JEE MAINS 2026

PAPER SOLUTION

04 APR, SHIFT 2

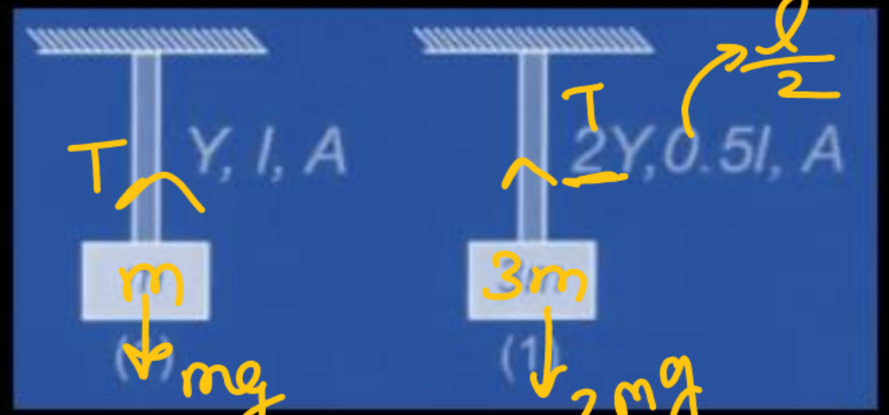
•LIVE

PHYSICS

Q) Two strings with length (l_1, l_2), Young's modulii (Y_1, Y_2) are elongated under two weights as shown. Find $\Delta l_1 / \Delta l_2$.

(A) 1/3 **(B) 2/3**

(C) 1/4 ~~**(D) 4/3**~~



$$\frac{F}{A} = Y\left(\frac{\Delta l}{l}\right)$$

$$\Delta l = \frac{F l}{Y A}$$

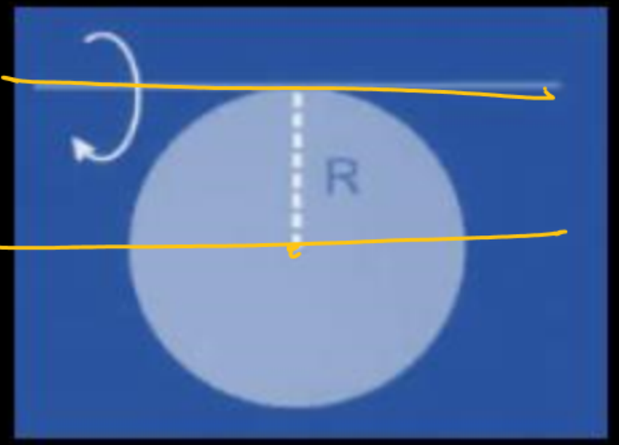
$$\Delta l_1 = \frac{mg\,l}{Y\,A}$$

$$\Delta l_2 = \frac{3mg \times \frac{l}{2}}{2Y \times A}$$

$$\frac{\Delta l_1}{\Delta l_2} = \frac{4}{3}$$

Ans. (D)

Q) Consider a ring of radius R, rotates about a horizontal axis as shown. Time period of small oscillation



(A) $2\pi\sqrt{\frac{5R}{g}}$

(B) $2\pi\sqrt{\frac{3R}{2g}}$

(C) $2\pi\sqrt{\frac{R}{g}}$

(D) $2\pi\sqrt{\frac{R}{2g}}$

$$I_s = \left(\frac{MR^2}{2} + MR^2\right)$$

$$l_{c.m} = R$$

$$T = 2\pi\sqrt{\frac{I_s}{mg\,l_{c.m}}}$$

Ans. (B)

Q) Two Cars A & B are moving on a road with speed 100 km/h and 80 km/h a stone is thrown from Car B with speed V km/h relative to it. Stone hit the Car A with speed 5 m/s w.r.t Car A. (ignore gravity.). The V is___.

(A) 18 (B) 20 (C) 38 (D) 48

$v + 80 - 100 = 18$

$v = 38$ km/h

Ans. (C)

Q) For a biconvex lens focal length is f and both radius of curvatures are R. Find value of f/R

(A) 1.25 **(B) 1.5**

(C) 2 **(D) 2.5**

$$\frac{1}{f} = (1.4-1)\left(\frac{2}{R}+\frac{1}{R}\right)$$

$$\frac{f}{R} = \frac{10}{8} = \frac{5}{4}$$

$$\frac{f}{R} = 0.8$$

Ans. (A)

Q) List-I presents some physical quantity and list-II presents the dimensions. Match the two list appropriately.

