JEE MAINS 2026

PAPER SOLUTION

02 APR, SHIFT 2

•LIVE

PHYSICS

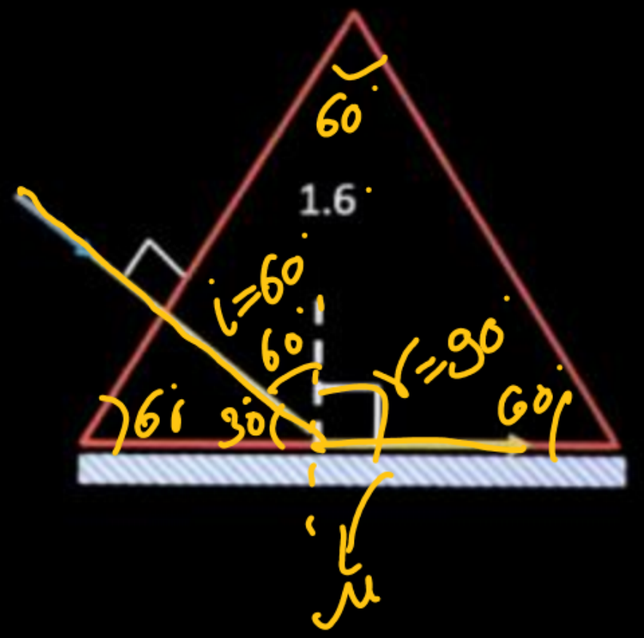
Q) In equilateral prism the path of a ray is shown. Determine μ

(A) 1.84

(B) 1.39

(C) 1.52

(D) 1.71



$$1.6 \sin 60^\circ = \mu \sin 90^\circ$$

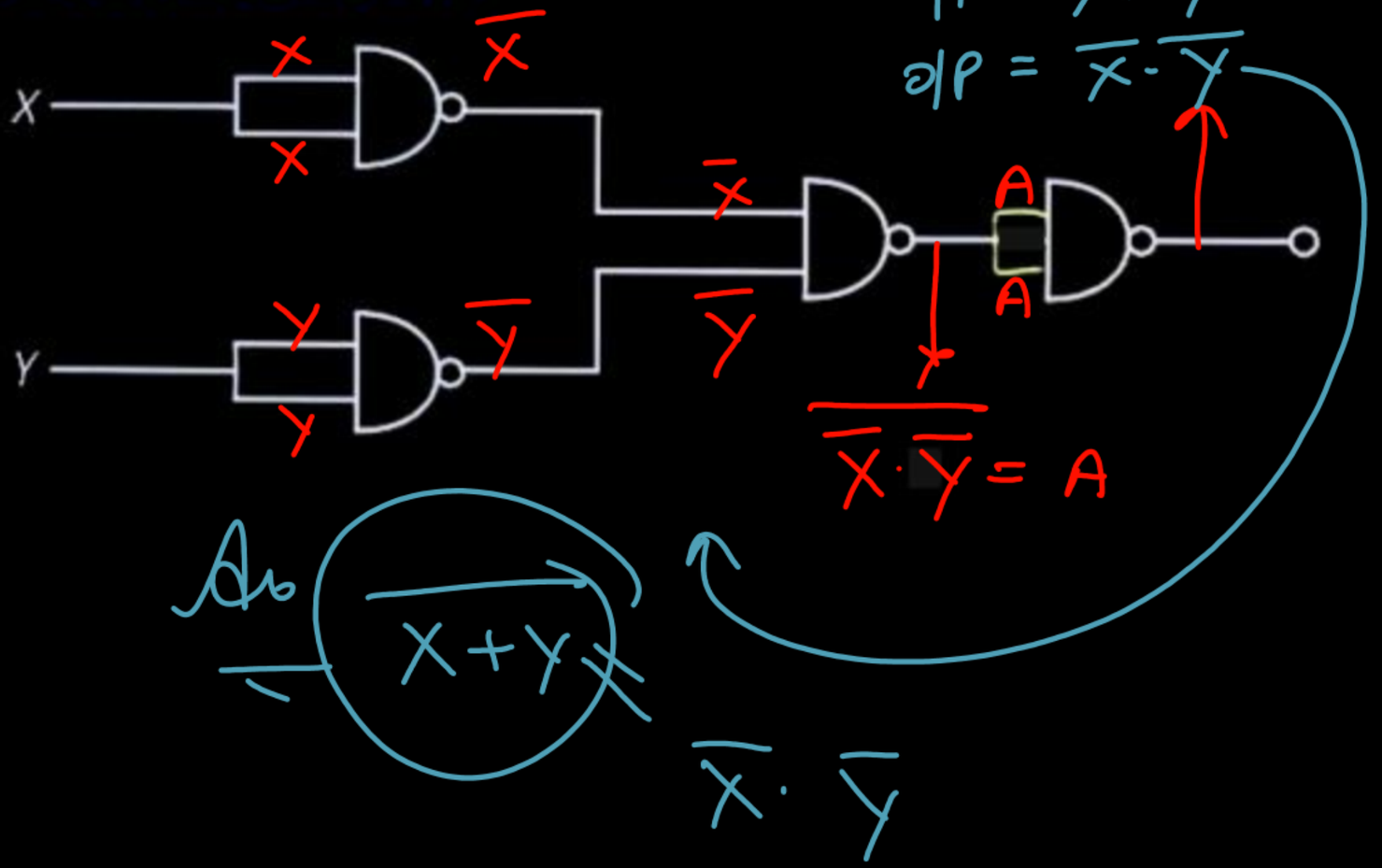
$$1.6 \times \frac{\sqrt{3}}{2} = \mu \times 1$$

