JEE MAINS 2026

PAPER SOLUTION

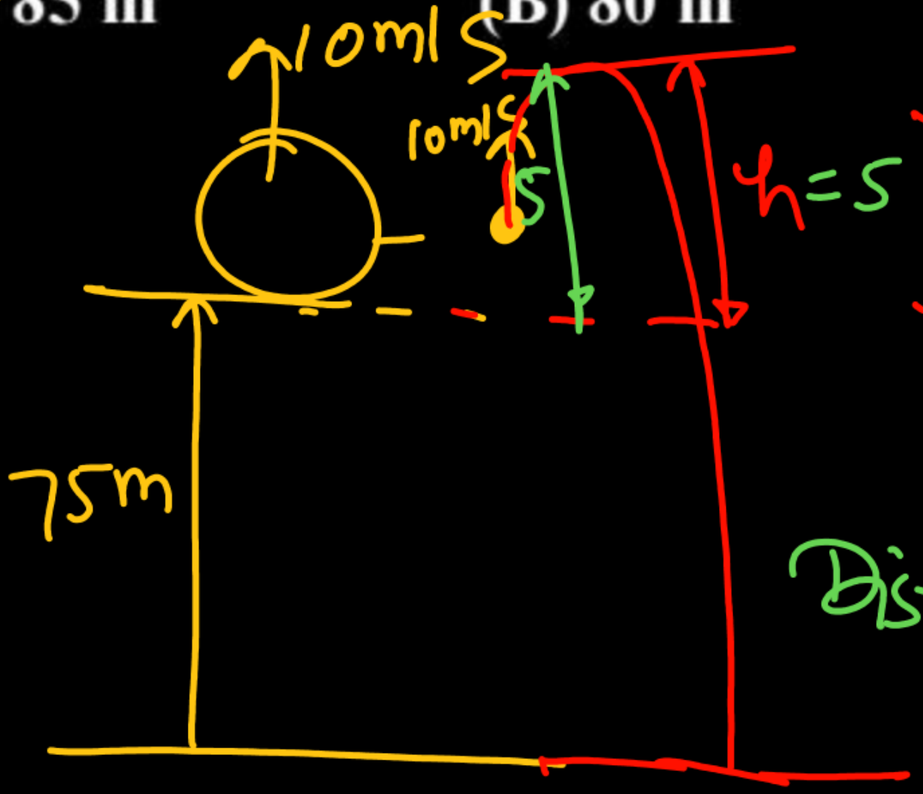
08 APR, SHIFT 2

•LIVE

PHYSICS

Q) A balloon is moving with speed 10 m/s in upward direction. At height of 75 m a stone is released. Distance travelled by stone in air.

(A) 85 m (B) 80 m (C) 70 m (D) 69 m



$h = \frac{v^2}{2g}$

$h = \frac{10 \times 10}{2 \times 10} = 5$

Distance = 5 + 5 + 75

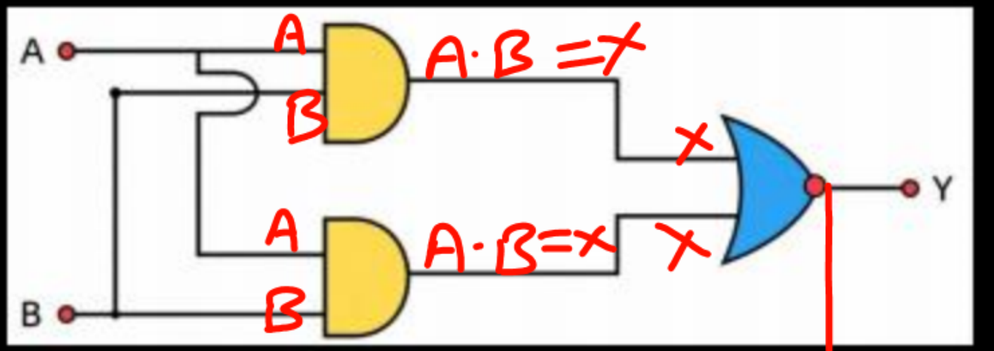
= 85 m

Ans. (A)

Q) For the logic gate shown in the diagram, find the output Y for the given input A and B.

