SINCE 1984

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STUDY CENTRE, PALA

JEE MAIN 2025

SESSION-1

SHIFT-1 MORNING

SCAN ME

VIDEO SOLUTION

MEMORY BASED QUESTIONS

Brilliant® SINCE 1984
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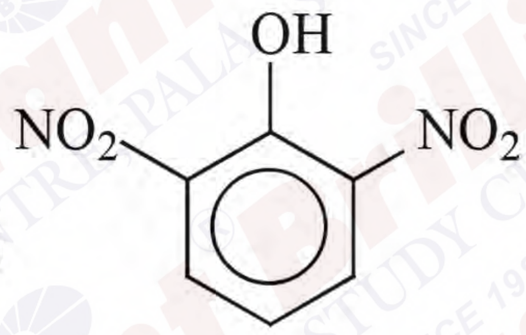
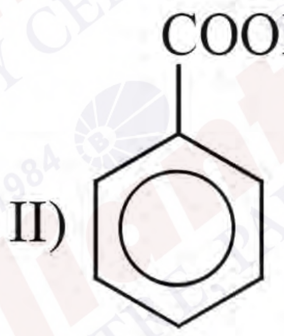
28-01-2025 | **SHIFT 1-MORNING**

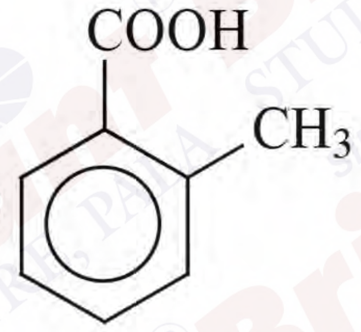
MEMORY BASED QUESTIONS

CHEMISTRY

QN What is the rate of reaction for releasign $CO_2(g)$ with aq. $NaHCO_3$ among the following?

I) 

II) 

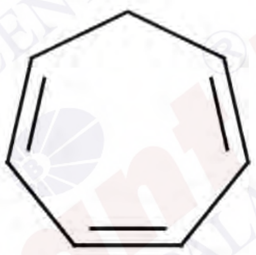
III) 

1) I > II > III 2) III > II > I 3) I > III > II 4) II > III > I

QN Which of the following pair have square pyramidal shape?

1) BrF_5, $XeOF_4$ 2) SbF_5, BrF_5 3) PCl_5, $XeOF_4$ 4) PCl_5, Sb_6F_5

QN Consider the following carbocations



$(Ph)_3\overset{\oplus}{C}$ $Ph_2\overset{\oplus}{C}H$ $CH_2CH_2-\overset{\oplus}{C}H-CH_2$

(I) (II) (III) (IV)

The correct increasing order of stability of these carbocations is

1) I < II < III < IV 2) IV < III < II < I 3) II < III < IV < I 4) IV < III < I < II

QN Which of the following set of quantum numbers have same energy?

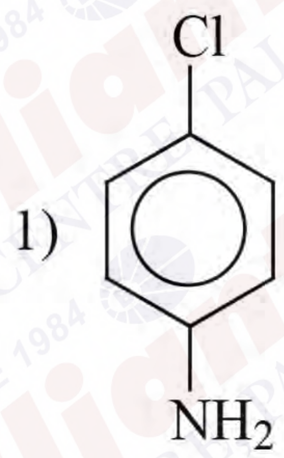
1) n = 2, l = 2, m = +1 2) n = 2, l = 1, m = –1

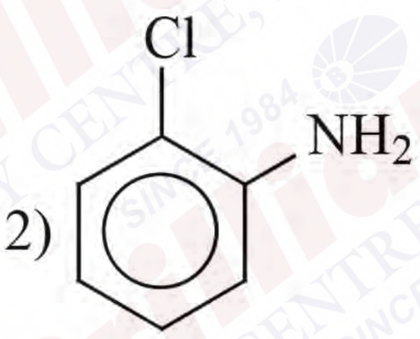
3) n = 3, l = 2, m = 0 4) n = 3, l = 2, m = 1

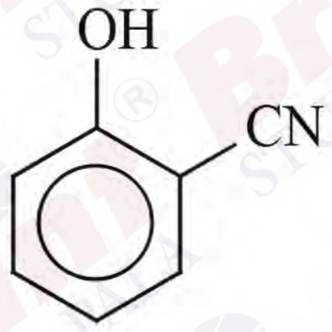
1) a, b 2) b, c 3) c, d 4) a, c

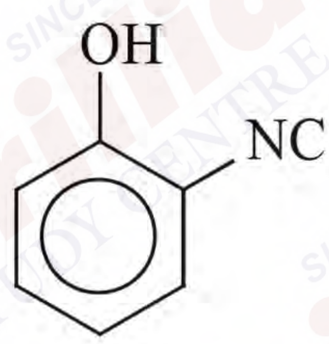
QN In the given reaction sequence:  $\xrightarrow[(ii)\ CO_2\ (iii)\ H^+\ (iv)\ NH_2/\Delta]{(i)\ KOH,\ 623\ k,\ 300\ atm}$ (s) $\xrightarrow[(ii)\ CHCl_2/KOH]{(i)\ Br_2/KOH}$ (R)

What is (R)

1) 

2) 

3) 

4) 

QN 70% by mass solution of HNO_3 is taken having density 1.41 gm/ml. Calculate molarity (Rounded off to nearest integer)

QN Δ_fH of H(g) is 222 kJ/mol. Δ_fH of O(g) is 250 kJ/mol. Δ_fH of H_2O is –248 kJ/mol.

