

# JEE MAINS 2026

# PAPER SOLUTION



**06 APR, SHIFT 1**

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**PHYSICS**

Q) In AC series circuit supply voltage  $V_{(rms)} = 100$  volts;  $R = 80\Omega$ ;  $X_L = 80\Omega$  and source frequency is  $f = 50$  Hz. Find the power factor

(A)  $1/2$

(B)  $\sqrt{3}/2$

(C)  $1/\sqrt{2}$

(D)  $3/4$

$$\cos \phi = \frac{R}{Z} = \frac{80}{80\sqrt{2}}$$

$$Z = \sqrt{R^2 + X_L^2}$$

$$Z = \sqrt{(80)^2 + (80)^2}$$

$$Z = 80\sqrt{2}$$

$$\cos \phi = \frac{1}{\sqrt{2}}$$

↓  
Power factor

Ans. (C)

Q) An expression of potential energy  $= \frac{A\sqrt{x}}{B+x}$  is given.

$B+x = \text{const.}$

$B = [L']$

Then dimensions of  $(A \cdot B)$  will be (x is position here.)

(A)  $[M^{1/2} L^{2/3} T^{-2}]$

(B)  $[ML^{3.5} T^{-2}]$

(C)  $[ML^{1/2} T^{-2}]$

(D)  $[MLT^{-1}]$

$$U = \frac{A\sqrt{x}}{B+x}$$

$$[M^1 L^2 T^{-2}] = \frac{A L^{\frac{1}{2}}}{[L']}$$

$$A = [M^1 L^{\frac{5}{2}} T^{-2}]$$

$$A \cdot B = [M^1 L^{\frac{5}{2}} T^{-2}] [L']$$

$$= [$$

Ans. (B)

**Q) A block of mass  $m$  is released from height  $h$  on smooth plane. If normal force on top of the circular part is  $3 mg$ . Find  $h$ .**