List-I	List-II
(A) f = work function	(1) $[ML^2 T^{-3} T^{-1}]$
(B) v_s = stopping potential	(2) $[M^0 L^0 T^{-1}]$
(C) h = Plank's constant	(3) $[ML^2 T^{-2}]$
(D) f = frequency	(4) $[ML^2 T^{-1}]$

(A) A → (3); B → (4); C →(2); D → (1)

(B) A →(2); B → (3); C →(4); D → (1)

(C) A → (3); B → (1); C → (4); D→ (2)

(D) A →(4); B →(3); C →(1); D → (2)

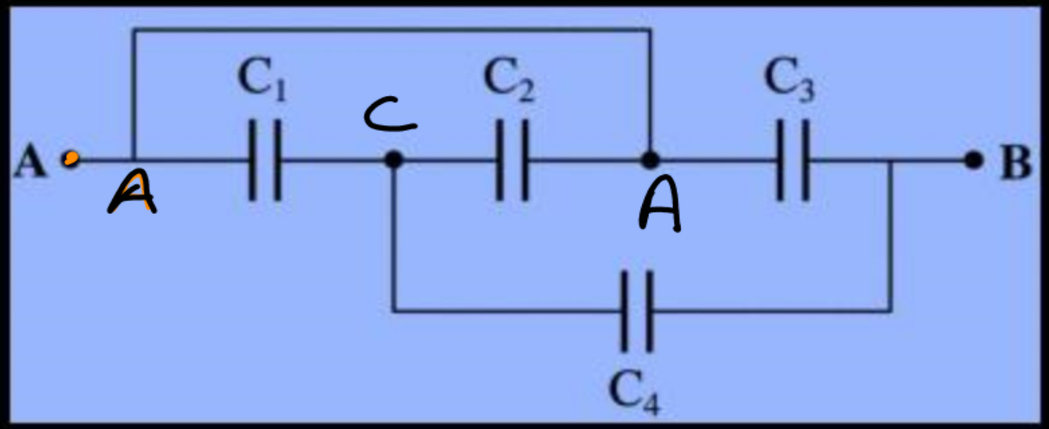
$\frac{W}{q}$

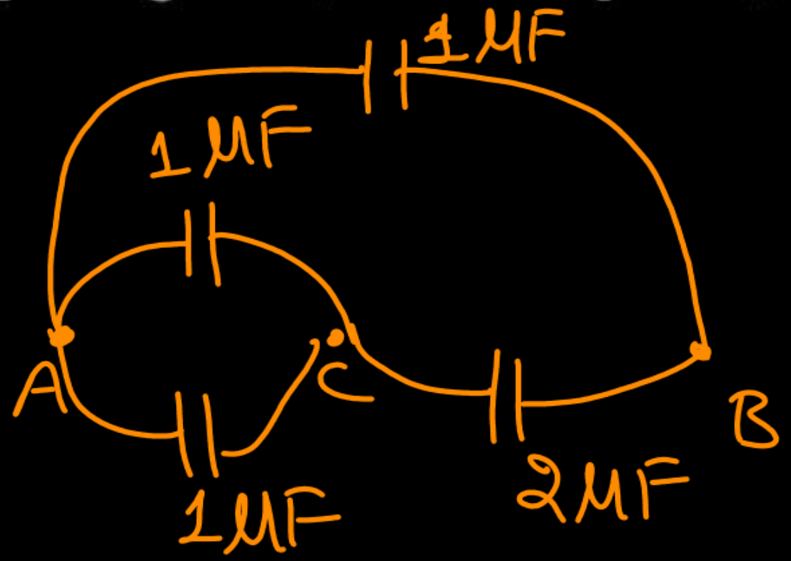
$V_s e = \phi_0$

$V_s e = \phi_0$

Ans. (C)

Q) For the circuit given below equivalent capacitance between A and B is
$(C_1 = C_2 = C_3 = 1\mu F$ and $C_4 = 2\mu F)$