What is the value of bond energy of O–H bond in H_2O in kJ/mol

QN 1g of a non-electrolyte solute (MW = 256 g/mol) dissolved in 50g of solvent, freezing point of solution lowered by 0.40 K. Calculate the molal depression constant of solvent

QN Among the following the incorrect order of atomic radius is

1) B > Al > Mg > F 2) Al > B > N > F 3) Mg > Al > Be > O 4) Mg > Be > N > F

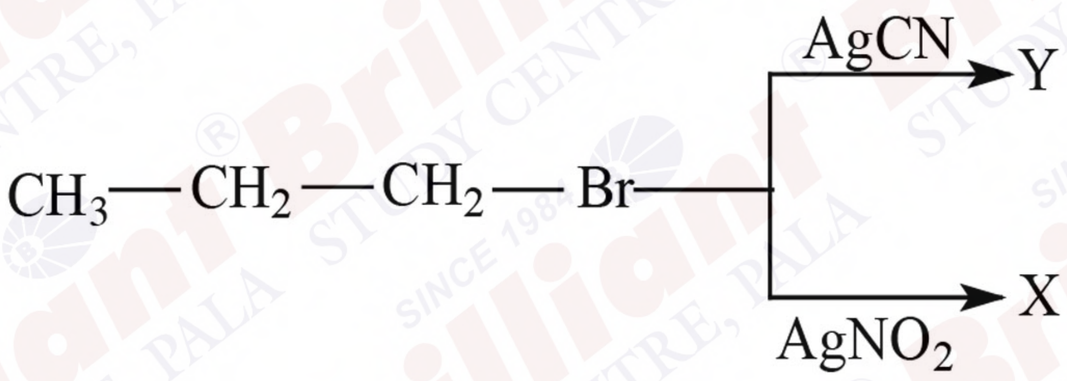
QN Match the following column and choose the correct option

Column-I	Column-II
A) $H_2O_2 \rightarrow H_2O + O_2$	P) Combustion reaction
B) $NaH \rightarrow Na + H_2$	Q) Disproportionation
C) $CH_4 + O_2 \rightarrow CO_2 + H_2O$	R) Decomposition reaction
D) $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$	S) Displacement reaction

1) A→Q; B→P; C→R; D→S 2) A→R; B→Q; C→S; D→P

3) A→Q; B→R; C→P; D→S 4) A→R; B→Q; C→P; D→S

QN Consider the following reaction



The major product X and Y respectively are

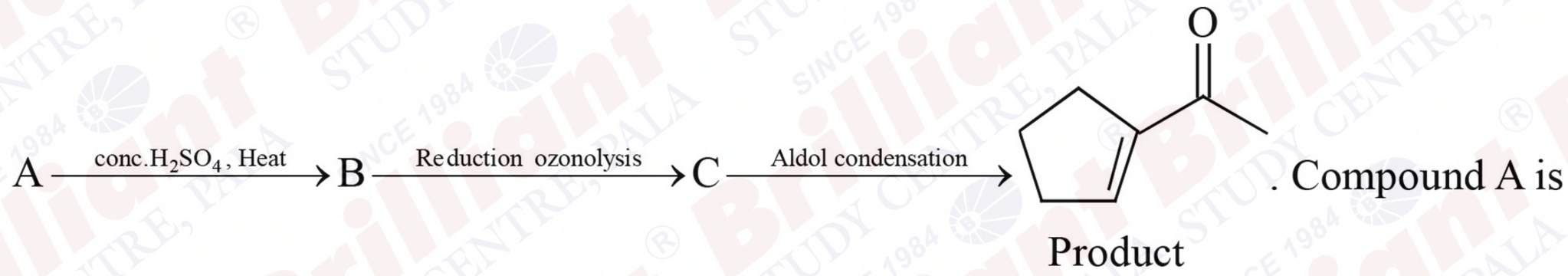
1) $CH_3CH_2CH_2ONO$ & $CH_3CH_2CH_2CN$

2) $CH_3CH_2CH_2NO_2$ & $CH_3CH_2CH_2CN$

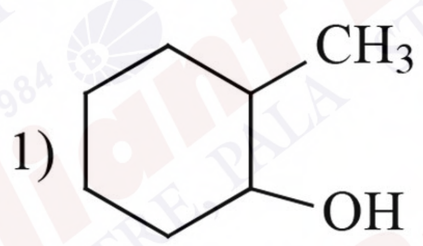
3) $CH_3CH_2CH_2NO_2$ & $CH_3CH_2CH_2NC$

