JEE MAINS 2026

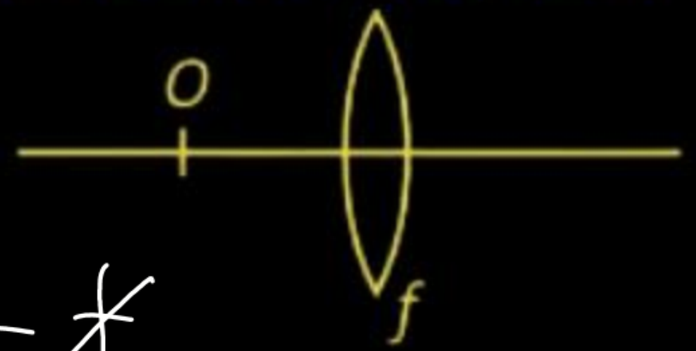
PAPER SOLUTION

23 JAN, SHIFT 2

Physics

Q) When an object is kept at distance 8 cm and 24 cm from a convex lens magnitude of magnification is same in both cases. Find focal length of the lens.

(A) 8 cm **(B) 16 cm**
(C) 32 cm **(D) 64 cm**



$$m = \frac{f}{f+4}$$

$$\frac{f}{f-8} = \frac{-f}{f-24}$$

$$f - 8 = 24 - f$$

$$f = \frac{32}{2} = 16\text{cm}$$

Ans. (B)

Q) A point charge 7 μC is placed at (−9, 0, 0) another point charge −2 μC is placed at (9, 0, 0). Find potential energy of system.

$$PE = \frac{9\times10^{9}\times7\times10^{-6}\times(-2\times10^{-6})}{18}$$

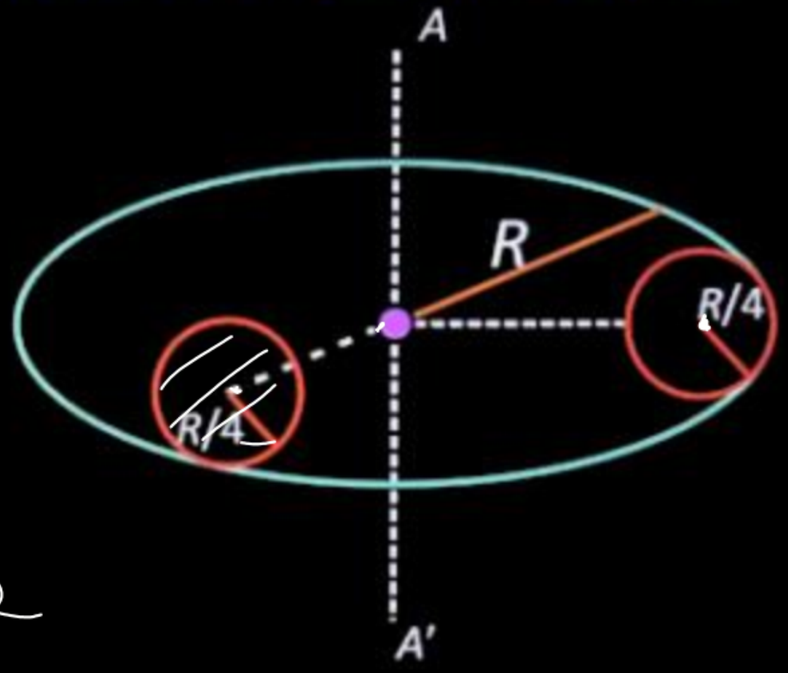
$$= -7\times10^{-3}\ J$$

Ans. (14 mJ)

Q) From a uniform disc of radius R and mass M two small discs of radius R/4 is being cut as shown in figure. Find the moment of inertia of the system about axis AA′.

(A) $\frac{79}{128}MR^2$ **(B)** $\frac{79}{256}MR^2$

(C) $\frac{109}{256}MR^2$ **(D)** $\frac{109}{128}MR^2$



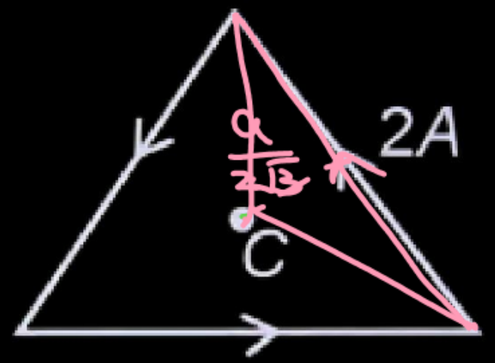
$$I = \frac{MR^2}{2} - \left[\frac{M/16\,(R/4)^2}{2} + \frac{M}{16}\left(\frac{3R}{4}\right)^2\right] \times 2$$

Ans. (C)

Q) In equilateral triangular frame, the is current of 2A. The side of frame is $4\sqrt{3}$ cm. Magnetic field at center C is

(A) $10\sqrt{10}\mu T$ (B) $3\sqrt{10}\ \mu T$

(C) $20\sqrt{3}\mu T$ (D) $30\sqrt{3}\mu T$



$$B_{net} = 3 \times \frac{\mu_0 i}{4\pi\left(\frac{a}{2\sqrt{3}}\right)}\left(2\times\frac{\sqrt{3}}{2}\right)$$

Ans. (D)

Q) A parallel plate capacitor with plate separation 5 mm is Charged by a battery. On introducing a mica sheet of 2 mm and maintaining the connections of the plates with the terminals of the battery, it is found that it draws 25% more charge from the battery. The dielectric constant of mica is ___.