(A)  $2R$

(B)  $3R$

(C)  $4R$

(D)  $5R$



$$N + mg$$

$$3mg + mg = \frac{mv^2}{R}$$

$$4mgR = mv^2$$

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

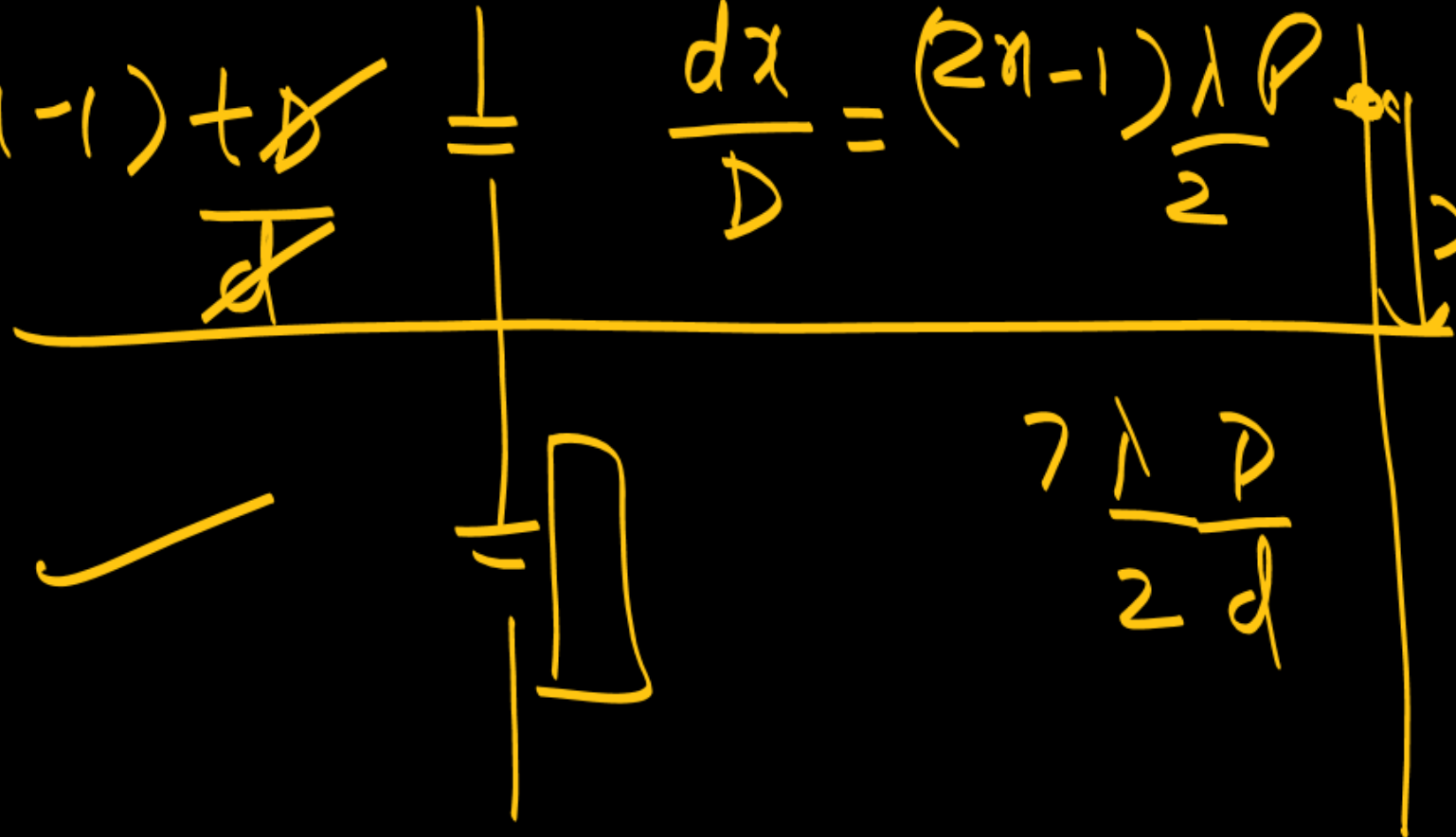
$$mgh + 0 = mg(2R) + 2mgR$$

$$mgh = 4mgR$$

$$h = 4R$$

**Ans. (C)**

**Q) In YDSE experiment a glass slab of thickness  $8 \mu\text{m}$  is introduced in front of a slit. If the central maxima shifts to a position of 4<sup>th</sup> minima, then find refractive index of glass slab (take  $\lambda = 500 \text{ nm}$ ).**

$$\frac{7\lambda D}{2d} = (\mu - 1)t + \frac{dx}{D} = (2n - 1) \frac{\lambda D}{2} \quad (\mu - 1)t + \frac{dx}{D} = 0$$