$$\boxed{\mu = 1.39}$$

Ans. (B)

Q) What is the equivalent gate for the circuit?

(A) NOR gate
(B) AND gate
(C) OR gate
(D) NAND gate



Ans. (A)

Q) $x = 30\sin\left(50t + \frac{\pi}{3}\right)$ at $t = t_1$, $v = 0$ and at $t = t_2$, $a = 0$

(A) $t_1 = \frac{\pi}{300}, t_2 = \frac{\pi}{75}$

(B) $t_1 = \frac{\pi}{25}, t_2 = \frac{\pi}{300}$

(C) $t_1 = \frac{\pi}{400}, t_2 = \frac{\pi}{50}$

(D) $t_1 = \frac{\pi}{75}, t_2 = \frac{\pi}{300}$

$x = 30\sin(50t + \pi/3)$

$v = \frac{dx}{dt} = 30 \times 50 \cos(50t_1 + \pi/3) = 0$

$50t_1 + \pi/3 = \pi/2$

$t_1 = \frac{\pi}{6 \times 50} = \pi/300$

$a = 0$

$50t_2 + \pi/3 = \pi$

$t_2 = \frac{2\pi}{3 \times 50}$

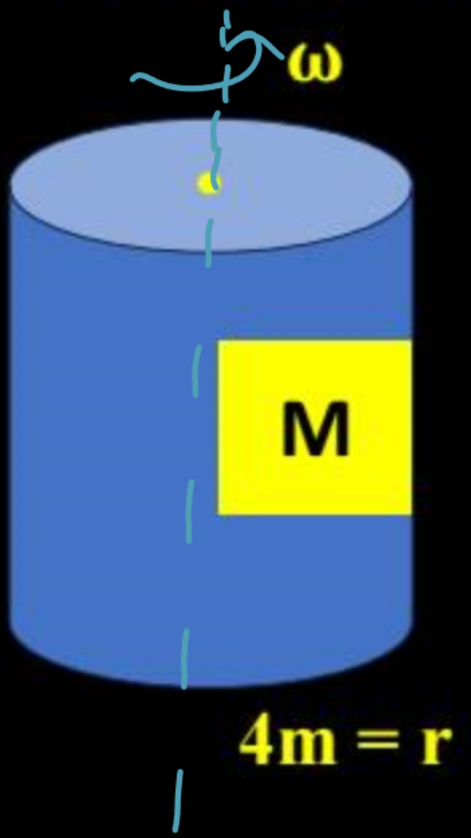
$t_2 = \pi/75$

Ans. (A)

Q) Determine minimum μ so that block do not slip with respect to wall of cylinder

$$\mu(m\omega^2 r) = mg$$

$$\mu = \frac{g}{\omega^2 r}$$



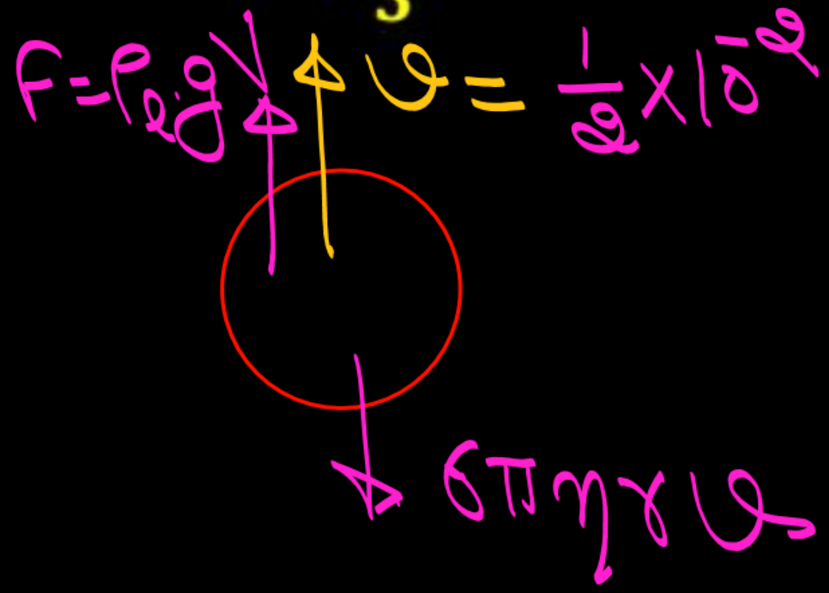
Ans. ()

Q) A soap bubble of radius $r = 1$ mm, liquid of density $\rho_1 = 2000\ kg/m^3$.