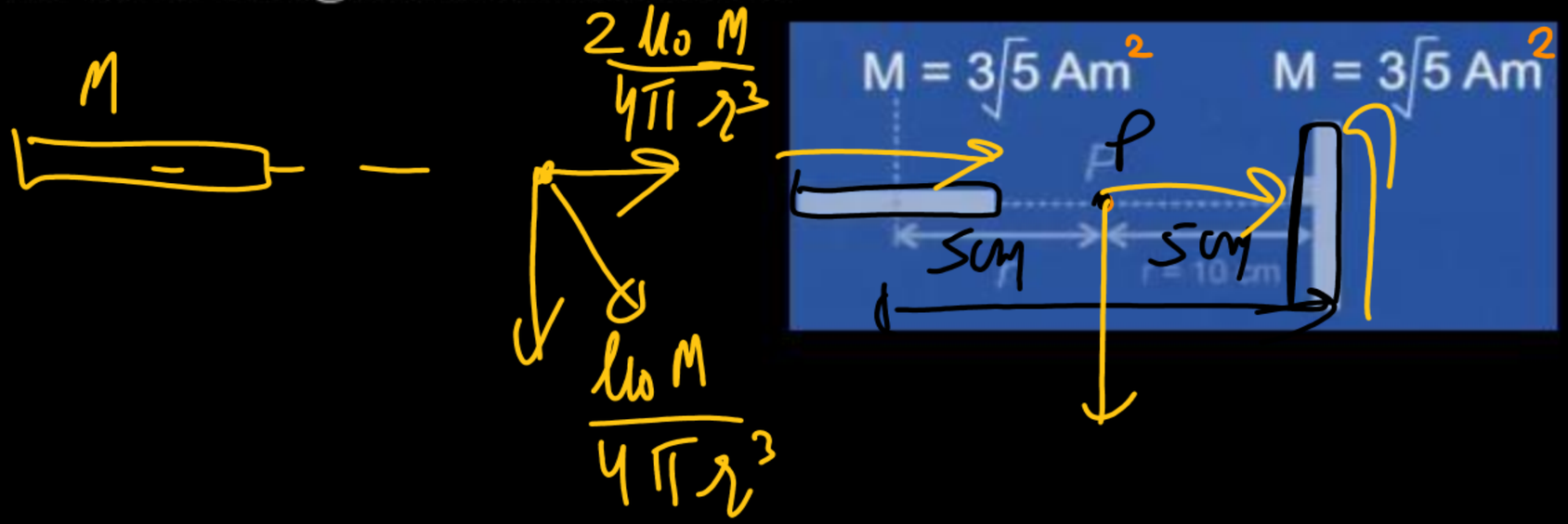




2MF

Q) Point P at r = 10 cm distance from centers of two bar to magnet each of magnetic moment $3\sqrt{5}$ Am. Magnetic field at P is

(A) 3.5 mT
(B) 2 mT
(C) 2.5 mT
(D) 1.5 mT



Ans. (D)

Q) Two scenarios of a dipole present in two electric field

(i) $\vec{E}_1 = E_0\hat{x}$

(ii) $\vec{E}_2 = E_0\hat{x} + 2E_0\hat{y} + 2E_0\hat{z}$. The dipole is stable equilibrium in separation instants. % increased in frequency of oscillation in case-II as compare to case-I

ω_1 ω_2

$\left(\frac{\omega_2 - \omega_1}{\omega_1}\right) \times 100$

$PE\theta = I\alpha$

$\alpha = \frac{PE}{I}\theta$

$\omega = \sqrt{\frac{PE}{I}}$

$\omega \propto \sqrt{E}$

$\frac{\sqrt{E'} - \sqrt{E}}{\sqrt{E}} \times 100$

Q) Electron and proton are accelerated by same potential difference and determine ratio of de Broglie wave length of electron and proton.

$$K.E. = eV$$

$$\frac{1}{2}mv^2 = eV$$

$$\frac{p^2}{2m} = eV$$

$$p = \sqrt{2meV}$$

$$\lambda = \frac{h}{p}$$

$$\lambda \propto \frac{1}{p}$$

$$\lambda \propto \frac{1}{\sqrt{m}}$$

Q) Assertion : H_2 and O_2 gas at same temperature have same mean KE

Reason : V_{rms} of H_2 and O_2 gas is same at same temperature

(A) Both Assertion (A) and Reason (R) are true, and R is the correct explanation of A.

(B) Both Assertion (A) and Reason (R) are true, but R is not the correct explanation of A.

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

$K.E = \frac{f}{2}RT$ | $V_{rms} = \sqrt{\frac{3RT}{M}}$

Ans. (C)

CHEMISTRY

Q) Which of the following is most acidic

(A) 

+M SH.