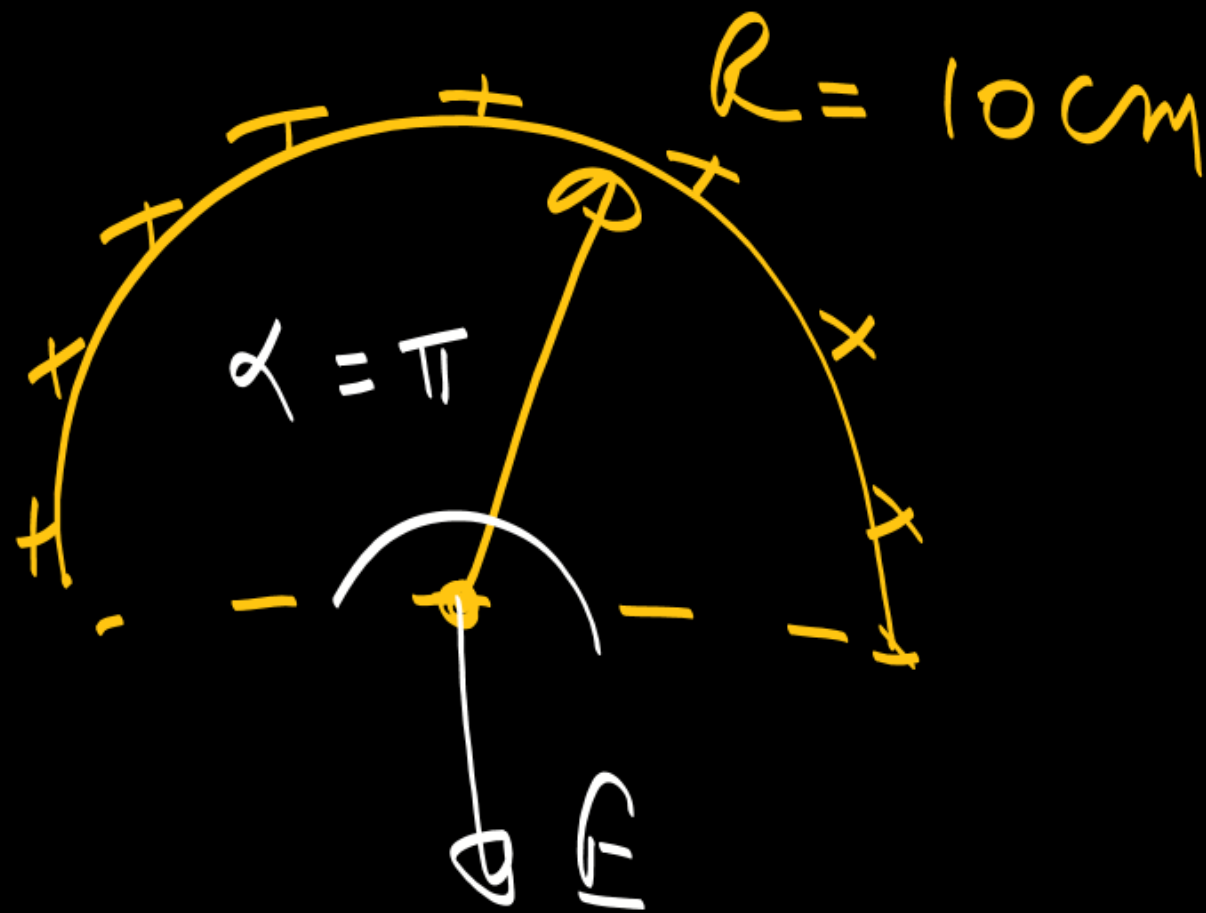
$$\mu = \frac{7\lambda D}{2d} + \frac{dx}{D} + 1$$

$$x = \frac{-(\mu - 1)tD}{d}$$

**Q) Electric field intensity at the centre of semicircular ring of radius 10 cm is 100 v/m. Determine the charge of ring**

$$E = 100 \text{ v/m}$$

$$q = \lambda \times \pi R$$



$$\frac{\lambda \sin \alpha / 2}{2\pi \epsilon_0 R} = E$$

$$\lambda = \checkmark$$

Q) In a electric field intensity  $\mathbf{E} = 2x\hat{i} + 3y^2\hat{j} + 4z\hat{k}$  work to be done in shifting the charge 3 C from point A(0, -1, -5) to B(5, 1, 2)

$$W_{ext} + W_{By E} = 0$$

$$W_{ext} = -W_{By E}$$

$$\vec{ds} = dx\hat{i} + dy\hat{j} + dz\hat{k}$$

$$W_{By E} = \int 9\vec{E} \cdot \vec{ds}$$

$$\Rightarrow 3 \int_0^5 2x dx + 4 \int_{-1}^1 y^2 dy + 4 \int_{-5}^2 z dz$$

**Q) A Spherical interface separate two medium of refractive index 1.4 & 1. object is placed in medium of refractive index = 1 determine magnification.**