At the instant bubble is rising upward with constant velocity $v = \frac{1}{2}$ cm/s.

Find coefficient of viscosity (η).

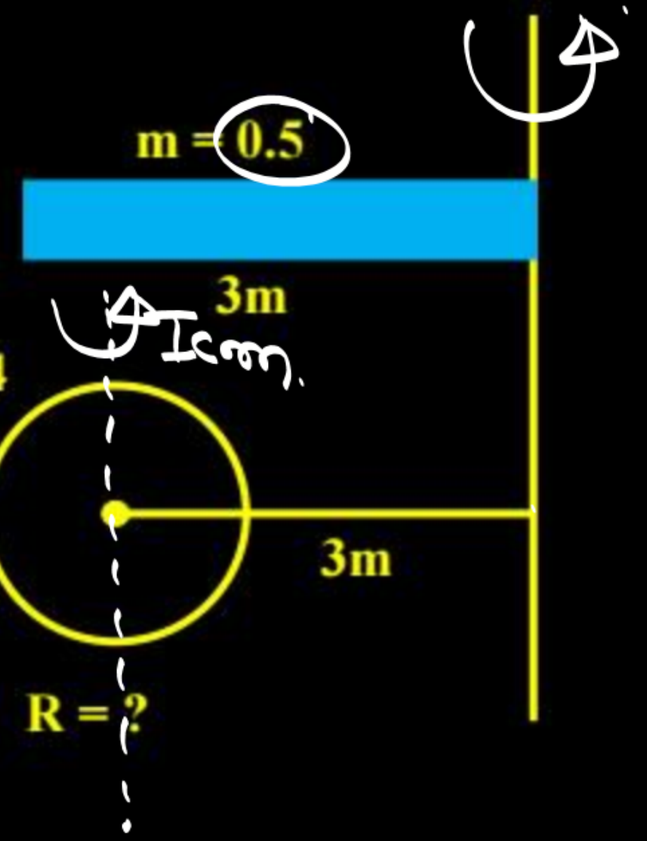
(A) $\frac{8}{9}$ N-S/m^2 (B) $\frac{2}{3}$ N-S/m^2 (C) $\frac{4}{9}$ N-S/m^2 (D) $\frac{2}{9}$ N-S/m^2



Ans. (A)

Q) M.I. of rod = M.I of sphere, find radius R?

$$0.5 \times \frac{3^2}{3} = \frac{2}{5}(4)R^2 + 4\times 3^2$$



Ans. ()

Q) Find the mutual inductance

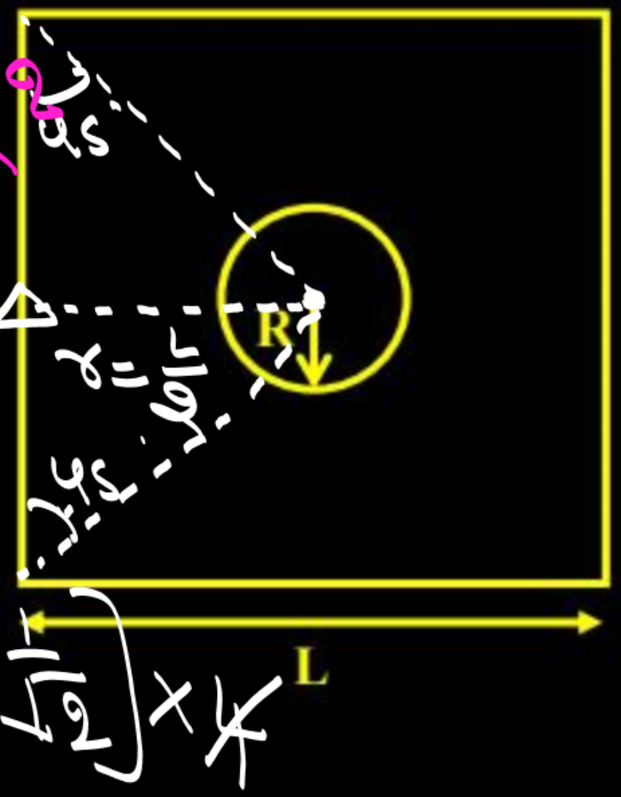
$R \ll L$

(A) $2\sqrt{2}\frac{R^2}{L}\mu$ (B) $\sqrt{2}\frac{R^2}{L}\mu$

(C) $2\sqrt{2}\frac{L^2}{R}\mu$ (D) $\sqrt{2}\frac{L^2}{R}\mu$

$\Phi = B \cdot \pi R^2$

$M i = \frac{2\sqrt{2}\mu_0 i \cdot \pi R^2}{\pi L}$



$B = \frac{\mu_0 i}{4\pi \cdot \frac{L}{2}}\left(\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}\right) \times 4$