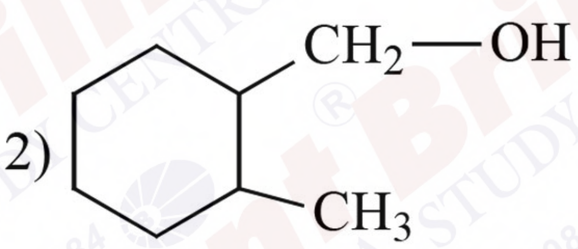
4) $CH_3CH_2CH_2ONO$ & $CH_3CH_2CH_2CN$

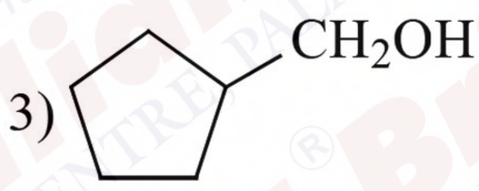
QN A compound contains 14.4% carbon, 1.2% hydrogen and 84.4% chlorine, calculate empirical formula mass of compound. (Molar mass of C = 12, H = 1, Cl = 35.5)

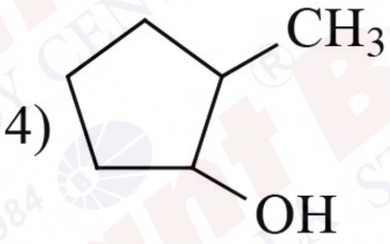
QN 

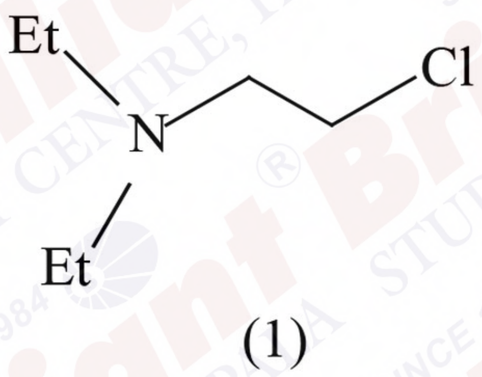
. Compound A is

1) 

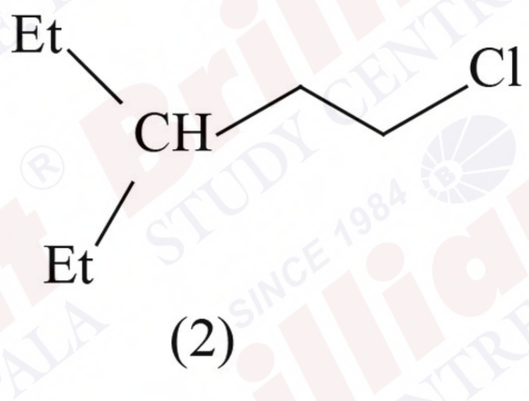
2) 

3) 

4) 

QN 

(1)

and 

(2)

Statement-I : Compound (2) shows faster alkaline hydrolysis compared to (1)

Statement-II : Compound (1) shows substitution via neighbouring group participation

1) Statement_I is correct statement-II is incorrect

2) Statement-I is incorrect statement-II is correct

3) Statemen-I and statement-II both are correct

4) Statement-I an statement-II are incorrect

QN Which of the following reaction(s)/test(s) can be used to distinguish acetaldehyde and acetone?

A)Iodoform test B) Cannizzaro reaction C) Aldol condensation

D) Fehling's test E) Tollen's test F) Clemmensen's reduction

1) D, E only B) A, B, C, F only C) B, C, F only D) B, C, D, E only

QN Which of the following has same energy in absence of electric and magnetic field for hydrogen atom?

1) 2s, 3p 2) 3s, 2p 3) 2s, sp 4) 3s, 4f

QN A weak acid HA has degree of dissociation x. Which options gives the correct expression of (pH – pKa)?

1) 0 2) (log (1+2x)) 3) $\log\left(\frac{x}{1-x}\right)$ 4) $\log\left(\frac{1-x}{x}\right)$

QN Ice and water are placed in a closed container at a pressure at 1 atm and temperature 273.15K. If the pressure of the container increases 2 times and the temperature is kept constant, then identify the correct observation from the following

1) The amount of ice decrease
2) Volume of system increases
3) Liquid phase disappear completely
4) Solid phase (ice) disappear completely

QN The product A and B in the following reactions, respectively

$$A \xleftarrow{AgNO_2} CH_3CH_2CH_2Br_2 \xrightarrow{AgCN} B$$

A) $CH_3 - CH_2 - CH_2 - ONO$, $CH_3 - CH_2 - CH_2 - CN$
B) $CH_3 - CH_2 - CH_2 - NO_2$, $CH_3 - CH_2 - CH_2 - NC$
C) $CH_3 - CH_2 \rightarrow + CH_2 - NO_2$, $CH_3 - CH_2 - CH_2CN$
D) $CH_3 - CH_2 - CH_2 - ONO$, $CH_3 - CH_2 - CH_2 - NC$

QN Consider the following element in In, Tl, Al and Pb. The most stable oxidation states of elements with highest and lowest first ionization enthalpies, respectively are

1) +4 and +1 2) + 2 and +3 3) +4 and + 3 4) +1 and +4

QN Which of the following Oxidation reaction reactions are carried out by both $K_2Cr_2O_7$ and $KMnO_4$ in acidic medium

1) $I^- \rightarrow I_2$ 2) $S^{2-} \rightarrow S$ 3) $I^- \rightarrow 10_3^-$ 4) $S_2O_3^{2-} \rightarrow SO_4^{2-}$

QN How many of the following ions have some value of spin only magnetic moment?