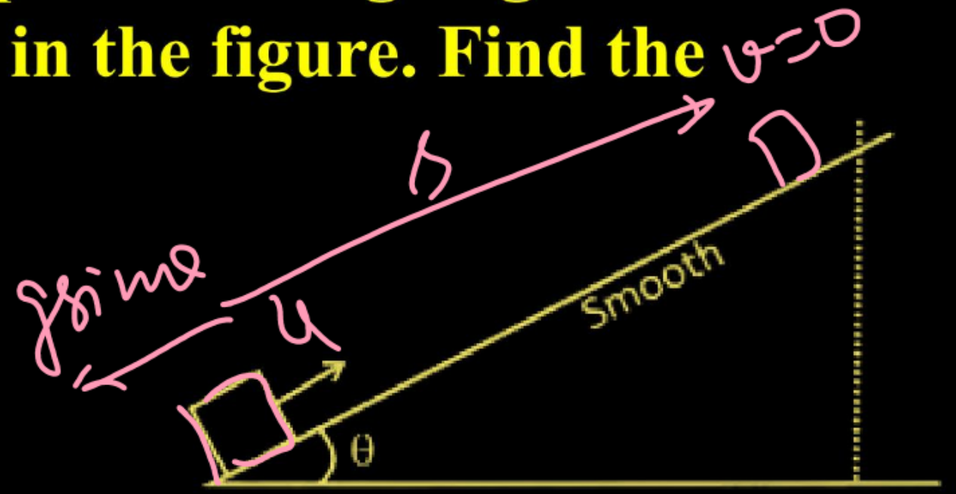
(A) 1.0 (B) 2.0 (C) 1.5 (D) 2.5

$$1.25\left(\frac{A\varepsilon_0}{5mm}\right)=\left(\frac{A\varepsilon_0}{5mm-2mm+\frac{2mm}{K}}\right) \quad Q=CV$$

$$\Rightarrow \frac{1.25}{5}=\frac{1}{3+\frac{2}{K}}$$

Ans. (B)

Q) A body is projected up the smooth incline plane having angle of inclination θ with the horizontal as shown in the figure. Find the distance covered before stopping.



(A) $\frac{u^2}{2g\sin\theta}$ (B) $\frac{u^2}{2g\tan\theta}$

(C) $\frac{u^2}{2g}$ (D) $\frac{u^2}{2g\cos\theta}$

$0 = u^2 + 2(-g\sin\theta)S$

$S = \frac{u^2}{2g\sin\theta}$

Ans. (A)

Chemistry

Q) DNA & RNA both are optically active due to

(A) Presence of D-sugar

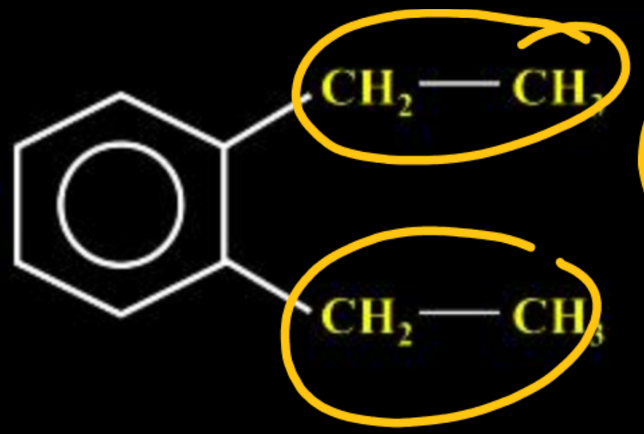
(B) presence of L-sugar

(C) presence of same unit

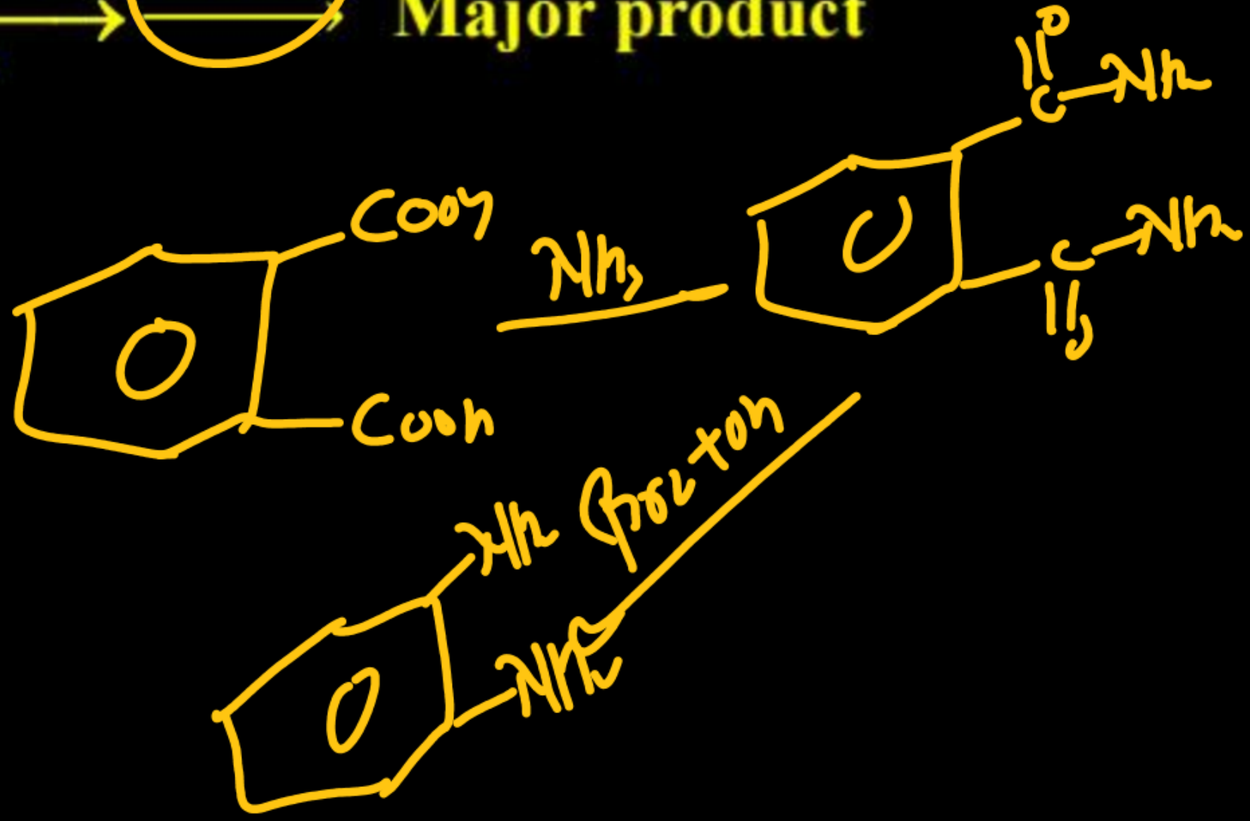
(D) presence of diphosphate ester

Ans. (A)