(A) $\overline{A} \cdot \overline{B}$ **(B)** $\overline{A + B}$

(C) $A \cdot \overline{B}$ **(D)** $\overline{A} + \overline{B}$



Let $A \cdot B = X$

$$Y = \frac{X}{X + X}$$

$$Y = \overline{X}$$

$$Y = \overline{A \cdot B}$$

$$Y = \overline{A} + \overline{B}$$

Ans. (D)

Q) Two photons of wavelength λ_1 and $\lambda_2 (\lambda_1 = 2\lambda_2 = 2\lambda)$ use photoelectric effect on a metal surface emitting two photoelectrons of kinetic energies K_1 and K_2 respectively. Find work function of metal $(K_1 = 3K_2 = 3K)$

(A) $\frac{4hc}{3\lambda}$ (B) $\frac{5hc}{4\lambda}$ (C) $\frac{hc}{2\lambda}$ (D) $\frac{6hc}{\lambda}$

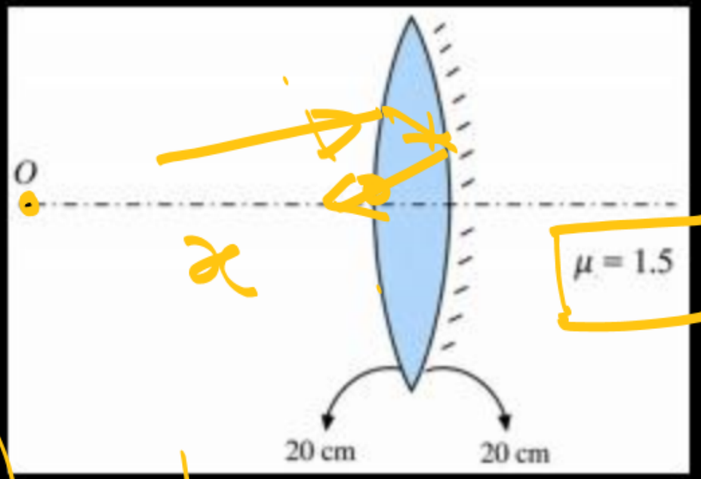
$K_1 = \frac{hc}{\lambda_1} - \phi \Rightarrow 3K = \frac{hc}{\lambda} - \phi$

$K_2 = \frac{hc}{\lambda_2} - \phi \quad K = \frac{2hc}{\lambda} - \phi$

Ans. (B)

Q) Find the distance of the object such that its image is formed on object it self.

Ans = Req



$$P = 2\left(\frac{1.5-1}{20}\right) + \left(\frac{-2\times 1.5}{-20}\right) = \frac{1}{4}$$

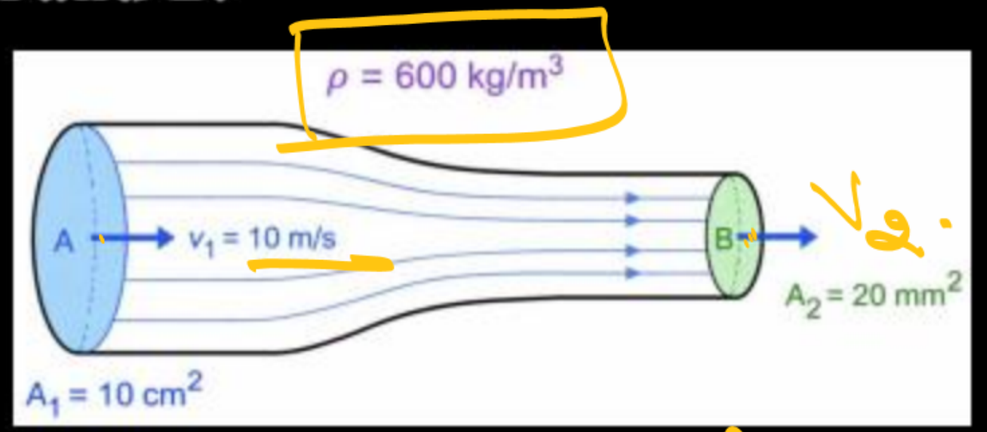
$$R_{eq} = 4f$$

Q) A block attached to a spring has natural frequency f_1. If the spring is cut in two equal half and only one of the half spring is connected to the block then the frequency becomes f_2. Find $\frac{f_2}{f_1}$

(A) $\frac{1}{2}$ (B) (C) $\sqrt{2}$ (D) $\frac{1}{\sqrt{2}}$

Ans. (C)

Q) Find the pressure difference between point A and B.