Ni^{2+}, V^{2+}, Ti^{2+}, Sc^{3+}, Ti^{3+}

QN Which of the following compounds have the same number of lone pair on central atom as ClF_3

1) XeF_5^- 2) XeF_2 3) BrF_5 4) I_3^-

QN Statement 1: For titration of oxalic acid using $KMnO_4$, warming of acid solution is required whereas in case of ferrous ammonium sulphate, it is done at room temperature.

Statement 2: Fe^{2+} converts to Fe^{3+} ions during titration

1) Statement 1 and Statement 2 are correct
2) Statement 1 is correct and Statement 2 is incorrect
3) Statement 1 is incorrect and Statement 2 is correct
4) Statement 1 and Statement 2 both are incorrect

QN Which of the following give violet colour in Borax bead test?

1) Cr^{3+} 2) Mn^{2+} 3) CO^{3+} 4) Fe^{2+}

QN If $\int_{-\pi/2}^{\pi/2} \frac{96\left(x^2+\cos x\right)}{1+e^x}dx = a\pi^3+\beta$ (where α,β are positive integers), then $\alpha+\beta$ equal to

1) 144 2) 100 3) 64 4) 196

QN If $\int_{\frac{-\pi}{2}}^{\frac{\pi}{2}} \frac{96\left(x^2+(-5x)\right)}{1+e^x}dx = \alpha\pi^3+\beta, \alpha,\beta \in N$ then $\alpha+\beta=$

QN Number of ways to form 5-digit numbers greater than 50,000 by using the digits 0,1,2,3,4,5,6,7 such that the sum of the Ist and last digits is not greater than 8

QN Image of (4,4,3) in the line $\frac{x-1}{2}=\frac{y-2}{1}=\frac{z-1}{1}$ is(a,b,c) then a + b + c is equal to

QN If $\int_0^x tf(t)dt = x^2f(x)$ and f(2)=3, then f(6)=

QN Let R be a relation such that $R=\{(x,y): x,y \in z \text{ and } x+y \text{ is even}\}$ then relation is

QN If $\int_0^x tf(t)dt = x^2f(x)$ and f(2)=3, then f(6) =

QN The value of $\cos\left(\sin^{-1}\frac{3}{5}+\sin^{-1}\frac{5}{13}+\sin^{-1}\frac{33}{65}\right)$ is

QN The sum of squares of the real roots fo the equation $x^2+|2x-3|-4=0$ is

QN Area of the region $\{(x,y): y<2|x|+1, y>x^2+1\}$

QN There are 3 bad oranges and 7 good oranges in a bag. Two oranges are selected at random. Let X be the number of bad oranges. The variance of X is

QN If $f(x)=\frac{2^x}{2^x+\sqrt{2}}$, then the value of $\sum_{k=1}^{81} f\left(\frac{k}{82}\right)$ is equal to

QN If $2a_{n+2}=5a_{n+1}-3a_n$, where n = 0,1,2....if $a_0=3$ and $a_1=4$, then the value $\sum_{k=1}^{100} a_k$ is equal to

A) $3a_{100}-91$ B) $3a_{99}-91$

QN Let k_1 and k_2 be two randomly selected natural numbers. The probability that $(i)^{k_1}+(i)^{k_2}$ is non-zero is (whee $i=\sqrt{-1}$)

QN $z_1=\sqrt{3}+2\sqrt{2}i \;\&\; \sqrt{3}|z_1|=|z_2|$ and $\arg(z_2)=\arg(z_1)+\frac{\pi}{6}$ then area of triangle with vertices z_1, z_2 and origin

1) $\frac{11\sqrt{3}}{4}$ 2) $\frac{3\sqrt{2}}{5}$ 3) $\frac{2\sqrt{3}}{5}$ 4) $\frac{2\sqrt{5}}{7}$

QN The sum of all local minimum values of the funciton

$$\begin{cases} 1-2x & x<-1 \\ \frac{1}{3}(7+2|x|) & -1\le x\le 2 \\ \frac{11}{18}(x-4)(x-5) & x>2 \end{cases} \text{ is}$$

1) $\frac{131}{72}$ 2) $\frac{157}{72}$ 3) $\frac{171}{72}$ 4) $\frac{167}{72}$

QN Let ${}^nC_{r-1}=28, {}^nC_r=56$ and ${}^nC_{r+1}=70$, let A (4 cost, 4 sint), B (2sin t, –2 cost) and $C(3r-n, r^2-n-1)$ be the vertices of a triangles ABC, where t is a parameter. If $(3x-1)^2+(3y)^2=a$, is the locus of the centroid of triangle ABC, then α equates

1) 20 2) 8 3) 48 4) 6

QN Let $f:R\to R$ be a function fefined by $f(x)=(2+3a)x^2+\left(\frac{a+2}{a-1}\right)x+b, a\neq 1,$ if $f(x+y)=f(x)f(y)+1-\frac{2}{x}xy,$ then the value of $28\sum_{i=1}^{5}|f(i)|$ is

1) 675 2) 750 3) 545 4) 725

QN Let ABCD be a trapezium whose vertices lie on parabola $y^2=4x$ let the sides the AD and BC of the trapezium be parallel to y-axis. If the diagonal AC is of length $\frac{25}{4}$ and it passes through the point (1,0) then the area of ABCD is