(B) 

-M

(C) 

(D) 

B > C > D > A

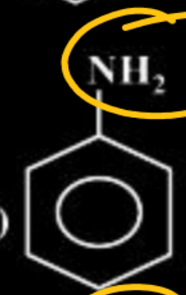
Ans. (B)

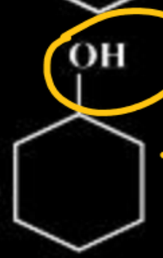
Q) Match list-I to list-II

List-I

(A) 

(B) 

(C) 

(D) 

List-II

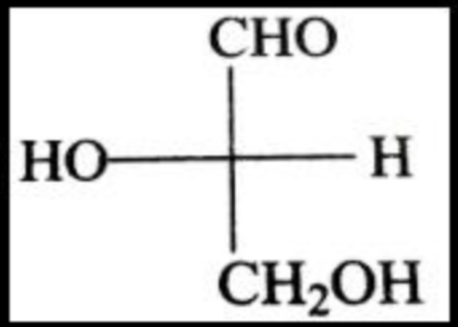
(P) Phthalein test

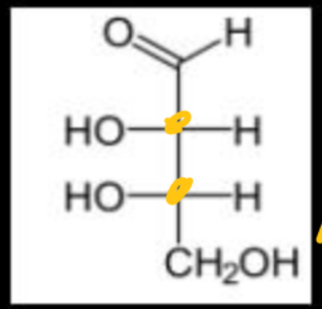
(Q) Hinsberg test

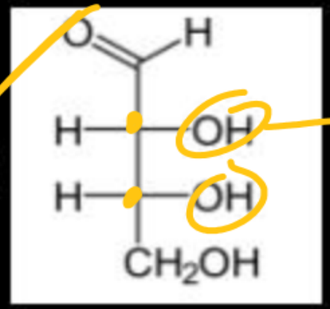
(R) Lucas test

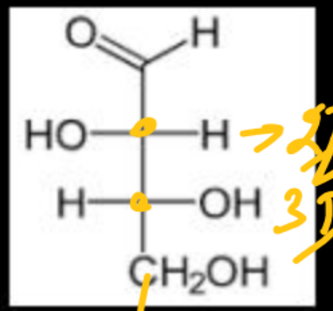
(S) Tollen's test

Q) D-Aldotetrose is

(A) 

(B) 

(C) 

(D) 

Ans. (C)

Q) Match list-I to list-II

List-I	List-II
(A) Fredal-craft reaction	(P) N.S.R
(B) Bromination of alkene	(Q) E.S.R
(C) Chlorination of alkane	(R) F.R.S.R
(D) Reaction with Lucas reagent	(S) E.A.R

Q) Manganese forms oxide and fluoride with highest oxidation state. The difference in the highest oxidation state of Mn in the oxide and fluoride is

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

+4

MnF_4

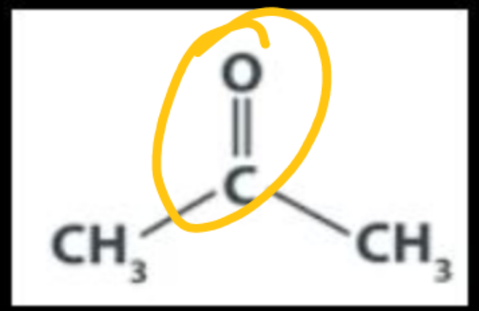
+7

Mn_2O_7

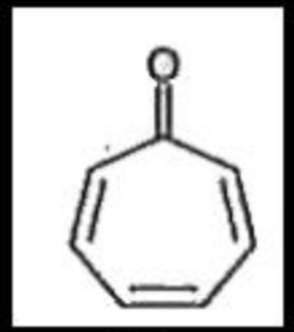
3

Ans. (C)

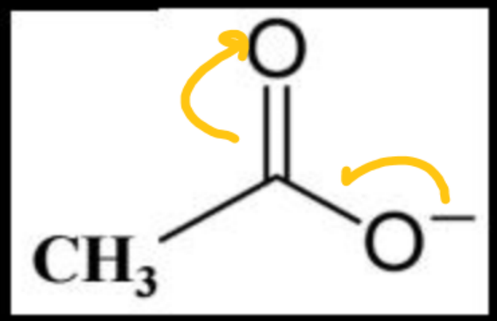
Q)



(a)



(b)



(c)