$= \frac{2\sqrt{2}\mu_0 i}{\pi L}$

Ans. (A)

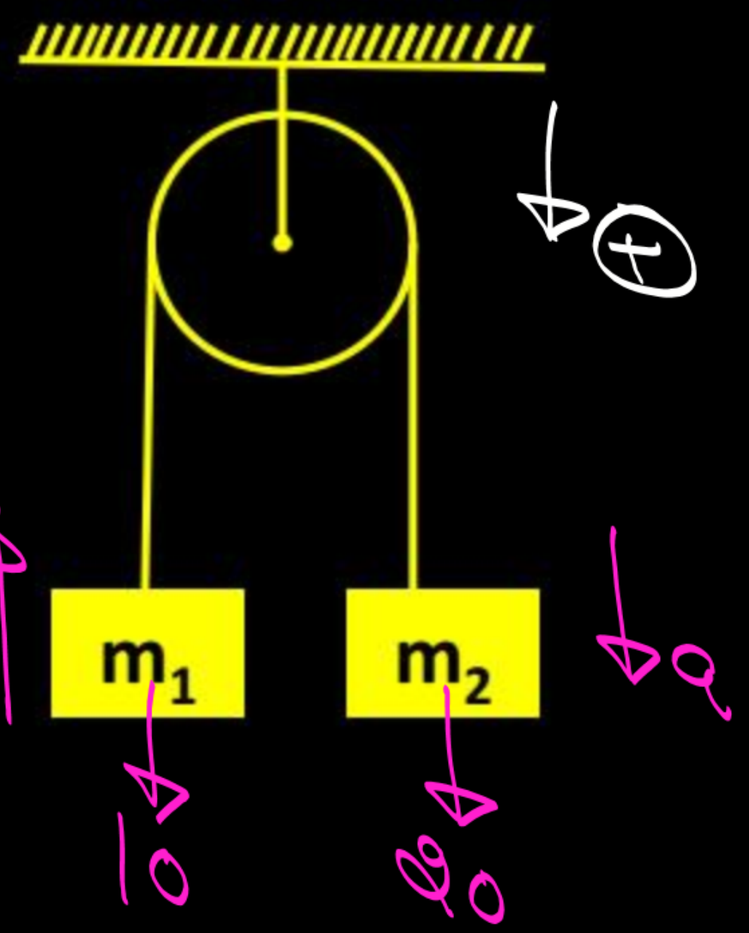
Q) Both blocks are released from rest at t = 0. Find displacement of center of mass in 2 sec. (m_1 = 1kg, m_2 = 2kg)

$$a = \frac{20 - 10}{3} = \frac{10}{3}\ m/s^2.$$

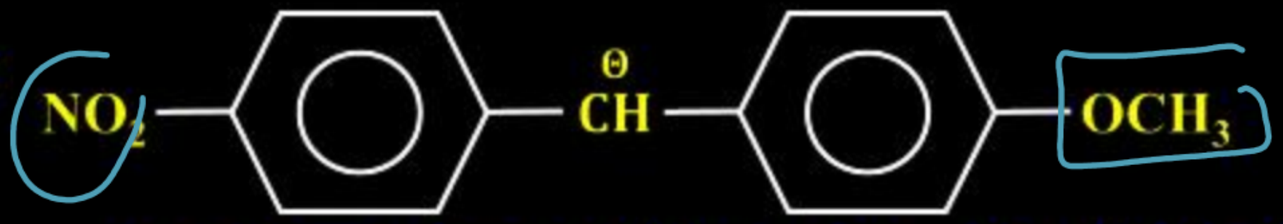
$$a_{cm} = \frac{2a - 1 \times a}{1 + 2} = \frac{a}{3} = \frac{10}{9}$$

$$V_{cm} = 0$$

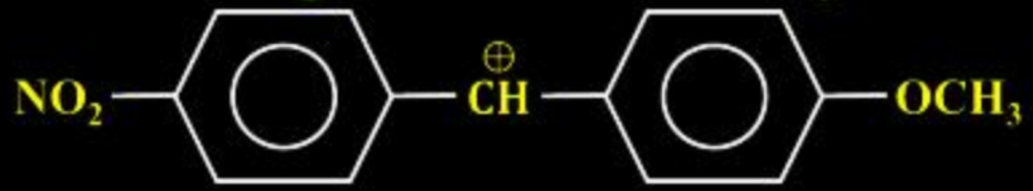
$$S = 0 + \frac{1}{2} \times \frac{10}{9} \times 2^2$$