1) $\frac{125}{8}$ 2) $\frac{25}{2}$ 3) $\frac{75}{8}$ 4) $\frac{75}{4}$

QN Let A(x,y,z) be point in xy plane, which is equidistant from three points (0,3,2), (2,0,3) and (0,0,1) let B(1,4,–1) and C (2,0,–2). Then among the statements. $S_1 = \Delta ABC$ is an isosceles right angle triangle, and S_2 = the area of ΔABC is $\frac{9\sqrt{2}}{2}$,

1) only S_1 is true 2) Both are false 3) Only S_2 is true 4) Both are true

QN Let T_r be the r^{th} term of an A.P. If for some m, $T_m = \frac{1}{25}, T_{25} = \frac{1}{20}$, and $20\sum_{r=1}^{25} T_r = 13$, Then $5m\sum_{r=m}^{2m} T_r$ is

1) 112 2) 90 3) 142 4) 126

QN Let the equation of the circle, which touches x-axis at the point $(a,0), a > 0$ cuts off an intercept of length 'b' on y-axis be $x^2 + y^2 - \alpha x + \beta y + r = 0$. If the circle lies below x-axis then the ordered pair $(2a,b^2)$ is equal to

1) $(r, \beta^2 + 4\alpha)$ 2) $(\alpha, \beta^2 - 4r)$ 3) $(r, \beta^2 - 4\alpha)$ 4) $(\alpha, \beta^2 + 4r)$

QN Assertion : Work done by central force is independent of path.

Reason : Potential energy is associated with every force

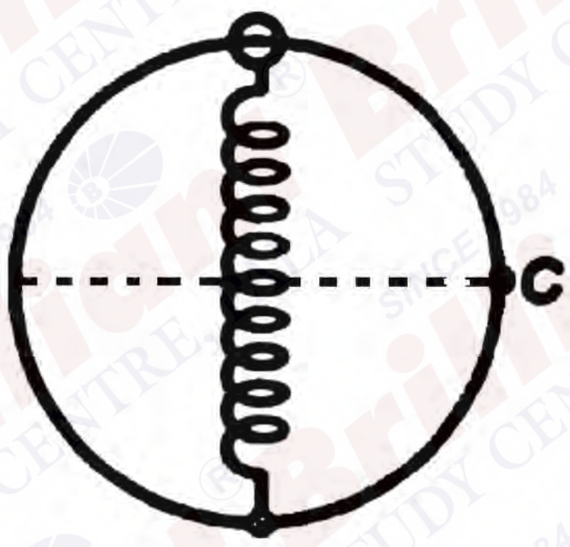
1) Both Assertion and Reason are correct

2) Assertion is correct, Reason is incorrect

3) Assertion is incorrect, Reason is correct

4) Both Assertion and Reason are incorrect

QN There is a smooth ring of radius R in vertical plane. A spring of natural length R and elastic constant K is vertical across along a diameter. The free end is connected to bead of mass m and when slightly disturbed it reaches point C with speed where V is



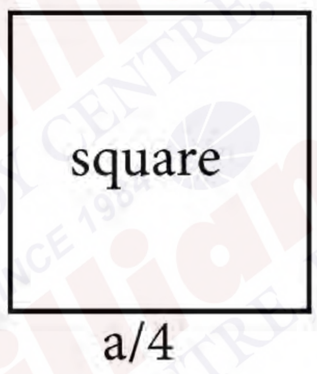
1) $\sqrt{\frac{KR^2(\sqrt{2}-1)+2mgR}{m}}$

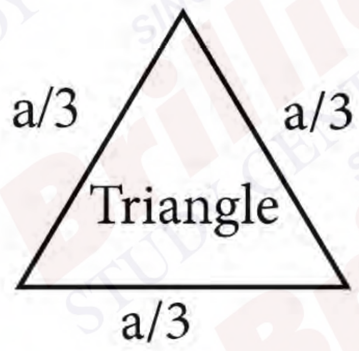
2) $\sqrt{\frac{2KR^2(\sqrt{2}-1)+2mgR}{m}}$

3) $\sqrt{\frac{2KR^2(\sqrt{2}-1)+mgR}{m}}$

4) $\sqrt{\frac{KR^2(\sqrt{2}-1)+mgR}{m}}$

QN In the given figure, the square and the triangle have same resistance per unit length. Find the ratio of their resistances about adjacent corners.