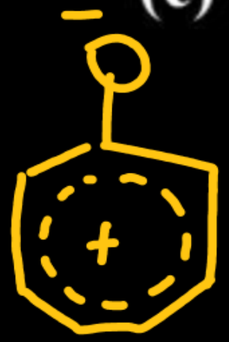
Compare C = O Bond length

(A) a > c > b

(B) a > b > c

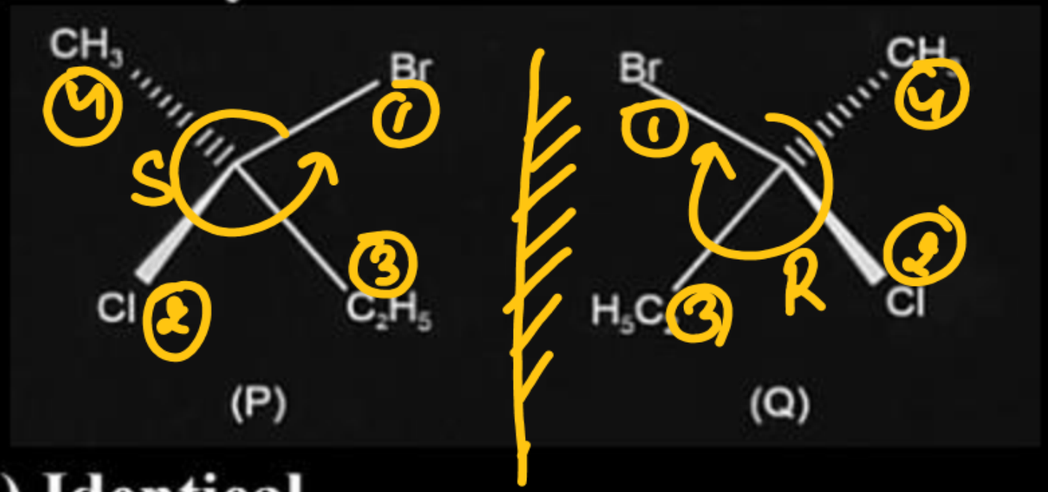
(C) b > c > a

(D) c > a > b



Ans. (C)

Q) Identify the relation between the following structures (P) and (Q)

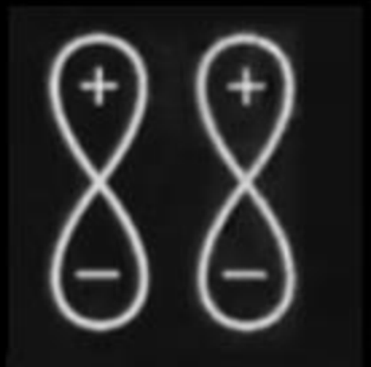


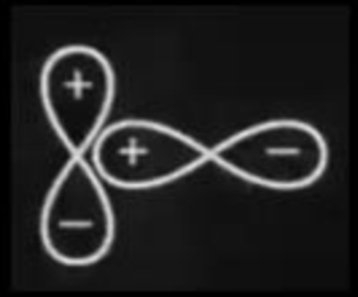
(A) Identical
(B) Diastereomers
(C) Enantiomers
(D) None of these

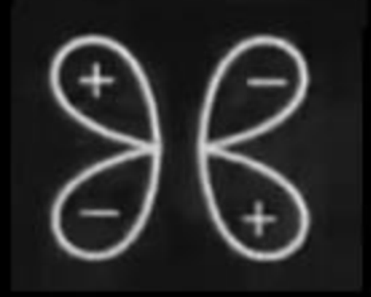
Ans. (C)

Q) Two atom are bonding along Z-axis. How will π^* orbital look like :
(Z is inter nuclear axis)

(A) 

(B) 

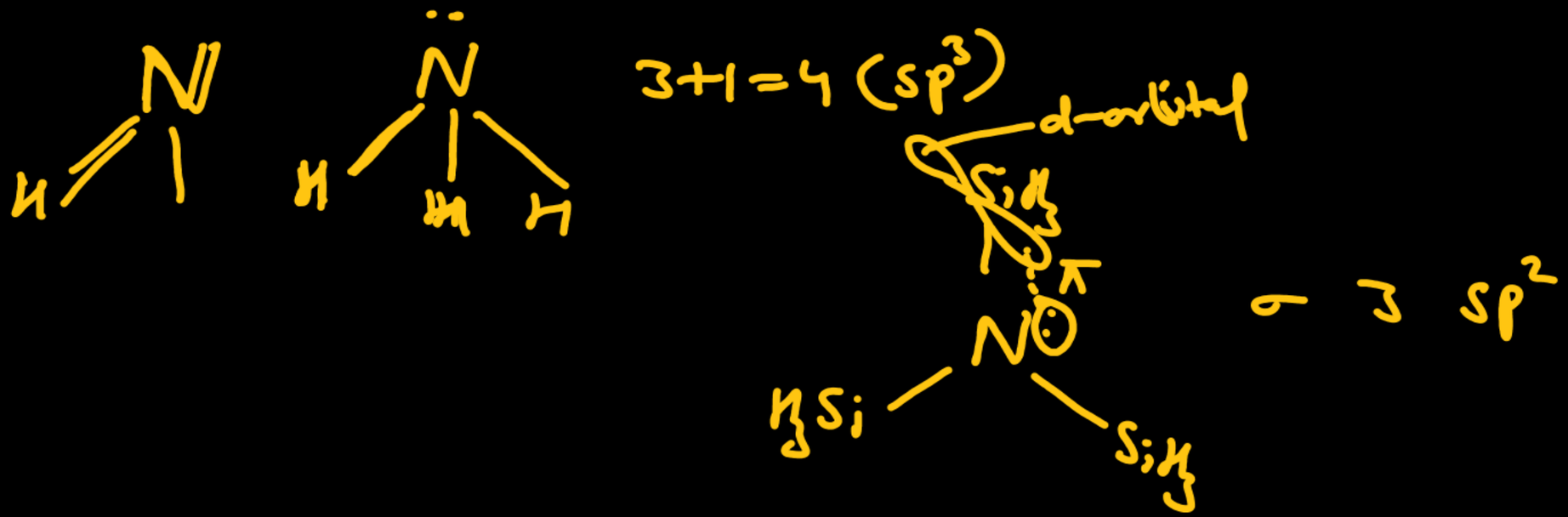
(C) 