$P + \frac{1}{2}\rho V^2 = \text{Const}$

$P_A + \frac{1}{2} \times 600 \times 10^2 = P_B + \frac{1}{2} \times 600 \times V_2^2$

$P_A - P_B = (\quad)$.

$P_A - P_B = ?$

$10 \times 10 = 20 \times 10^2 \times V_2$.

$A_2 = 20 \times 10^{-6}$

CHEMISTRY

O_2^+ O_2 O_2^- O_2^{2-}

	B.O.
O_2	2
O_2^+	2.5
O_2^-	1.5
O_2^{2-}	1

Q) Increasing order of bond length from the following

(A) $O_2^{2-}, O_2^-, O_2, O_2^+$

(B) $O_2^-, O_2^{2-}, O_2^+, O_2$

(C) $O_2^+, O_2, O_2^{2-}, O_2^-$

(D) $O_2^+, O_2, O_2^-, O_2^{2-}$

B.L. $\propto \frac{1}{B.O.}$

O_2

$\sigma_{1s}^2 \sigma_{1s}^{*2} \sigma_{2s}^2 \sigma_{2s}^{*2} \sigma_{2p_z}^2 \pi_{2p_x}^2 = \pi_{2p_y}^2 \pi_{2p_x}^{*1} = \pi_{2p_y}^{*1}$

$\frac{1}{2}(N_b - N_a)$ O_2 $B.O. = \frac{1}{2}(10-6) = 2$

Ans. (D)

Q) Given $\lambda_1 = 3000\text{Å}$ and $\lambda_2 = 6000\text{Å}$ then find the ratio of E_1 and E_2

$$E = \frac{hc}{\lambda}$$

$$\frac{E_1}{E_2} = \frac{\lambda_2}{\lambda_1} = \frac{6000}{3000} = \frac{2}{1}$$

Q) $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g); Kp_1 = 8 \times 10^{-2}$ atm

$C(s) + CO_2(g) \rightleftharpoons 2CO(g); Kp_2 = 2$ atm

If partial pressure of CO at equilibrium is $x \times 10^{-1}$ atm find x ?

$x \rightarrow 4$

$$K_{p_1} = P_{CO_2} = 8 \times 10^{-2} \text{ atm}$$

$$K_{p_2} = \frac{P_{CO}^2}{P_{CO_2}} = 2$$

$$P_{CO}^2 = 2 \times 8 \times 10^{-2} = 16 \times 10^{-2}$$

$$P_{CO} = 4 \times 10^{-1} \text{ atm}$$

Ans. (4)

Q) If $E^{o}_{Fe^{2+}/Fe}$ is xV and $E^{o}_{Fe^{3+}/Fe}$ is yV . Then calculate $E_{Fe^{2+}/Fe^{3+}}$ in V.

(A) $(2x - 3y)$ (B) $(2x + 3y)$ (C) $(x - y)$ (D) $(x + y)$

$Fe^{2+} + 2e^- \longrightarrow Fe_{(s)}$ $\quad E_1^0 = x$

$Fe^{3+} + 3e^- \longrightarrow Fe_{(s)}$ $\quad E_2^0 = y$

(3) = (1) − (2)

$Fe^{2+} \longrightarrow Fe^{3+} + e^-$ $\quad E_3^0 = ?$

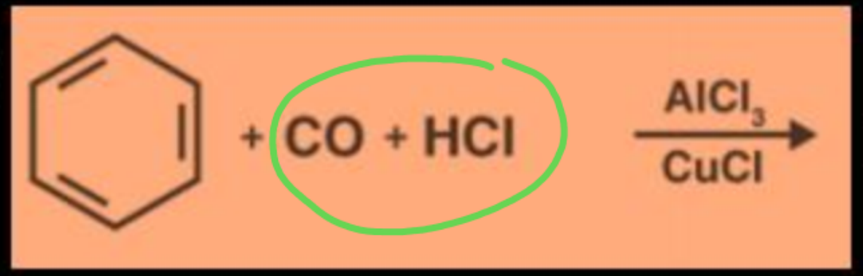
$\Delta G_3^0 = \Delta G_1^0 - \Delta G_2^0$

Ans. (A)