Q)



$\xrightarrow[\text{heat}]{KMnO_4 \quad NH_3 \text{ excess} \quad Br_2KOH}$ Major product

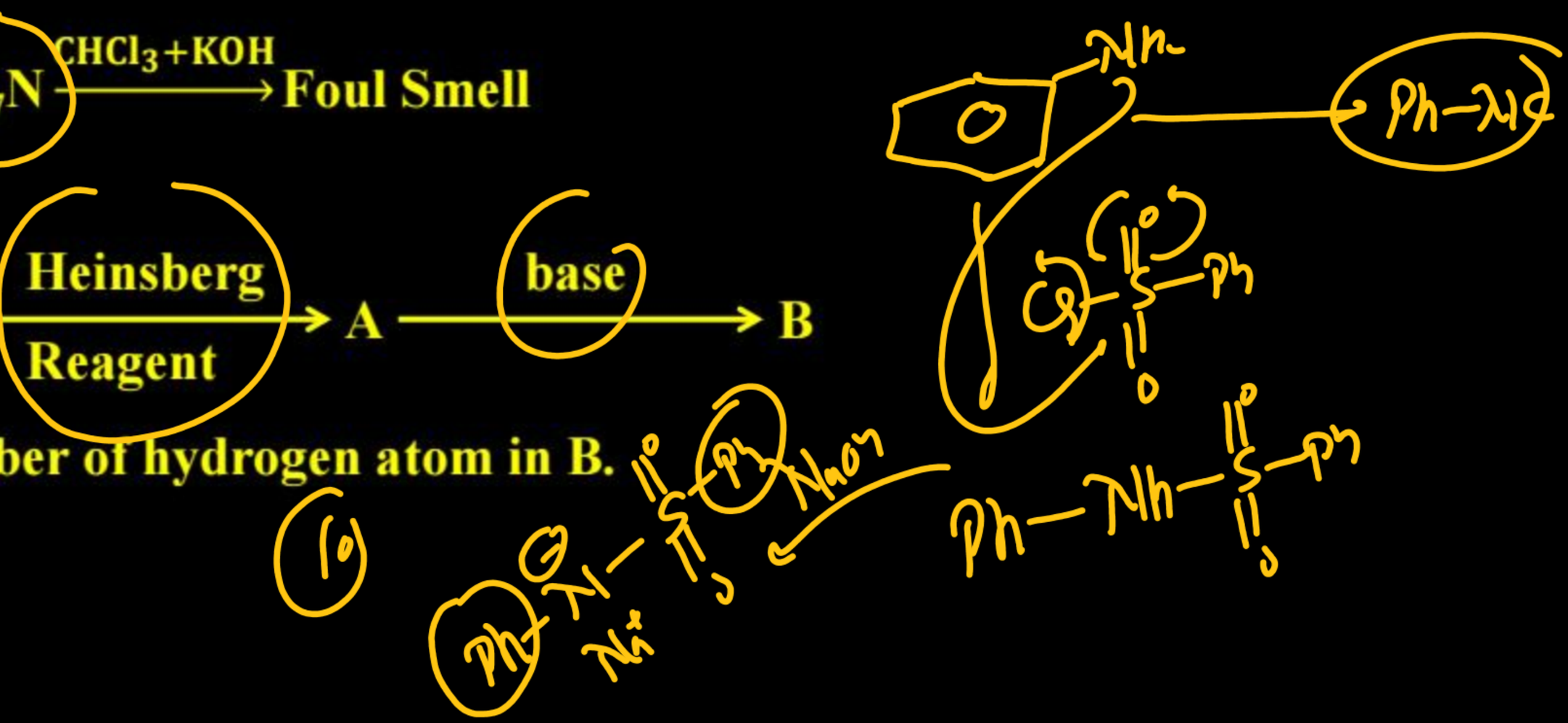


Q) $C_6H_7N \xrightarrow{CHCl_3+KOH}$ Foul Smell

$C_6H_7N \xrightarrow[\text{Reagent}]{\text{Heinsberg}} A \xrightarrow{\text{base}} B$

Number of hydrogen atom in B.

(10)



Q) In Carius method for estimation of halogens, 180 mg of an organic compound produced 143.5 mg of AgCl . The percentage composition of chlorine in the compound is _____ %.
[Given : molar mass in g mol^{-1} of Ag: 108, Cl = 35.5]

$\%Cl = \frac{35.5}{143.5} \times \frac{143.5}{180} \times 100$

$= 24.7\%$

Ans. (24.7)