✓(D) 

Ans. (D)

Q) Hybridisation of N atom in NH_3 and $N(SiH_3)_3$ are respectively

(A) sp^3,sp^3 (B) sp^2,sp^2 (C) sp^3,sp^2 (D) sp^2,sp^3



Ans. (C)

MATH

Q) If the system of equations

$x + y + z = 5$ — (1)

$x + 2y + 3z = 9$ — (2)

$x + y + \lambda z = \mu$ has infinite number of solutions. Then, the value of $\lambda + \mu$ is: — (3)

(A) 23 (B) 18 (C) 21 (D) 22

2(2) − (1)

$x + 3y + 5z = 13$ ✓

$\Delta = 0$

$$\begin{vmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 1 & \lambda \end{vmatrix} = 0$$

$\lambda = 5$

$\Delta_3 = 0$

$$\begin{vmatrix} 1 & 1 & 5 \\ 1 & 2 & 9 \\ 1 & 1 & \mu \end{vmatrix} = 0$$

$\mu = 13$

$\lambda + \mu = 18$

Ans. (B)

Q) The number of non-negative integer solution of the equation $a^3 + b + 2c = 22$, is:

(A) 144 (B) 124 (C) 135 (D) 136

$a+b+2c = 22$.

$c = 0$; $a+b = 22$. (23)

$c = 1$; $a+b = 20$ (21)

$c = 11$; $a+b = 0$ (1)

$1+3+5+\cdots+23$

$= \frac{12}{2}(1+23)$

$= 12 \cdot 12$

$= 144$

Ans. (A)

Q) Evaluate $(0.2)^{\log_{\sqrt{5}}^{\alpha}} + (0.04)^{\log_{5}^{\beta}}$

if $\alpha = \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \cdots = \frac{1/4}{1-1/2} = 1/2$

$\beta = \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \cdots = \frac{1/3}{1-1/3} = 1/2$

(A) 5
(B) 6
(C) 8
(D) 3

Ans. (C)

$(0.2)^{\log_{\sqrt{5}}(1/2)} + (0.04)^{\log_{5}(1/2)}$

$(\frac{1}{2})^{\log_{\sqrt{5}}(\frac{1}{5})} + (\frac{1}{2})^{\log_{5}(\frac{1}{25})}$

$(\frac{1}{2})^{-2} + (\frac{1}{2})^{-2} = 8$

Q) In expansion of $\left(9x - \frac{1}{3\sqrt{x}}\right)^{18}$, if the coefficient of term independent of x is 221k, then the value of k is:

(A) 82 (B) 84 (C) 83 (D) 86

$${}^{18}C_r (9x)^{18-r} \left(-\frac{1}{3\sqrt{x}}\right)^r$$

$${}^{18}C_r (9)^{18-r} \left(-\frac{1}{3}\right)^r (x)^{18-r-\frac{r}{2}} = 0 \Rightarrow r = 12$$

$${}^{18}C_{12} (9)^6 \left(-\frac{1}{3}\right)^6 = 221k \Rightarrow k = 84$$

Ans. (B)

Q) Let $S = \{z \in C : z^2 + 4z + 16 = 0\}$. Then $\sum_{z \in S} |z + \sqrt{3}i|^2$ is equal to:

(A) 23
(B) 27
(C) 38
(D) 42

$z^2+4z+4 = -12$

$(z+2)^2 = -12$

$z+2 = \pm 2\sqrt{3}\,i$

$z = -2+2\sqrt{3}\,i \;,\; -2-2\sqrt{3}\,i$

$Sum = |-2+3\sqrt{3}i|^2 + |-2-\sqrt{3}i|^2$

$= (4+27)+(4+3)$

$= 31+7 = 38$

Ans. (C)