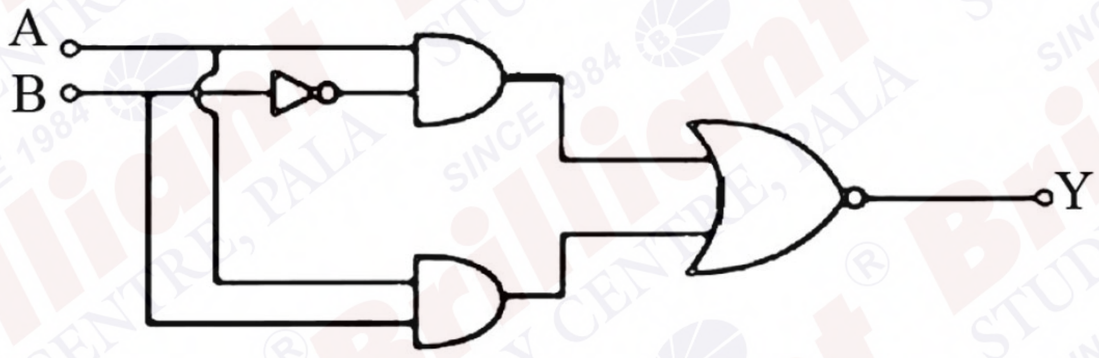
1) $\frac{32}{27}$

2) $\frac{27}{32}$

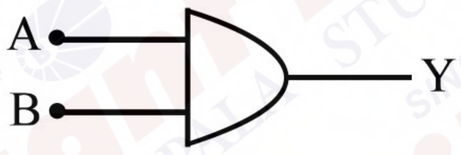
3) $\frac{8}{9}$

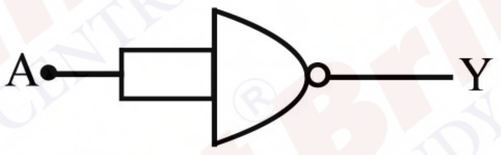
4) $\frac{9}{8}$

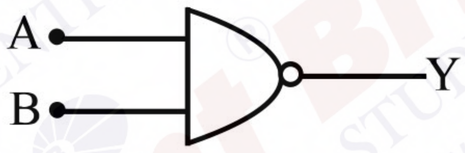
QN The equivalent logic gate for the circuit shown below is:

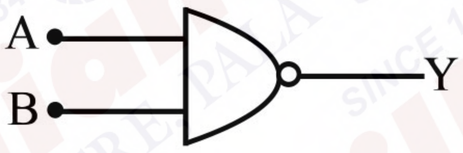


QN

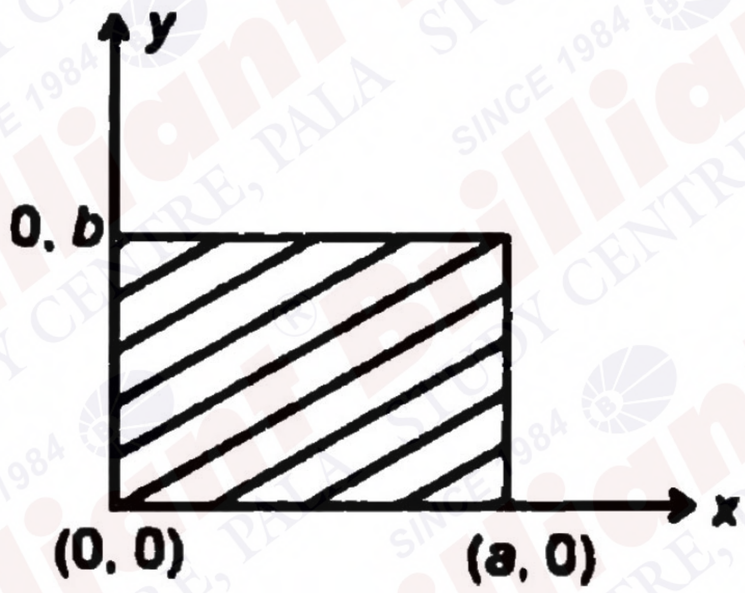
1) 

2) 

3) 

4) 

QN Surace mass density varies as $\sigma = \frac{\sigma_0 x}{ab}$ for the given plane sheet. Find the position of centre of mass for the distribution given

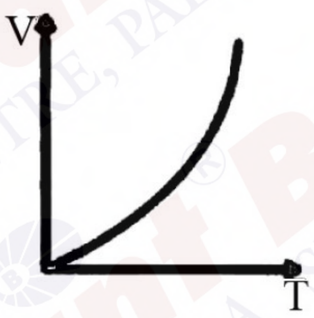


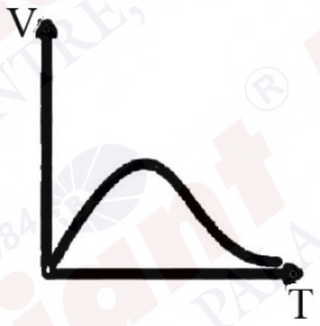
1) $\frac{2a}{3}, \frac{2b}{3}$ 2) $\frac{2a}{3}, \frac{b}{2}$ 3) $\frac{a}{3}, \frac{b}{2}$ 4) $\frac{a}{2}, \frac{b}{2}$

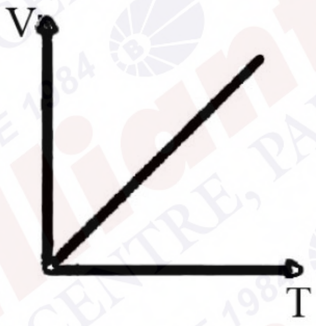
QN Which of the following reaction is correct? (Where symbols have their usual meanings)