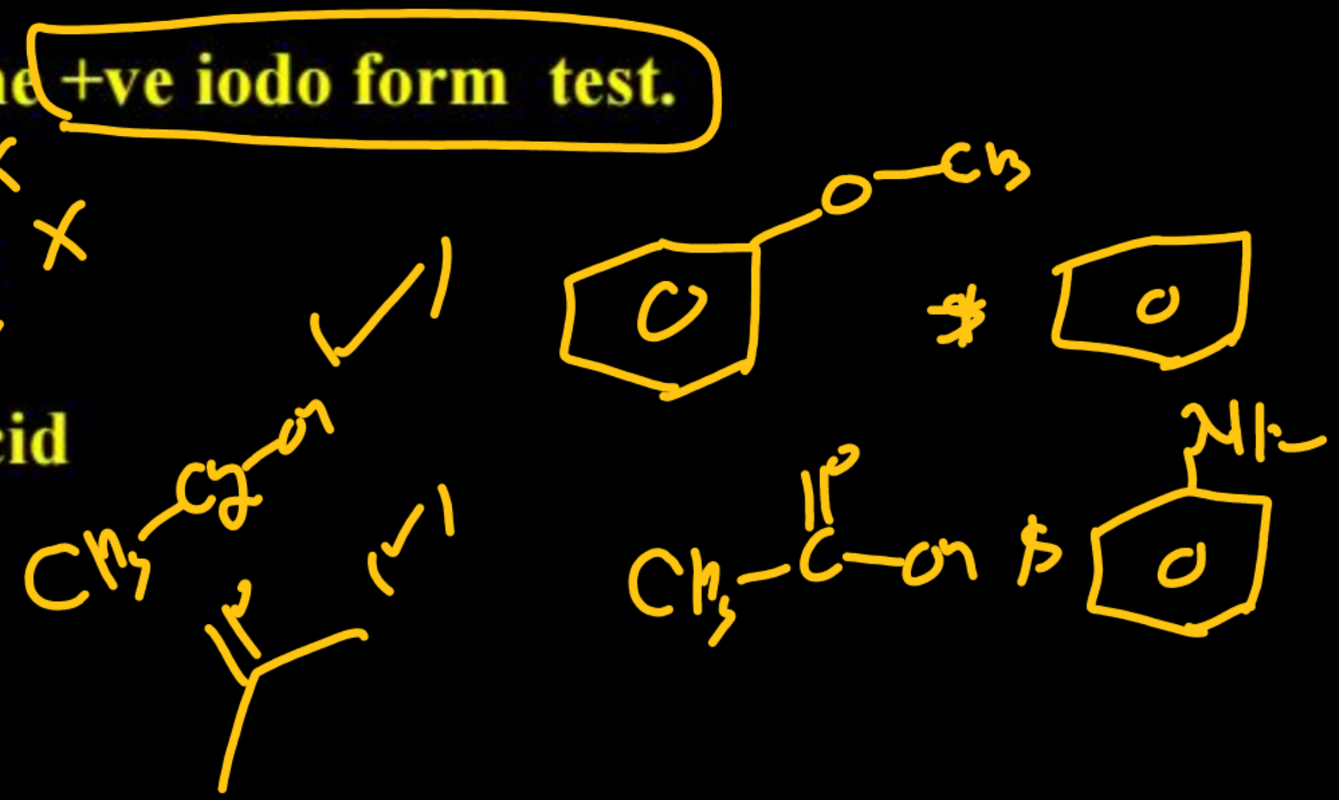
Q) In given Pair which give the +ve iodo form test.

(A) Anisole and benzene ×

(B) Acetic acid and aniline ×

(c) ethanol and acetone ✓

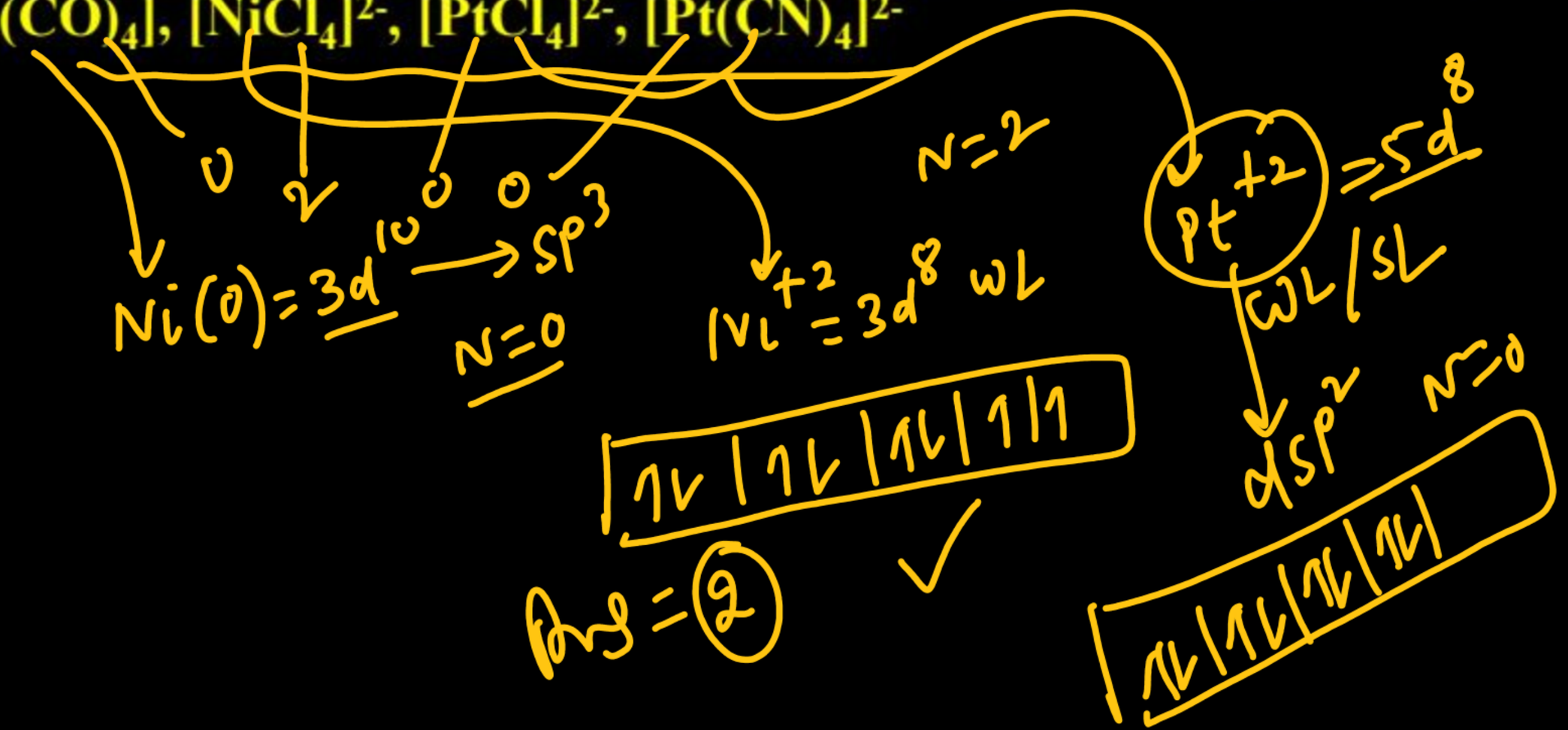
(d) acetone and benzoic acid ~~×~~



Ans. ()

Q) How many of the following complex(es) have unpaired electrons

$[Ni(CO)_4]$, $[NiCl_4]^{2-}$, $[PtCl_4]^{2-}$, $[Pt(CN)_4]^{2-}$



Q) Statement I – $(CH_3)_3\,C^+$ & CH_3^+ in more stable due to more α-H in t Butyl C+ ✓ T

Statement II – $(CH_3)_3\,C^+$ > CH_3^+ is more stable (less) F

(A) Both Statement-I and Statement -II are correct

(B) Both Statement-I and Statement-II are incorrect

(C) Statement-I is correct and Statement-II are incorrect

(D) Statement-I is incorrect and Statement-II are correct

Q) Statement I : Size of O^{2-} is smaller than F^-.
Statement II : Electronegativity of F is more than that of oxygen.
In the light of above statements, choose the correct option.
(A) Both Statement I and Statement II are correct
(B) Both Statement I and Statement II are incorrect
(C) Statement I is correct but Statement II is incorrect
(D) Statement I is incorrect but Statement II is correct

Ans. (D)

Q) For XeO_2F_2, select the correct statement(s).