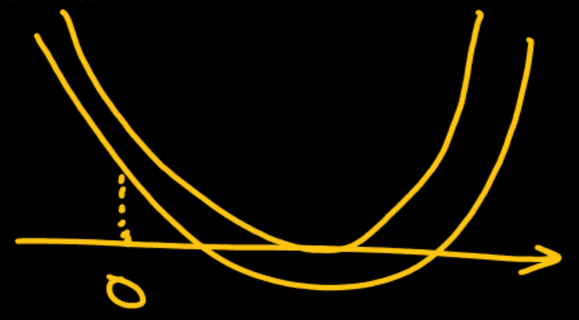
$\lambda \in \left[-\frac{32}{7}, -2\right)$ $\lambda = -4, -3$

Q) If the quadratic ~~expression~~ $(\lambda+2)x^2 - 3\lambda x + 4\lambda = 0, \lambda \neq -2$ has two positive roots then the number of possible integral values of λ is

(A) 1 (B) 2 ✓
(C) 3 (D) 4

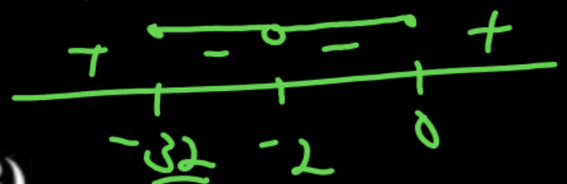
$x^2 - \frac{3\lambda}{\lambda+2}x + \frac{4\lambda}{\lambda+2} = 0$

$f(x) = x^2 - \frac{3\lambda}{\lambda+2}x + \frac{4\lambda}{\lambda+2}$



$\frac{-7\lambda^2 - 32\lambda}{(\lambda+2)^2} \geq 0$

$\frac{\lambda(7\lambda+32)}{(\lambda+2)^2} \leq 0$



$\lambda \in \left[-\frac{32}{7}, 0\right] - \{-2\}$

$f(0) > 0$ and $D \geq 0$ and $\frac{3\lambda}{(\lambda+2).2} > 0$

$\frac{4\lambda}{\lambda+2} > 0$ and $\frac{9\lambda^2}{(\lambda+2)^2} - \frac{16\lambda}{\lambda+2} \geq 0$ and $\lambda < -2 \cup \lambda > 0$

$\lambda < -2 \cup \lambda > 0$

$\frac{9\lambda^2 - 16\lambda(\lambda+2)}{(\lambda+2)^2} \geq 0$

Ans. (B)

Q) $\int_0^1 \cot^{-1}\left(1+x+x^2\right)$ is equal to

(A) $2\tan^{-1}2-\frac{1}{2}\log_e\left(\frac{5}{4}\right)-\frac{\pi}{2}$

(B) $2\tan^{-1}2-\frac{1}{2}\log_e\left(\frac{5}{4}\right)+\frac{\pi}{2}$

(C) $2\tan^{-1}2+\frac{1}{2}\log_e\left(\frac{5}{4}\right)-\frac{\pi}{2}$

(D) $2\tan^{-1}2-\frac{1}{2}\log_e\left(\frac{5}{4}\right)+\frac{\pi}{2}$

Ans. (A)

$$I = \int_0^1 \tan^{-1}\left(\frac{(x+1)-x}{1+(x+1)x}\right)dx$$

$$= \int_0^1 \left(\tan^{-1}(x+1)-\tan^{-1}(x)\right)dx$$

$$I = \int_0^1 \tan^{-1}(x+1)\,dx - \int_0^1 \tan^{-1}x\,dx$$

$$I = I_1 - I_2 \quad \text{——} \quad (1)$$

$$I = 2\tan^{-1}2 - \frac{1}{2}\ln 5 - \tan^{-1}1 + \frac{1}{2}\ln 2 - \tan^{-1}1 + \frac{1}{2}\ln 2.$$

$$\therefore I_2 = \tan^{-1}1 - \frac{1}{2}\ln 2$$

$$I = 2\tan^{-1}2 - \frac{\pi}{2} - \frac{1}{2}(\ln 5 - \ln 4)$$

$$= 2\tan^{-1}2 - \frac{\pi}{2} - \frac{1}{2}\ln(5/4)$$

$$I_1 = 2\tan^{-1}2 - \frac{1}{2}\ln(5) - \int \tan^{-1}x\,dx$$

$$\{\tan^{-1}1 - \frac{1}{2}\ln 2\} = \left(x\tan^{-1}x - \frac{1}{2}\ln(1+x^2)\right)_0^1.$$