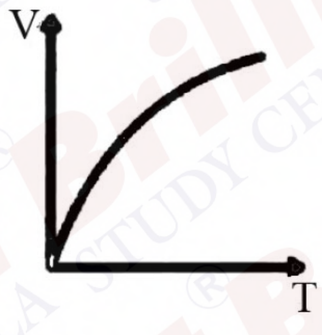
1) $n \rightarrow p + e^- + v$ 2) $n \rightarrow p + e^+ + v$ 3) $n \rightarrow p + e^+ + \overline{v}$ 4) $n \rightarrow p + e^- + \overline{v}$

QN The graph of root mean square velocity versus temperature is

1) 

2) 

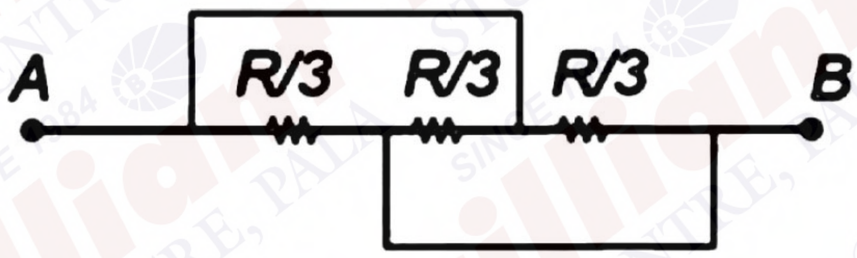
3) 

4) 

QN A coin is placed at the bottom of a hemispherical container filled with a liquid of refractive index μ. Find the least refractive index if the coin is visible to an observer at E.

1) $\sqrt{3}$ 2) $\sqrt{2}$ 3) $\frac{\sqrt{3}}{2}$ 4) $3\sqrt{2}$

QN Find equivalent resistance across A and B.



1) R 2) $\frac{R}{6}$ 3) $\frac{R}{3}$ 4) $\frac{R}{9}$

QN A uniform wire of linear charge density λ is placed along y-axis. The locus of equipotential surface is

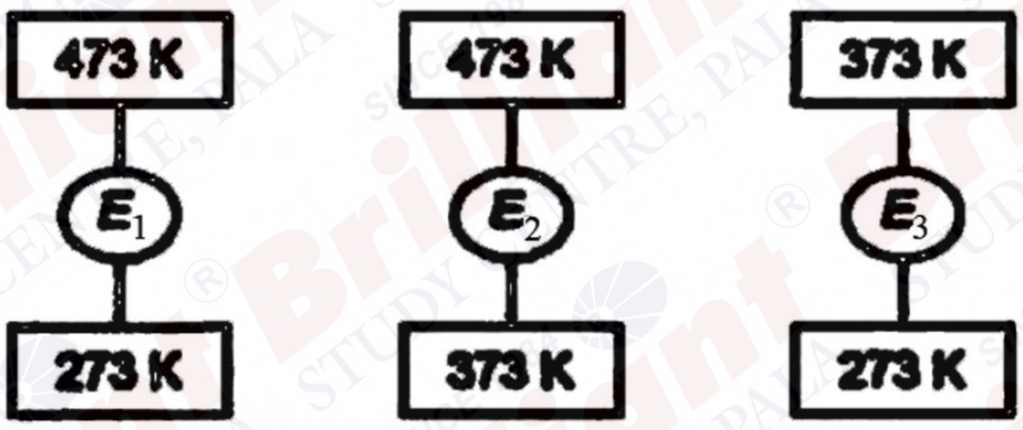
1) $x^2 + y^2 + z^2 =$ constant

2) $x^2 + z^2 =$ constant

3) xyz = constant

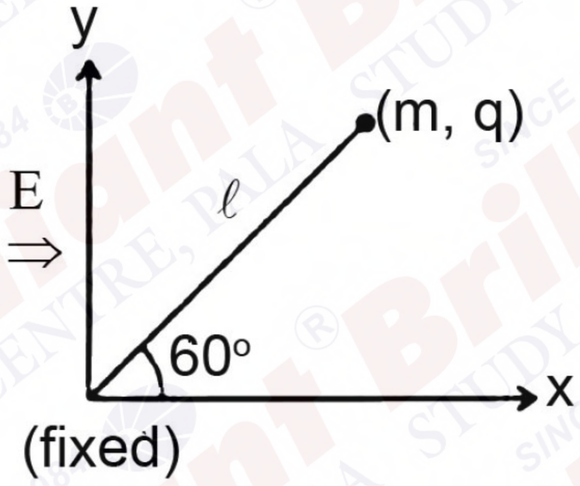
4) xy + yz + zx = constant

QN η_1, η_2 and η_3 are the efficiencies of the three Carnot E_1, E_2 and E_3 operating between temperature shown in the figure. Choose the correct option relating the efficiencies.



1) $\eta_2 + \eta_3 > \eta_1$ 2) $\eta_2 + \eta_3 = \eta_1$ 3) $\eta_2 + \eta_3 < \eta_1$ 4) $\eta_1 + \eta_2 = \eta_3$

QN A simple pendulum of length ℓ and both of mass m is placed on smooth horizontal surface as shown. When electric field of strength E is switched on, the bob passes the x-axis with speed θ, then



1) $v = \sqrt{\frac{2qE\ell}{m}}$ 2) $v = \sqrt{\frac{qE\ell}{m}}$ 3) $v = \sqrt{\frac{qE\ell}{2m}}$ 4) $v = 2\sqrt{\frac{qE\ell}{m}}$

QN Statement I : Velocity of sound is solids is more compared to that in gases

Statement II : Bulk modulus of gas is more than that of solids.