(I) It shows see-saw shape.

(II) Number of lone pair(s) of e^- on Xe is 1 .

(III) $\angle FXeF = 180^\circ$ (approx.)

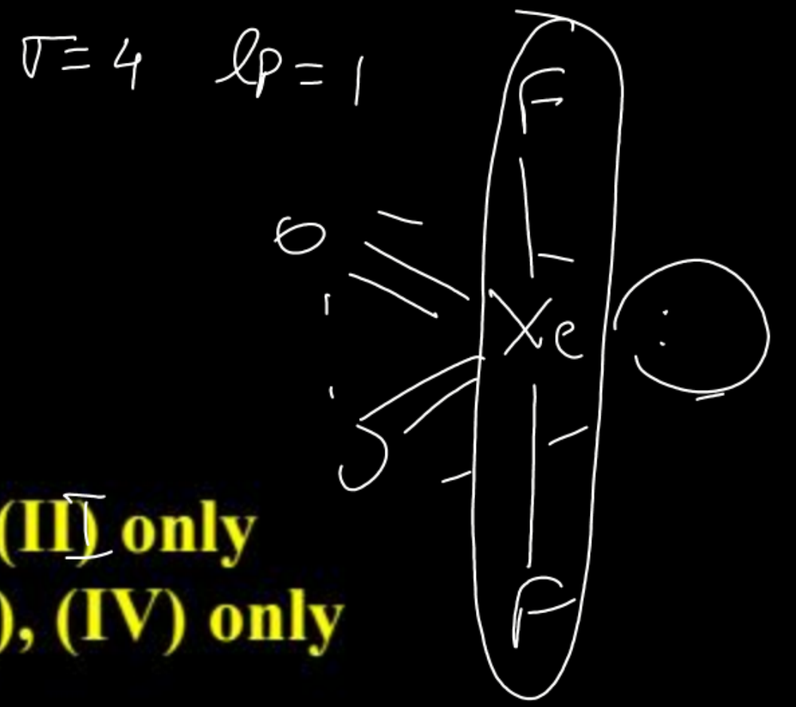
(IV) It has tetrahedral shape.

(A) (I), (III), (IV) only

(B) (I), (II), (III) only

(C) (I), (II) only

(D) (II), (III), (IV) only



Ans. (B)

Q) An ideal solution is formed by mixing 3 mole of A and 1 mole of B and the vapour pressure of solution is found to be 500 mm Hg . After further addition of 1 mole A, pressure of solution becomes 520 mm Hg. Find P°_{A} .

$P_A^0 = 600$

A	B
3	1

$\frac{3}{4}P_A^0 + \frac{1}{4}P_B^0 = 500$

$3P_A^0 + P_B^0 = 2000$

A	B
4	1

$\frac{4}{5}P_A^0 + \frac{1}{5}P_B^0 = 520$

$4P_A^0 + P_B^0 = 2600$

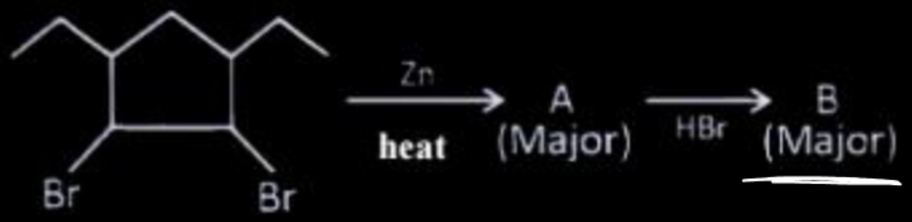
Q) Electronegativity difference between a group 15 element & P is less than electronegativity difference between another group 15 element & P. Those group 15 elements respectively are-