CHEMISTRY

Q) Statement I : 

-ve charge is stabilized by –M effect of $-NO_2$ group

Statement II :  +ve charge is stabilized

by +M effect of $-OCH_3$ group

(A) Statement I is correct & Statement II is incorrect

(B) Statement I is incorrect & Statement II is correct

(C) Both Statements are correct

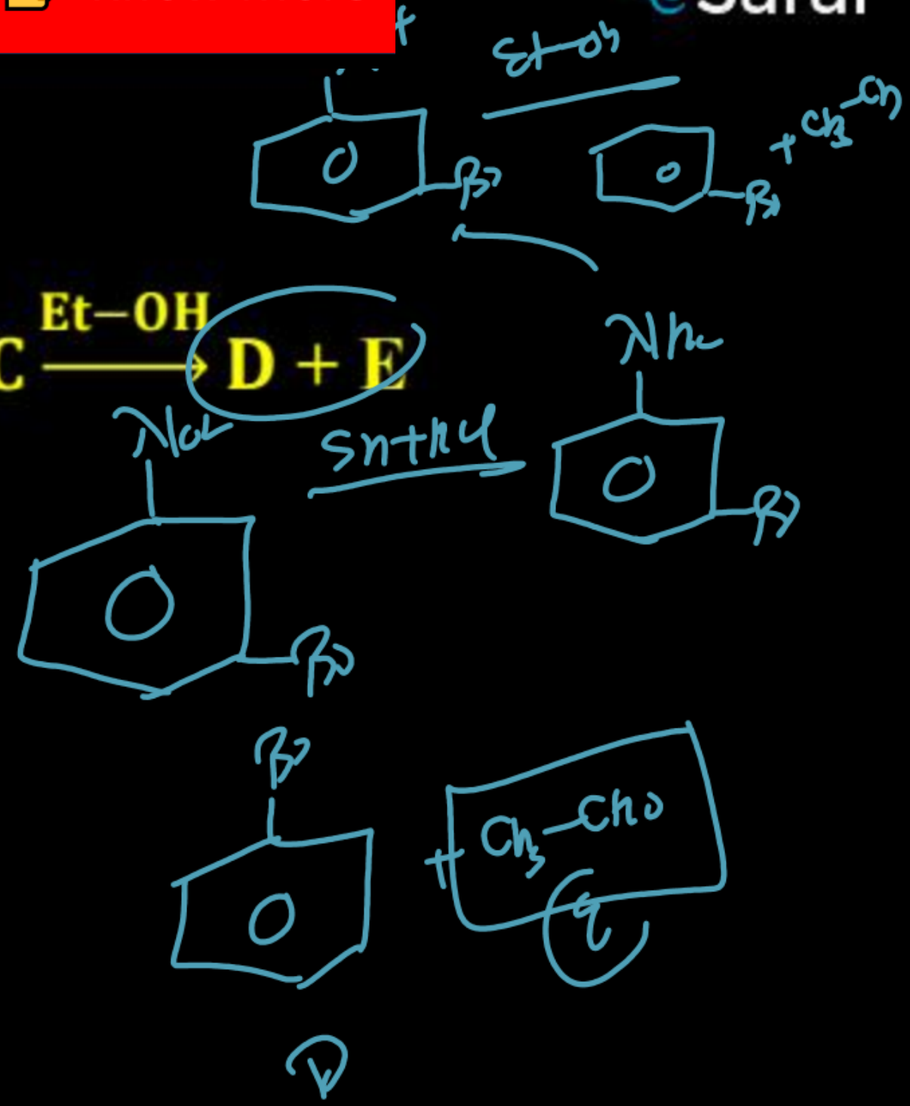
(D) Both Statements are incorrect

Ans. (C)

Q)

$$\xrightarrow[FeBr_3]{Br_2} A \xrightarrow{Sn/HCl} B \xrightarrow[0-5^{\circ}]{NaNO_2/HCl} C \xrightarrow{Et-OH} D + E$$

D is aromatic compound find out the A & E



Q) Consider the reaction given below :

Select the correct statements

(I) A & B can be differentiated Fehling's test.

(II) Molar weight of A & B are same

(III) A & B can be differentiated $NaHCO_3$.