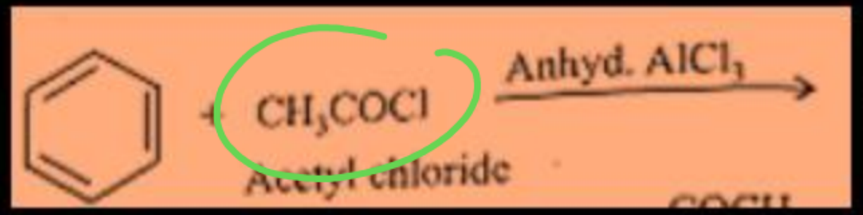
$$(-1)\, F\, \varepsilon^{\circ}_{Fe^{2+}/Fe^{3+}} = (-2)\, F(X) - (-3)\, F(Y)$$

$$\varepsilon^{0}_{Fe^{2+}/Fe^{3+}} = 2X - 3Y$$

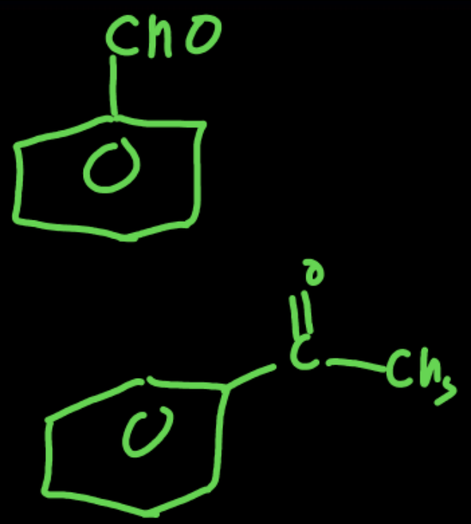
Q)

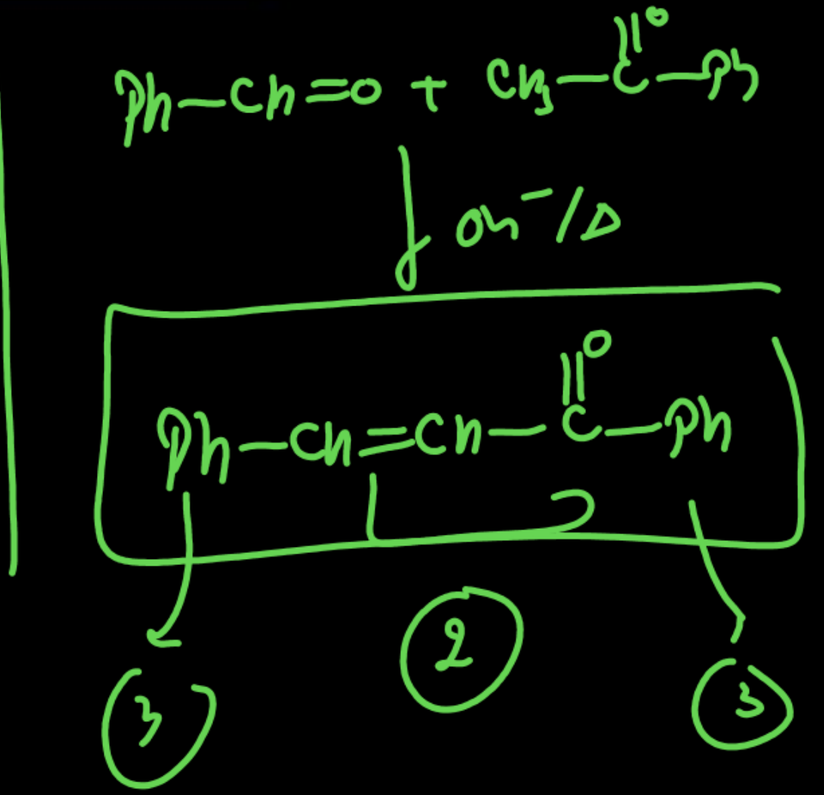


P



Q





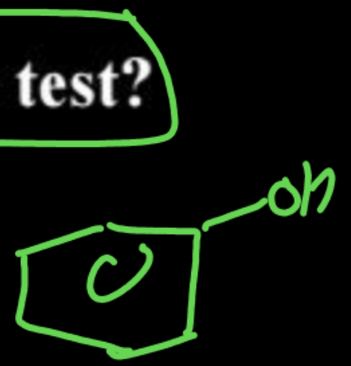
$$P + Q \xrightarrow[\Delta]{NaOH} \text{Product}$$ ✓