(A) Bi, N **(B) Sb, As** **(C) Sb, Bi** **(D) N, As**

$N > P > As > Sb \approx Bi$

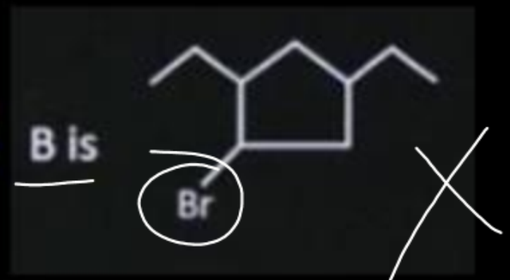
3 2.1 2 1.9 1.9

Q) Consider the reaction,

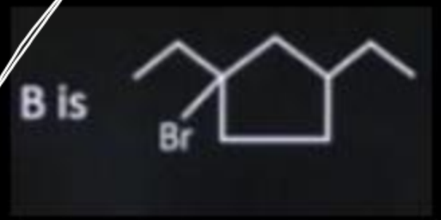


Choose the correct option,

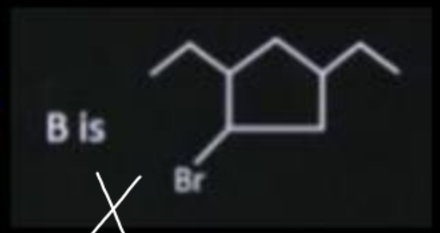
(A) B is



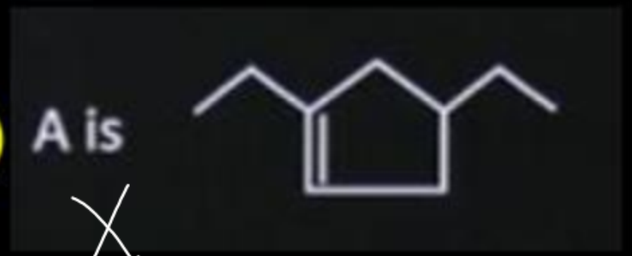
(B) B is

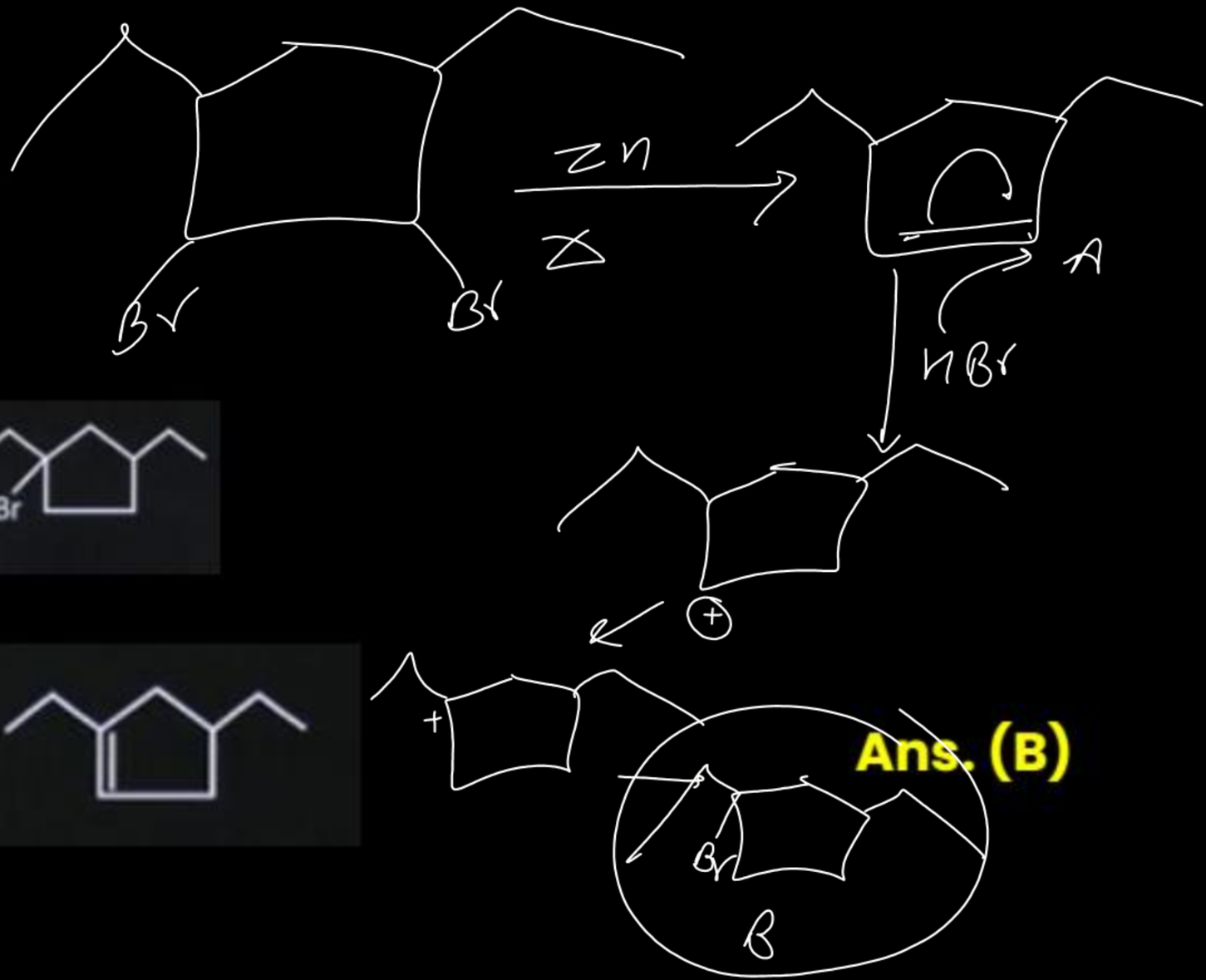


(C) B is



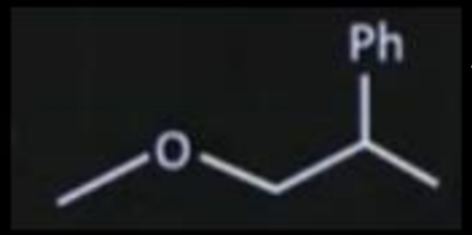
(D) A is



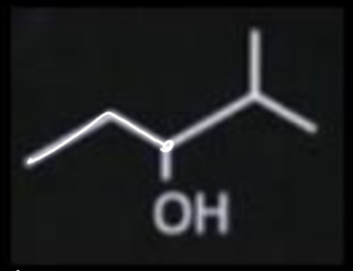


Ans. (B)

Q) Which of the following molecule gives iodoform reaction.

(A) 

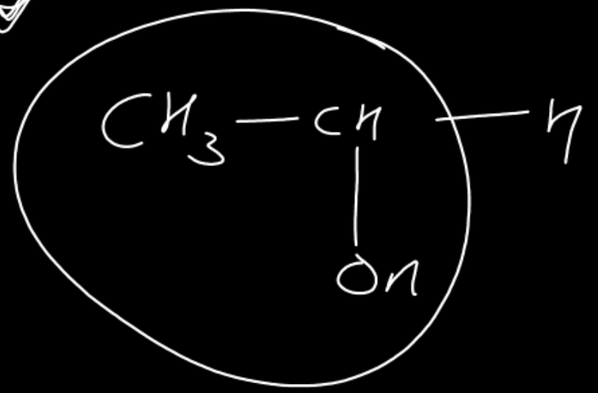
✗

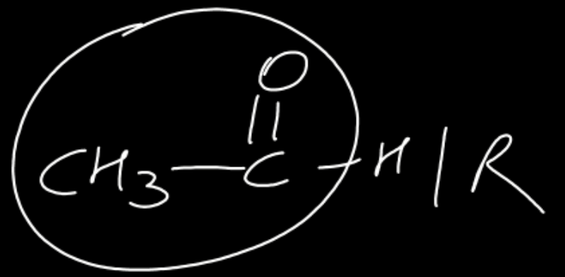
(B) 