(IV) A & B can be differentiated 2,4-DNP

(A) I & III (B) I & II (C) I , II & III (D) All of these

Q) Match list-I to list list-II

List-I	List-II
(P) Y	(A) Insulin
(Q) T	(B) Threonine
(R) Q	(C) Tyrosine
(S) P	(D) Glutamine
	(E) Proline

Q) Arrange following complexes in increasing order of Δ_o

(a) $[Co(H_2O)_6]^{2+}$ Co^{2+} WFL

(b) $[Co(H_2O)_6]^{3+}$ Co^{3+} WFL

(c) $[Co(en)_3]^{3+}$ Co^{3+} SFL

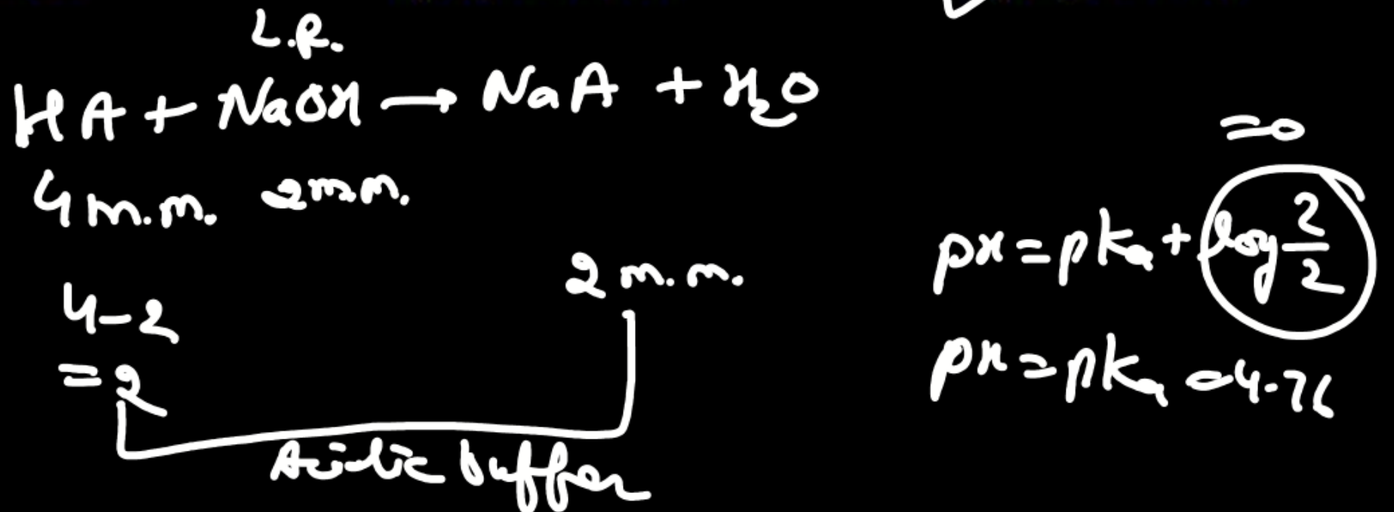
(A) c > b > a (B) b > a > c (C) c > a > b (D) a > b > c

$c > b > a$

Ans. (A)

Q) 20 mL of 0.2 M HA (weak monoprotic acid) is titrated with 10 mL of 0.2 M NaOH solution. pH of solution at 25°C is (pK_a of weak acid is 4.76)

(A) 5.24 (B) 9.76 (C) 4.76 (D) 9.24



Ans. (C)

Q) Molarity of H_2SO_4 solution is 4.9 M. If density of solution is 1.40 g/ml, then molality and mole fraction of solute in solution is

(A) $m = 5.34, \chi_{solute} = 0.072$

(B) $m = 5.21, \chi_{solute} = 0.072$

(C) $m = 5.34, \chi_{solute} = 0.088$

(D) $m = 5.21, x_{solute} = 0.088$

Ans. (C)

$n_{solute} = 4.9$

$V_{solution} = 1\,lt = 1000\,mL$

$W_{solution} = 1000 \times 1.40$

$= 1400\,gm$

$W_{solute} = 4.9 \times 98$

$= 480\,gm$

$W_{solvent} = 1400 - 480$

$= 920\,gm$

$m = \frac{4.9}{0.920} = 5.33$

$$\chi_{H_2SO_4} = \frac{4.9}{4.9 + \frac{920}{18}} = \frac{4.9}{4.9 + 51.1}$$

$$= 0.088$$

MATH

Q) The value of the sum $\sum_{n=1}^{8} \frac{1^3 + 2^3 + \cdots + \text{upto n terms}}{1 + 3 + 5 + \cdots}$ is:

$$\sum_{n=1}^{8} \frac{n^2(n+1)^2}{4 \cdot n^3}$$

$$= \frac{1}{4}\left(\frac{9 \cdot 10 \cdot 19}{6} - 1\right)$$

$$= 71$$

Ans. (71)