1) Statement I is correct Statement II is correct

2) Statement I is correct Statement II is incorrect

3) Statement I is incorrect Statement II is correct

4) Statement I is incorrect Statement II is incorrect

QN The dimensions of Young's modules of elasticity per unit length is $M^aL^bT^c$ then | a + b + c | is

QN Two solid spheres of radii R_1 and R_2 made of same material where $R_2 = 2R_1$ find Radio of Moment of Inertia $\frac{I_1}{I_2} = ?$

QN A proton of mass 'm_p' has same energy as that of photon of specific wavelength. If the proton is moving at non-relativistic speed, then ratio of de Broglie wavelength of the proton to the wavelength of photon is

a) $\frac{1}{c}\sqrt{\frac{2E}{m_p}}$ b) $\frac{1}{c}\sqrt{\frac{E}{2m_p}}$ c) $\frac{1}{c}\sqrt{\frac{E}{m_p}}$ d) $\frac{1}{2c}\sqrt{\frac{E}{m_p}}$

QN In YDSE for $\lambda_1 = 600$ nm 10^{th} bright fringe at 10 mm from central maxima then for $\lambda_2 = 660$ nm

. What is the distance of 10^{th} bright fringe from central maxima.

QN A thin prism P_1 with angle 4° made of glass having refractive index 1.54, is combine with another thin prism P_2 made of glass having refractive index 1.72 to get dispersion without deviation. The angle of the prism P_2 in degrees is

1) 4 2) $\frac{16}{3}$ 3) 3 4) 1.5

QN In the experiment for measurement of viscosity η of given liquid with a ball having radius R, consider the following statements.

A) Graph between terminal velocity v and R will be a Parabola

B) Terminal velocities of different diameter balls are constant for a given liquid

C) Measurement of terminal velocity is dependent on the temperature

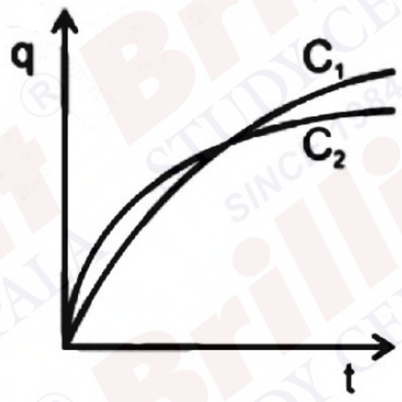
D) This experiment can be utilize to assess the density of a given liquid

E) If balls are dropped with some initial speed, the value of η will change.

Choose the correct answer from the options given below.

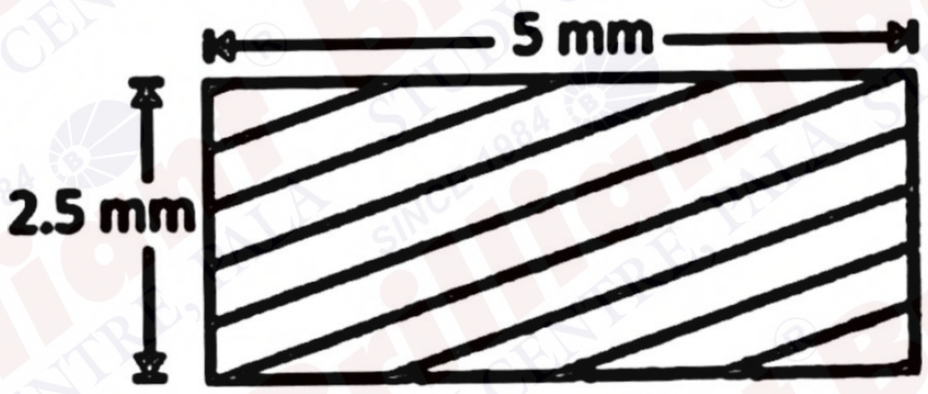
1) B, D and E only 2) A, B and E only 3) A, C and D only 4) C, D and E only

QN Two capacitors C_1C_2 are connected in parallel to a battery. Charge time graph is shown below for the two capacitors. The energy store with them in steady state are u_1 and u_2 respectively. Which of the given statement is correct.



1) $C_1 > C_2, u_1 < u_2$ 2) $C_1 > C_2, u_1 > u_2$ 3) $C_2 > C_1, u_2 > u_1$ 4) $C_2 > C_1, u_2 < u_1$

QN The length of a rectangular sheet is measured from a screw gauge of pitch 0.75 mm and number of division on circular scale = 15. Find maximum possible error in measurement of area



1) 0.225 mm^2 2) 0.375 mm2 3) 0.75 mm^2 4) 0.30 mm^2

QN The energy associated with a cylindrical region due to an EM wave $E = 100\sin(kx - \omega t)$ is u_0. Find the equation of EM wave for which a cylinder of same length and half the diameter (as previous one) contains same energy u_0.

1) $200\sin(kx - \omega t)$ 2) $25\sin(\omega t - kx)$ 3) $50\sin(kx - \omega t)$ 4) $400\sin(\omega t - kx)$