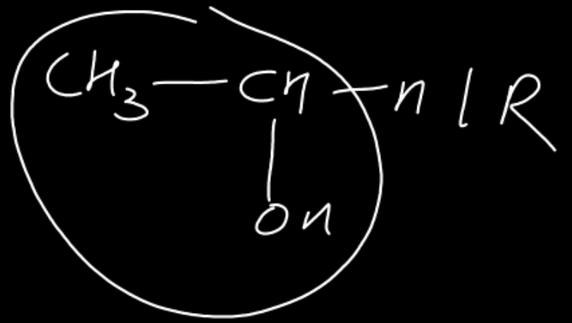
✓

(C) CH_3COOH ✗

(D) CH_3CH_2OH







Q) What is the oxidation state of chromium in the product when $K_2Cr_2O_7$ reacts with acidified KI

(A) +6 (B) +3 (C) +4 (D) +5

$K_2Cr_2O_7 \xrightarrow{H^+} Cr^{3+}$

Ans. (B)

Math

$x^2 = 4 - y^2$

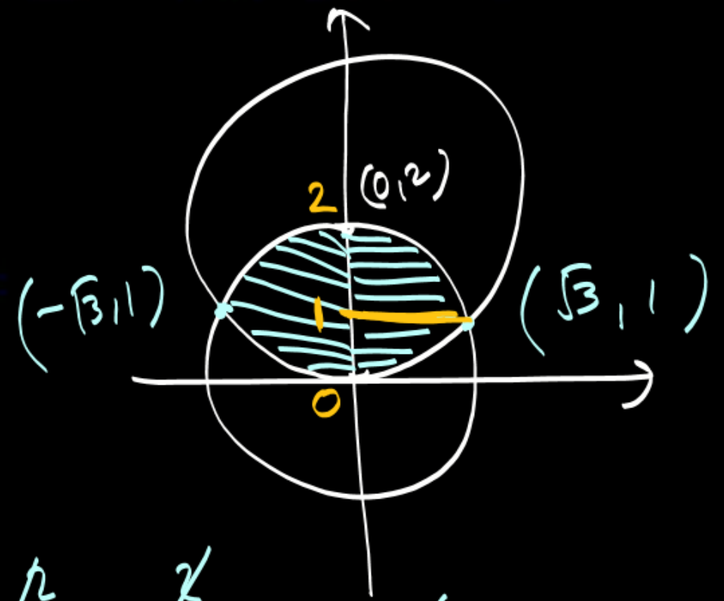
Q) Find the area enclosed in between $x^2 + y^2 = 4$ and $x^2 + (y-2)^2 = 4$

(A) $\frac{4\pi}{3} + 2\sqrt{3}$

(B) $\frac{8\pi}{3} + \sqrt{3}$

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

(D) $\frac{8\pi}{3} - 2\sqrt{3}$



$$R.A = 2\left[\int_0^1 \sqrt{4-(y-2)^2}\,dy + \int_1^2 \sqrt{4-y^2}\,dy\right] = \frac{8\pi}{3} - 2\sqrt{3}$$

$4 - y^2 + y^2 - 4y + 4 = 4$

$y = 1$

$x = \pm\sqrt{3}$

Ans. (D)

$\int \sqrt{a^2 - y^2}\,dy$

Q) Number of ways to distribute 6 identical oranges among 4 persons such that each gets at least one orange is

(A) 8 **(B) 12** **(C) 10** **(D) 13**

C notes

$p_1 + p_2 + p_3 + p_4 = 6$

i) ${}^{n-1}C_{r-1}$, $p_i \geq 1$

$n = 6 \quad r = 4$

${}^5C_3 = 10$

ii) ${}^{n+r-1}C_{r-1}$; none of all

${}^5C_3 = 10$

Ans. (C)

Q) If $\sum_{k=1}^{n} a_k = \alpha n^2 + \beta n$ and $a_6 = 7a_1$, $a_{10} = 59$, then find the value of $\alpha + \beta$.

(A) 6 (B) 5 (C) 10 (D) 8

$\alpha+\beta = 5$

Ans. (B)

$\alpha+\beta = \frac{d}{2} + a - \frac{d}{2} = a$

$a+5d = 7a$

$5d = 6a \quad -(1)$

$a+9d = 59$

$a+9\left(\frac{6a}{5}\right) = 59$

$\frac{59a}{5} = 59$

$S_n = \frac{n}{2}(2a+(n-1)d)$

$= \frac{d}{2}n^2 + (a-d/2)n$

$\alpha = d/2, \beta = a - d/2$

Q) The minimum value of $3\sin^2\theta + \cos^2\theta - 6\sin\theta\cos\theta + 2$, where $\theta \in \left(0, \frac{\pi}{2}\right)$

(A) $4 + \sqrt{10}$ **(B) -1** **(C) 1** **(D) $4 - \sqrt{10}$**

Ans. (D)

$\Rightarrow \sin 2\theta = \frac{3}{\sqrt{10}}$

$\cos 2\theta = \frac{1}{\sqrt{10}}$

$f(\theta) = 4 - (3\sin 2\theta + \cos 2\theta)$

$\left(f(\theta)\right)_{min} = 4 - \left(3.\frac{3}{\sqrt{10}} + \frac{1}{\sqrt{10}}\right)$

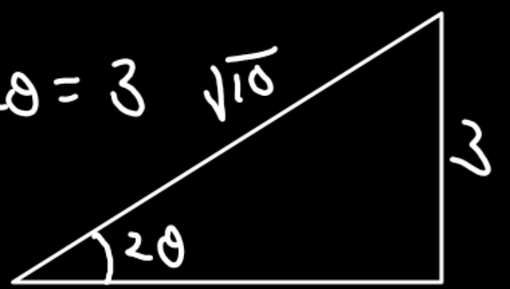
$= 4 - \sqrt{10}$

$f(\theta) = 2\sin^2\theta + 3 - 3\sin 2\theta$

$f(\theta) = 4 - \cos 2\theta - 3\sin 2\theta \;,\; 2\theta \in (0, \pi)$

$f'(\theta) = 2\sin 2\theta - 6\cos 2\theta = 0$

$\Rightarrow \tan 2\theta = 3$



$0 < 2\theta < \pi/2$

$f''(\theta) = 4\cos 2\theta + 12\sin 2\theta > 0$!