Q) f(x) is 5 degree polynomial has extremes at $x = \pm 1$ and $\lim_{x\to 0} \frac{f(x)}{x^3} = 5$, then $f(2) - f(-2)$ is:

Let $F(x) = a_0x^3 + a_1x^4 + a_2x^5$

$$\lim_{x\to 0} \frac{F(x)}{x^3} = a_0 = 5$$

$$F'(x) = 15x^2 + 4a_1x^3 + 5a_2x^4$$

$$F'(1) = F'(-1) = 0 \Rightarrow a_1 = 0,\ a_2 = -3$$

$$F(x) = 5x^3 - 3x^5$$

$f(2) = 8(5-12)$

$= -56$

$f(-2) = 56$

$f(2) - f(-2) = -112$

Ans. (112)

Q) If $^{30}C_{30-r} + 3 \cdot {}^{30}C_{31-r} + 3 \cdot {}^{30}C_{32-r} + {}^{30}C_{33-r} = {}^{n}C_{r}$ **then n = ?**

$n = 33$

$$^{n}C_{r} + {}^{n}C_{r-1} = {}^{n+1}C_{r}$$

$$^{30}C_{30-r} + {}^{30}C_{31-r} + 2\left({}^{30}C_{31-r} + {}^{30}C_{32-r}\right) + {}^{30}C_{32-r} + {}^{30}C_{33-r} = {}^{n}C_{r}$$

$$^{31}C_{31-r} + 2\,{}^{31}C_{32-r} + {}^{31}C_{33-r} = {}^{n}C_{r}$$

$$^{31}C_{31-r} + {}^{31}C_{32-r} + {}^{31}C_{32-r} + {}^{31}C_{33-r} = {}^{n}C_{r}$$

$$^{32}C_{32-r} + {}^{32}C_{33-r} = {}^{n}C_{r}$$

$$^{33}C_{33-r} = {}^{n}C_{r}$$

Ans. (33)

$1 - 2\sin^2 x \cos^2 x$

Q) $\int_0^{20\pi} (\cos^4 x + \sin^4 x)\, dx =$

$1 - \frac{1}{2}\sin^2 2x$

(A) 15π (B) 25π (C) $\frac{15\pi}{2}$ (D) $\frac{15\pi}{4}$

$T = \frac{\pi}{2}$

$I = \int_0^{\frac{\pi}{2}(40)} (\cos^4 x + \sin^4 x)\, dx.$

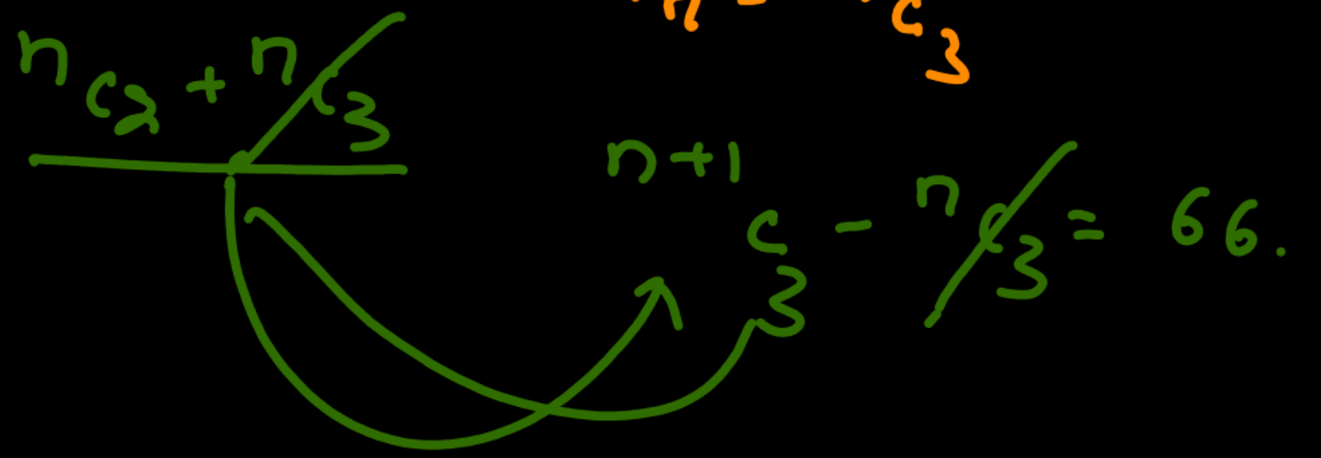
$I = 40 \int_0^{\frac{\pi}{2}} (\cos^4 x + \sin^4 x)\, dx.$

$I = 40\left[2\int_0^{\frac{\pi}{2}} \cos^4 x\, dx\right]$

$= 80\left[\frac{(4-1)(4-3)}{4(4-2)} \cdot \frac{\pi}{2}\right] = 15\pi$

Ans. (A)

Q) If P_n denotes the number of triangles formed by the vertices of n-sides polygon and $P_{n+1} - P_n = 66$, then n is



$${}^nC_2 = 66.$$

$$\frac{n(n-1)}{2} = 66.$$

$$n^2 - n - 132 = 0$$

$$(n-12)(n+11) = 0$$

$$\boxed{n = 12}$$

Ans. (12)

Q) On tossing a coin 10 points are obtained if head appears, 5 points are obtained if tail appears find the probability of obtaining 30 points.