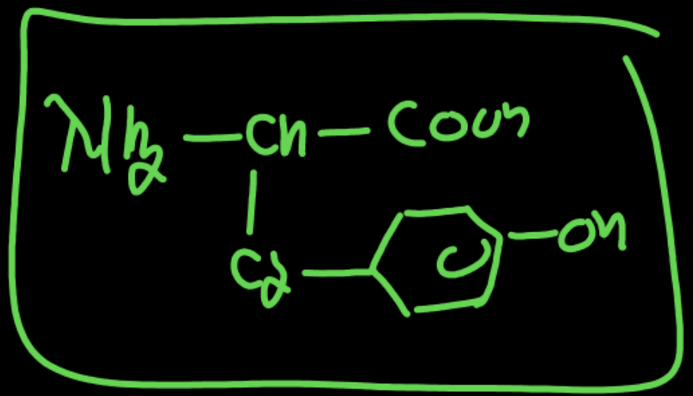
How many pi bonds are present in final product ?

Ans. (8) ✓

Q) Which of the following compounds gives a positive neutral $FeCl_3$ test?

(A) Threonine
(B) Cysteine
(C) Tyrosine
(D) Valine

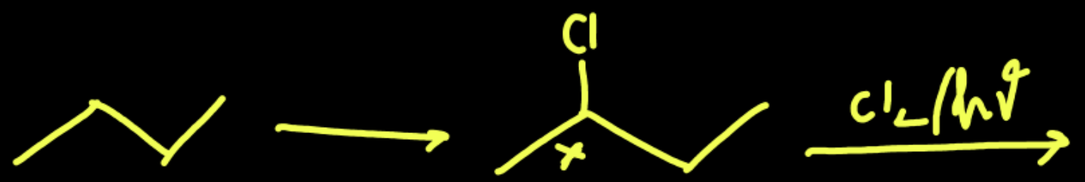




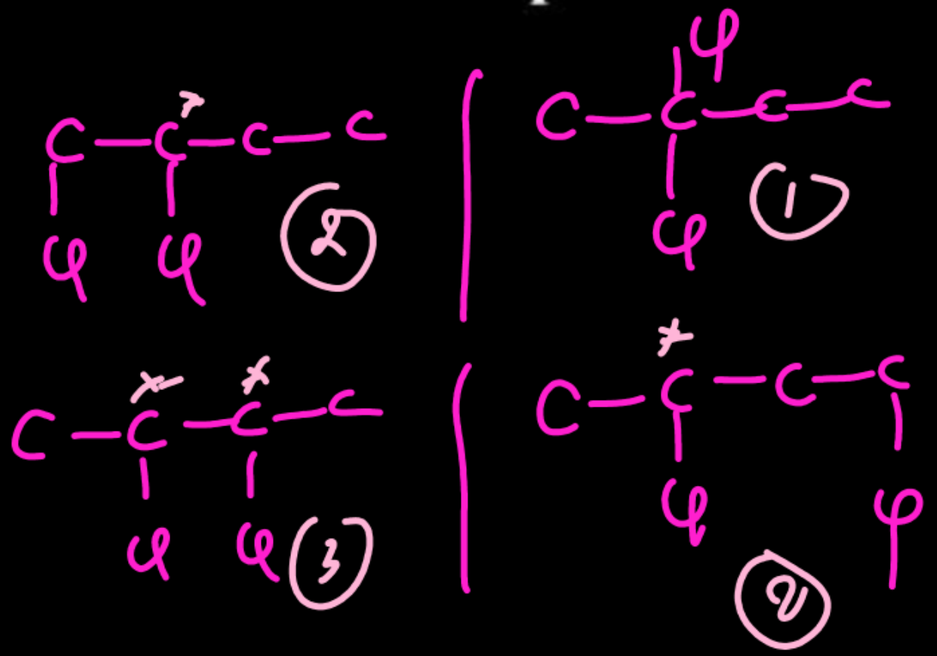
Ans. (C)

(Chiral centre)

Q) n-Butane give optically active compound on monochlorination. Which on further chlorination give dichloroproduct. Number of dichloroproduct are



(4)



Ans. (8)

Q) Which of the following statements are correct

I : All Monosaccharides are reducing sugars ✓

II : Open chain and cyclic of D-glucose is found in equilibrium, this is the property of only α–D glucopyranose ✗

III : All oligosaccharides gives same monosaccharides on hydrolysis. ✗

IV : Glycogen is animal starch. ✓

(2)