Q) Let A = {1, 2, 3, ….., 9}; xRy iff x - y is multiple of 3.

~~S_1~~: Number of elements in R is 36

~~S_2~~: R is equivalence relation

(A) S_1 & S_2 both are correct

(B) S_1 is correct but S_2 is not correct

(C) S_1 & S_2 both are incorrect

(D) S_2 is correct but S_1 is not correct.

3, 6, 9

3, 6, 9

1, 4, 7

(x, y)

9 ← $(3k_1, 3k_2)$

(1-4) 4-7 1-7

9 ← $(3k_1+1, 3k_2+1)$ → 1, 4, 7

9 ← $(3k_1+2, 3k_2+2)$ → 2, 5, 8

R: $x=y \Rightarrow 0$ is mul

$x-y=3r$

$y-x=3r_1$

$x-y=3r_1$

$y-z=3r_2$

Ans. (D)

Q) Let $|\vec{a}| = 1$, $|\vec{b}| = 4$ & $|\vec{c}| = 2$. If $\vec{a} \times \vec{b} = 2(\vec{a} \times \vec{c})$ and $\vec{b} \wedge \vec{c} = \frac{\pi}{3}$ then find $|\vec{a} \cdot \vec{c}|$

$|\vec{b} - 2\vec{c}|^2 = |\alpha\vec{a}|^2$

$b^2 + 4c^2 - 4\vec{b}\cdot\vec{c} = \alpha^2 a^2$

$16 + 16 - 4 \times 4 \times 2 \times \frac{1}{2} = \alpha^2 \times 1$

$\alpha^2 = 16$

$\alpha = \pm 4$

$\vec{a} \times \vec{b} - 2(\vec{a} \times \vec{c}) = 0$

$\vec{a} \times (\vec{b} - 2\vec{c}) = 0$

$\vec{b} - 2\vec{c} = \alpha\vec{a}$

$\vec{b} = 2\vec{c} + \alpha\vec{a}$

$\vec{b} = 2\vec{c} \pm 4\vec{a}$

$\vec{b}\cdot\vec{c} = 2c^2 \pm 4\vec{a}\cdot\vec{c}$

$4 = 8 \pm 4\vec{a}\cdot\vec{c}$

$\vec{a}\cdot\vec{c} = \pm 1$

Ans. (1)

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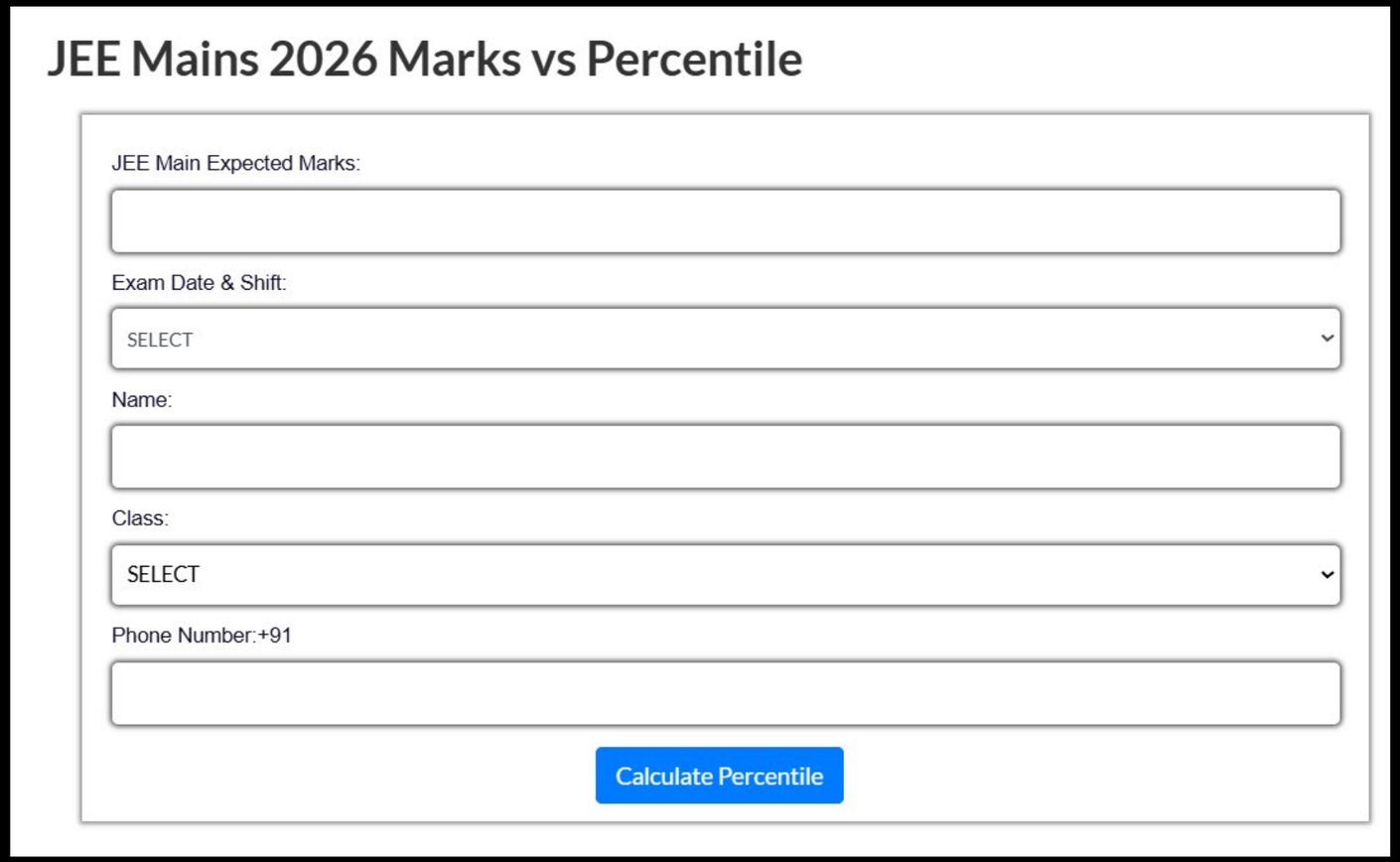

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