in (-\infty, -1) \cup (3, \infty)$

(C) $a \in (-1, 3)$

(D) None of these

Q.No. 41 If $A = \begin{bmatrix} k & l \\ m & n \end{bmatrix}$ and k.n ≠ lm, then the value of $A^2 - (k + n)A + (kn - lm)I$ equals

(A) The zero matrix of order 2 x 2

(B) A

(C) -A

(D) 2A where l is the identify matrix of order 2 x 2

Q.No. 42 The unit vector which is orthogonal to the vector $\hat{i} + \hat{j} + \hat{k}$ and is coplanar with vectors $\hat{i} + 2\hat{j} - \hat{k}$ and $2\hat{i} + \hat{j} + 3\hat{k}$, is

(A) $\frac{i+5\hat{j}-6\hat{k}}{\sqrt{62}}$

(B) $\frac{i+3\hat{j}-\hat{k}}{\sqrt{11}}$

(C) $\frac{i+7i}{\sqrt{50}}$

(D) $\frac{\hat{i}+2\hat{j}+\hat{k}}{\sqrt{6}}$

Q.No. 43 Let $f(x) = x^3 + x$, then the equation $\frac{2}{y-f(2)} + \frac{3}{y-f(3)} + \frac{4}{y-f(4)} = 0$, has

(A) both roots lying in (f(2), f(3))

(B) exactly one root lying in (f(3), f(4))

(C) exactly one root lying in $(-\infty, f(2))$

(D) exactly one root lying in $(f(4), \infty)$

Q.No. 44 If $\cot^{-1}(\sqrt{\cos\alpha}) - \tan^{-1}(\sqrt{\cos\alpha}) = x$ then sin x is equal to

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(A) $\tan^2(\alpha/2)$

(B) $\cot^2(\alpha/2)$

(C) $\tan\alpha$

(D) $\cot(\alpha/2)$

Q.No. 45 The length of perpendicular from the point $\hat{i}+2\hat{j}+3\hat{k}$ to the line $\frac{x-6}{3}=\frac{y-7}{2}=\frac{z-7}{-2}$

(A) 6

(B) 7

(C) √17

(D) √14

Q.No. 46 A five-digit number divisible by 3 is to be formed using the numbers 0, 1, 3, 4 and 5 without repetition. The total number of ways this can be done is

(A) 216

(B) 600

(C) 240

(D) 3125

Q.No. 47 A fair coin is tossed n times. Let the random variable X denote the number of times the head occurs. If P[X = 1], P[X = 2) and P[X = 3] are in arithmetic progression (AP), then the number n of independent trial is

(A) 7

(B) 10

(C) 12

(D) 14

Q.No. 48 If A and B are disjoint sets, then $B \cap A'$ where A' is complement of A is equal to

(A) A

(B) B

(C) A'

(D) B'

Q.No. 49 A straight line has its extremities on two fixed straight lines and cuts off from them a triangle of constant area C^2.Then the locus of the middle point of the line is

(A) $2xy = C^2$

(B) $xy + C^2 = 0$

(C) $4x^2y^2 = C$

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(D) None of these

Q.No. 50 Which of the following is an incorrect statement?

(A) $n^3 + 3n^2 + 5n + 3$ is divisible by 3 for all $neIN$

(B) $n(n+1)(2n+1)$ is divisible by 6 for all $neIN$

(C) $n^2 - n + 41$ is a prime number for all $neIN$

(D) $7^n - 3^n$ is divisible by 4 for all $neIN$ where IN denotes the set of all natural numbers.