MATH

Q) If $\alpha = 3 + 4 + 8 + 9 + 13 + \cdots$ upto 40 terms and $(\tan\beta)^{\frac{\alpha}{1020}}$ is the root of the equation $x^2 - x - 2 = 0$. Then, the value of $\sin^2\beta + 3\cos^2\beta$ is

(A) 1/2 (B) 2 (C) 1 (D) $\frac{5}{3}$

$x^2 - x - 2 = 0$

$(x-2)(x+1) = 0$

$x = 2$, $x = -1$

$\frac{\alpha}{1020} = 2$

$\alpha = (3+8+15+\cdots) + (4+9+14+\cdots)$

$\alpha = \frac{20}{2}[6 + 19\times 5] + \frac{20}{2}[8 + 19\times 5]$

$= 10[6 + 8 + 190]$

$= 2040$

$\tan^2\beta = 2$.

$1 + \sec\beta = 1 + \frac{2}{1+2} = 1 + 2/3 = 5/3$

Ans. (D)

Q) If $\alpha = 3\sin^{-1}\left(\frac{6}{11}\right)$, consider statements:

Statement 1: $\cos(\alpha + \beta) > 0$

Statement 2: $\cos\alpha < 0$

Then which of the following is true?

(A) Statement 1 and 2 are correct

(B) Only statement 1 is correct

(C) Only statement 2 is correct ✓

(D) None of these statements are correct.

Ans. (C)

$\beta = 3\cos^{-1}\left(\frac{9}{16}\right)$

$\frac{6}{12} < \frac{6}{11} < 1$

$\frac{1}{2} < \frac{6}{11} < \sqrt{3}/2$

$\frac{\pi}{6} < \sin^{-1}(6/11) < \pi/3$

$\pi/2 < 3\sin^{-1}(6/11) < \pi$

$\frac{\pi}{2} < \alpha < \pi$

$$\frac{\pi}{16} < \frac{\pi}{16} < 1$$

$$0 < \sin^{-1}\left(\frac{9}{16}\right) < \pi/3$$

$$0 < 3\sin^{-1}\left(\frac{9}{16}\right) < \pi$$

$$0 < \beta < \pi$$

$$\frac{\pi}{2} < \alpha < \pi$$

$$\pi/2 < \alpha + \beta < 2\pi$$

Q) A person has 3 different bags & 4 different books. The number of ways in which he can put these books in the bags so that no bag is empty is

(A) 34 (B) 36 (C) 32 (D) 30

(2) (1) (1)

$$= \left(\frac{{}^4C_2 \cdot {}^2C_1 \cdot {}^1C_1}{2!} \cdot \frac{1}{2!}\right) \cdot 3!$$

$$= \frac{24}{4} \cdot 6$$

$$= 36$$

Ans. (B)

Q) If $\left(x\sqrt{1-x^2}\right)dy-\left(y\sqrt{1-x^2}-x^2\cos^{-1}x\right)dx=0$ and $\lim\limits_{x\to1^-}y(x)=1$,

then $y\left(\frac{1}{2}\right)$ is:

(A) $\frac{\pi^2}{36}$ (B) $\frac{\pi^2}{36}+\frac{1}{2}$ (C) $\frac{\pi}{36}+\frac{1}{2}$ (D) $\frac{\pi}{36}$

$\sqrt{1-x^2}\,(x\,dy-y\,dx)=-x^2\cos^{-1}(x)\,dx$

$\int d(y/x)=\int-\frac{\cos^{-1}(x)}{\sqrt{1-x^2}}\,dx$

$\frac{y}{x}=\frac{(\cos^{-1}x)^2}{2}+c$

$x=1,\ y=1 \Rightarrow c=1$

$\frac{y}{x}=\frac{1}{2}(\cos^{-1}x)^2+1$

$x=\frac{1}{2} \Rightarrow y=\frac{\pi^2}{36}+\frac{1}{2}$

Ans. (B)

Q) The value of $\int_0^2 \frac{\sqrt{x(x^2+x+1)}}{\sqrt{x+1}\sqrt{x^4+x^2+1}}\,dx$ is:

$x^4+x^2+1 = (x^2+x+1)(x^2-x+1)$

$x^3+1 = (x+1)(x^2-x+1)$

(A) $\frac{1}{3}\ln(2^{3/2}+3)$ (B) $\ln(2^{3/2}+3)$

(C) $\ln(3^{3/2}+1)$ (D) $\frac{2}{3}\ln(2^{3/2}+3)$

Let $x^{3/2} = t$

$\frac{3}{2}x^{1/2}\,dx = dt$

$I = \int_0^2 \frac{\sqrt{x}}{\sqrt{x+1}\sqrt{x^2-x+1}}\,dx = \int_0^2 \frac{\sqrt{x}}{\sqrt{(x^{3/2})^2+1}} = \int_0^{2^{3/2}} \frac{\frac{2}{3}\,dt}{\sqrt{t^2+1}}$

$= \frac{2}{3}\left(\ln\left(t+\sqrt{t^2+1}\right)\right)_0^{2^{3/2}}$

Ans. (D)

Q) Let $\frac{x^2}{f(a^2+2a+7)} + \frac{y^2}{f(3a+14)} = 1$ represents an equation of ellipse. The major axis of given ellipse is y-axis and f is a decreasing function. If the range of a is $R - [\alpha, \beta]$ then $\alpha + \beta$ is:

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

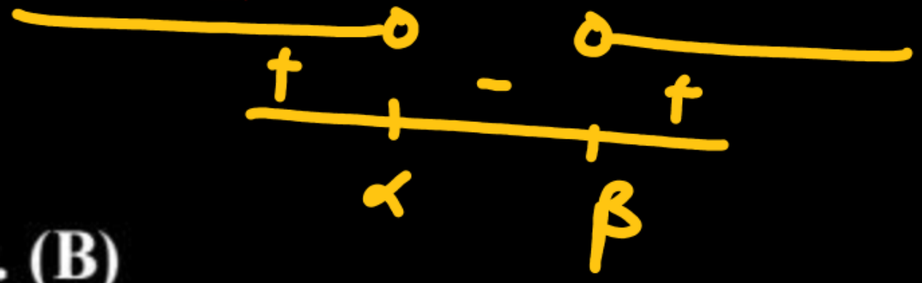
$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

$a < b$

$f(a^2+2a+7) < f(3a+14)$

$a^2+2a+7 > 3a+14$

$a^2 - a - 7 > 0$



$a \in (-\infty, \alpha) \cup (\beta, \alpha)$

$a \in R - [\alpha, \beta]$.

Ans. (B)

Q) The number of values of $Z \in C$ satisfying the equation $|Z-(4+8i)| = \sqrt{10}$ and $|Z-(3+5i)| + |Z-(5+11i)| = 4\sqrt{5}$ is

(A) 0 **(B) 2** **(C) 1** **(D) 4**

(4,8) $PS_1 + PS_2 = 2a$

$S_1(3,5)$ $S_2(5,11)$

$2a = 4\sqrt{5}$

$a = 2\sqrt{5} > R$

$b^2 = a^2(1-e^2)$

$b^2 = 20\left(1-\frac{1}{2}\right) = 10$

$\sqrt{4+36} = \sqrt{40} = 2\sqrt{10} = 2ae$

$b = \sqrt{10} = R$

$e = \frac{\sqrt{10}}{a} = \frac{\sqrt{10}}{2\sqrt{5}} = \frac{1}{\sqrt{2}}$

Ans. (B)

Q) $\vec{a} = 4\hat{i} - \hat{j} + 3\hat{k}$

$\vec{b} = 10\hat{i} + 2\hat{j} - \hat{k}$

and a vector $\vec{c}$ be such that $2(\vec{a} \times \vec{b}) + 3(\vec{b} \times \vec{c}) = \vec{0}$. If $\vec{a} \cdot \vec{c} = 15$, then the value of $\vec{c} \cdot (\hat{i} + \hat{j} - 3\hat{k})$ is:

(A) 5 (B) -3 (C) -5 (D) 3

$2(\bar{a} \times \bar{b}) - 3(\bar{c} \times \bar{b}) = 0$

$(2\bar{a} - 3\bar{c}) \times \bar{b} = \bar{0}$

$2\bar{a} - 3\bar{c} = \lambda \bar{b}$

$\bar{c} = \dfrac{2\bar{a} - \lambda \bar{b}}{3}$

$\bar{a} \cdot \bar{c} = 15$

$\dfrac{2|\bar{a}|^2 - \lambda(\bar{b} \cdot \bar{a})}{3} = 45$

$2 \times 26 - \lambda \times 35 = 45$

$35\lambda = 52 - 45$

$\lambda = \dfrac{1}{5}$

Ans. (C)

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