$\Sigma x_i = 10$

$\Sigma x_i^2 = 100$

Q) Let $x_1, x_2, x_3, \ldots, x_{10}$ be 10 observations such that $\sum_{i=1}^{10}(x_i - 1)^2 = 90$ and $\sum_{i=1}^{10}(x_i + 2)^2 = 180$. Then, the standard deviation of $x_1, x_2, x_3, \ldots, x_{10}$ is

(A) $2\sqrt{2}$ (B) 3 (C) 9 (D) 10

$\because \sigma^2 = \frac{\Sigma x_i^2}{10} - \left(\frac{\Sigma x_i}{10}\right)^2$

$= 10 - 1$

$= 9$

$\sum_{i=1}^{10}(x_i - 1)^2 = 90$

$\sum_{i=1}^{10}(x_i + 2)^2 = 180$

$\sum_{i=1}^{10}(x_i)^2 - 2\sum_{i=1}^{10}x_i = 80 \quad -①$

$\sum_{i=1}^{10}x_i^2 + 4\sum_{i=1}^{10}x_i = 140 \quad -②$

② - ①

$6\sum_{i=1}^{10}x_i = 60$

Ans. (B)

$-\sqrt{3}i$

Q) If $\sqrt{3}i$, 1 are the roots of $x^3 + ax^2 + bx + c = 0$ $a, b, c \in R$.

Then $\int_{-1}^{1} (x^3 + ax^2 + bx + c)\,dx$ is:

(A) $\frac{20}{3}$ **(B) $-\frac{20}{3}$** **(C) $\frac{10}{3}$** **(D) $-\frac{10}{3}$**

$a = -$ Sum $= -1$

$b = +$ Sum of Products $2 = 3$

$c = -$ Product $= -3$

$$\int_{-1}^{1} (x^3 - x^2 + 3x - 3)\,dx$$

$$2\left[-\frac{x^3}{3} - 3x\right]_0^1$$

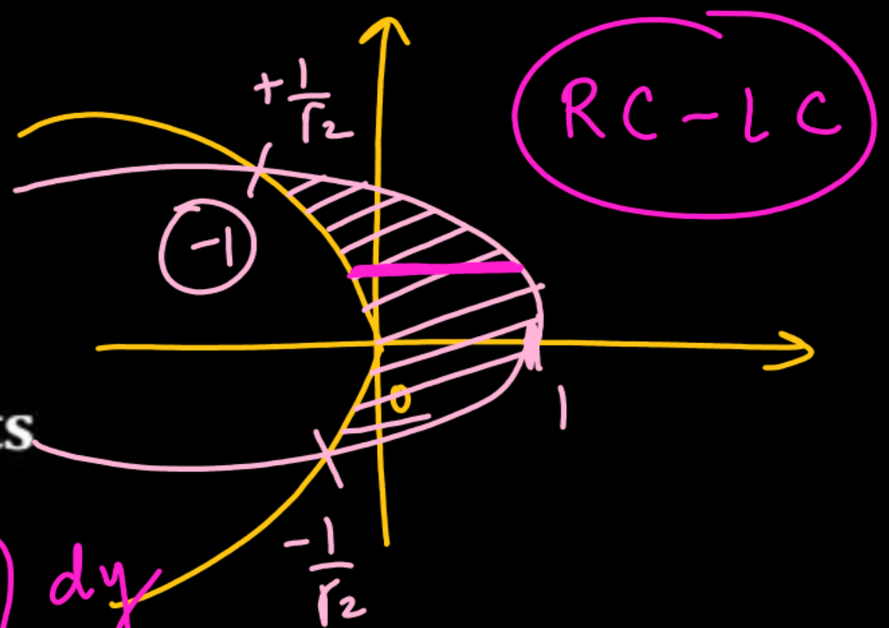
Ans. (B)

Q) Area bounded by $x = -2y^2$ and $x = 1 - 4y^2$ is:

$y^2 = -4ax$

(A) $\frac{\sqrt{2}}{3}$ **sq. units** **(B)** $\frac{2}{3}$ **sq. units**

(C) $\frac{2\sqrt{2}}{3}$ **sq. units** **(D)** $\frac{3\sqrt{3}}{2}$ **sq. units**



$1 = 2y^2$

$y = \pm \frac{1}{\sqrt{2}}$

$$A = \int_{-1/\sqrt{2}}^{1/\sqrt{2}} (1 - 4y^2) - (-2y^2)\, dy$$

$$2\int_{0}^{1/\sqrt{2}} (1 - 2y^2)\, dy$$

Ans. (C)

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- 5 Layered Offline Mentorship
- Highest Selection Ratio
- Covers All Backlogs
- Best JEE Modules

OFFLINE