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Physics Answer Key

Q.No	Answer
Q.No. 1	(B)
Q.No. 2	(A)
Q.No. 3	(C)
Q.No. 4	(D)
Q.No. 5	(B)
Q.No. 6	(B)
Q.No. 7	(C)
Q.No. 8	(D)
Q.No. 9	(C)
Q.No. 10	(B)
Q.No. 11	(B)
Q.No. 12	(A)
Q.No. 13	(B)
Q.No. 14	(B)
Q.No. 15	(A)
Q.No. 16	(D)
Q.No. 17	(A)
Q.No. 18	(A)
Q.No. 19	(A)
Q.No. 20	(B)
Q.No. 21	(C)
Q.No. 22	(A)
Q.No. 23	(D)
Q.No. 24	(B)
Q.No. 25	(D)
Q.No. 26	(A)
Q.No. 27	(D)
Q.No. 28	(C)
Q.No. 29	(C)
Q.No. 30	(B)
Q.No. 31	(B)
Q.No. 32	(D)
Q.No. 33	(B)
Q.No. 34	(A)
Q.No. 35	(B)
Q.No. 36	(A)
Q.No. 37	(B)
Q.No. 38	(C)
Q.No. 39	(A)
Q.No. 40	(B)
Q.No. 41	(D)
Q.No. 42	(B)
Q.No. 43	(B)
Q.No. 44	(A)
Q.No. 45	(A)
Q.No. 46	(D)
Q.No. 47	(A)
Q.No. 48	(C)
Q.No. 49	(B)
Q.No. 50	(B)

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Chemistry Answer Key

Q.No	Answer
Q.No. 1	(B)
Q.No. 2	(B)
Q.No. 3	(A)
Q.No. 4	(C)
Q.No. 5	(D)
Q.No. 6	(A)
Q.No. 7	(D)
Q.No. 8	(C)
Q.No. 9	(A)
Q.No. 10	(A)
Q.No. 11	(C)
Q.No. 12	(B)
Q.No. 13	(B)
Q.No. 14	(D)
Q.No. 15	(B)
Q.No. 16	(A)
Q.No. 17	(B)
Q.No. 18	(C)
Q.No. 19	(D)
Q.No. 20	(A)
Q.No. 21	(B)
Q.No. 22	(A)
Q.No. 23	(B)
Q.No. 24	(C)
Q.No. 25	(A)
Q.No. 26	(B)
Q.No. 27	(B)
Q.No. 28	(B)
Q.No. 29	(A)
Q.No. 30	(D)
Q.No. 31	(B)
Q.No. 32	(C)
Q.No. 33	(A)
Q.No. 34	(A)
Q.No. 35	(D)
Q.No. 36	(A)
Q.No. 37	(C)
Q.No. 38	(A)
Q.No. 39	(B)
Q.No. 40	(C)
Q.No. 41	(C)
Q.No. 42	(D)
Q.No. 43	(B)
Q.No. 44	(C)
Q.No. 45	(C)
Q.No. 46	(A)
Q.No. 47	(B)
Q.No. 48	(B)
Q.No. 49	(D)
Q.No. 50	(A)

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Maths Answer Key

Q.No	Answer
Q.No. 1	(C)
Q.No. 2	(A)
Q.No. 3	(A)
Q.No. 4	(A)
Q.No. 5	(A)
Q.No. 6	(B)
Q.No. 7	(D)
Q.No. 8	(D)
Q.No. 9	(A)
Q.No. 10	(A)
Q.No. 11	(B)
Q.No. 12	(A)
Q.No. 13	(C)
Q.No. 14	(B)
Q.No. 15	(A)
Q.No. 16	(B)
Q.No. 17	(B)
Q.No. 18	(C)
Q.No. 19	Answer is missing
Q.No. 20	(A)
Q.No. 21	(C)
Q.No. 22	(B)
Q.No. 23	(B)
Q.No. 24	(A)
Q.No. 25	(B)
Q.No. 26	(C)
Q.No. 27	(C)
Q.No. 28	(B)
Q.No. 29	(D)
Q.No. 30	(B)
Q.No. 31	(B)
Q.No. 32	(C)
Q.No. 33	(B)
Q.No. 34	(A)
Q.No. 35	(A)
Q.No. 36	(B)
Q.No. 37	(D)
Q.No. 38	(C)
Q.No. 39	(B)
Q.No. 40	(C)
Q.No. 41	(A)
Q.No. 42	(A)
Q.No. 43	(B)
Q.No. 44	(A)
Q.No. 45	(B)
Q.No. 46	(A)
Q.No. 47	(A)
Q.No. 48	(B)
Q.No. 49	(A)
Q.No. 50	(C)

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