(A) $\frac{43}{64}$ **(B) $\frac{44}{63}$** **(C) $\frac{41}{68}$** **(D) $\frac{40}{71}$**

$H \to 10, T \to 5$

$\{H, H, H\} = (\frac{1}{2})^3$

$\frac{43}{64}$

$\{H, H, T, T\} = (\frac{1}{2})^4 \frac{4!}{2!2!}$ - - - -

$\{H, T, T, T, T\} = (\frac{1}{2})^5 \frac{5!}{4!}$

$\{T, T, T, T, T, T\} = (\frac{1}{2})^6$

Ans. (A)

Q) If $A = \begin{pmatrix} 2 & -2 \\ 4 & -2 \end{pmatrix}$, $B = \begin{pmatrix} 3 & 3 \\ 1 & 9 \end{pmatrix}$ and $PA = B$ and $AQ = B$, then $2(P + Q)$ is:

(A) $\begin{pmatrix} 11 & 12 \\ 24 & 13 \end{pmatrix}$

(B) $\begin{pmatrix} -11 & 12 \\ 24 & 13 \end{pmatrix}$

(C) $\begin{pmatrix} -11 & 12 \\ -24 & 13 \end{pmatrix}$

(D) $\begin{pmatrix} 11 & 12 \\ -24 & 13 \end{pmatrix}$

$P = BA^T$, $Q = A^T B$

$Q = \frac{1}{2}\begin{bmatrix} -1 & 1 \\ -2 & 1 \end{bmatrix} \times \begin{bmatrix} 3 & 3 \\ 1 & 9 \end{bmatrix}$

$2Q = \begin{bmatrix} -2 & 6 \\ -5 & 3 \end{bmatrix}$, $2P = \begin{bmatrix} -9 & 6 \\ -19 & 10 \end{bmatrix}$

$\begin{bmatrix} 3 & 3 \\ 1 & 9 \end{bmatrix}\begin{bmatrix} -2 & 2 \\ -4 & 2 \end{bmatrix}$

4

$\frac{1}{2}\begin{bmatrix} 3 & 3 \\ 1 & 9 \end{bmatrix}\begin{bmatrix} -1 & 1 \\ -2 & 1 \end{bmatrix}$

$\frac{1}{2}\begin{bmatrix} -9 & 6 \\ -19 & 10 \end{bmatrix}$

Ans. (C)

Q) If $f(x) = \int \frac{16x+24}{x^2+2x-15} dx$, given that $f(4) = 14\ln 3$, then the value of $f(7)$ is:

(A) $32\ln 2 - 7\ln 3$
(B) $\ln 2 + 32\ln 3$
(C) $32\ln 2 + 7\ln 3$
(D) $32\ln 3 - 7\ln 2$

$\int \frac{ax+b}{px^2+qx+r} dx$

$8\int \frac{(2x+2)}{x^2+2x-15} dx + 8\int \frac{1}{(x+1)^2-(4)^2} dx$

$f(x) = 8\ln|x^2+2x-15| + 8 \times \frac{1}{2\times 4} \ln\left|\frac{(x+1)-4}{(x+1)+4}\right| + C$

$14\ln 3 = 8\ln(3^2) + \ln\left(\frac{1}{3^2}\right) + C$

$C = 0$

$f(7) = 8\ln(48) + \ln\left(\frac{1}{9}\right)$

$= 8\ln(2^4 \times 3) - \ln 3^2$

$= 32\ln 2 + 7\ln 3$

Ans. (C)

Q) Let $x_1, x_2, x_3, \ldots, x_n$ be ' n ' observations such that $\sum_{i=1}^{n-1} x_i = 48$ and $\sum_{i=1}^{n-1} x_i^2 = 496$. If mean and variance of the distribution are 8 and 16 respectively then value of n is :-

(A) 7 (B) 8 (C) 9 (D) 12

$$8 = \frac{48 + x_n}{n}$$

$$8n = 48 + x_n$$

$$16 = \frac{496 + x_n^2}{n} - 8^2$$

$$80n = 496 + (8n - 48)^2$$

$$80n = 496 + 64(n - 6)^2$$

$$10n = 62 + 8(n - 6)^2$$

$$5n = 31 + 4(n - 6)^2$$

Ans. (A)

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