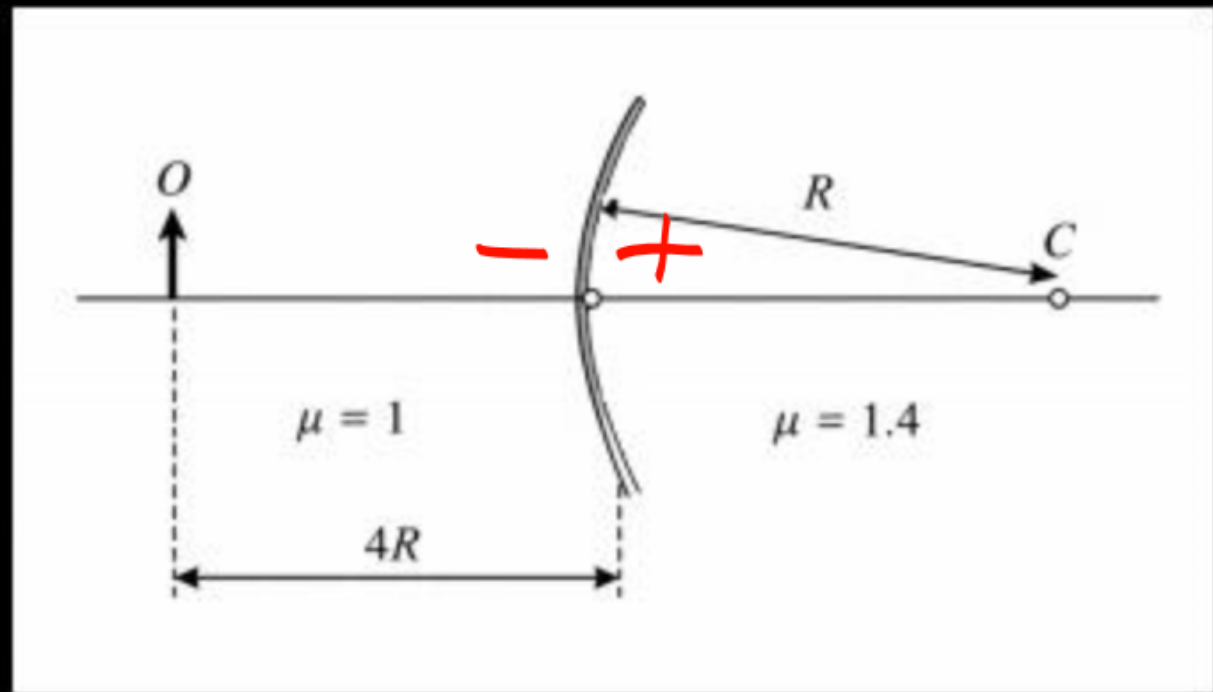
$$\frac{n_2}{v} - \frac{n_1}{u} = \frac{n_2 - n_1}{R}$$

$$\frac{1.4}{v} - \frac{1}{-4R} = \frac{1.4 - 1}{R}$$

$$v = \checkmark$$

$$m = \frac{v}{u} \times \frac{n_1}{n_2}$$

$$= \frac{v}{u} \times \frac{1}{1.4}$$



$$u = -4R$$

$$v = ?$$

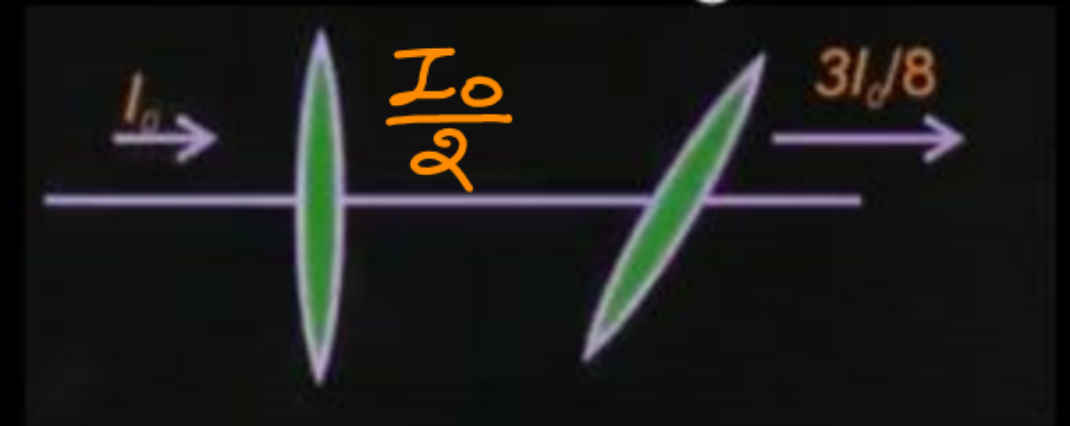
Q) Unpolarised light with intensity  $I_0$  incident on polariser. Find angle between axis of polariser and analyser, so that intensity of emergent light is  $\frac{3I_0}{8}$ .

(A)  $45^\circ$

~~(B)  $30^\circ$~~

(C)  $37^\circ$

~~(D)  $60^\circ$~~



$$\frac{3I_0}{8} = \frac{I_0}{2} \cos^2 \phi$$

$$\cos^2 \phi = \frac{3}{4}$$

$$\cos \phi = \frac{\sqrt{3}}{2}$$

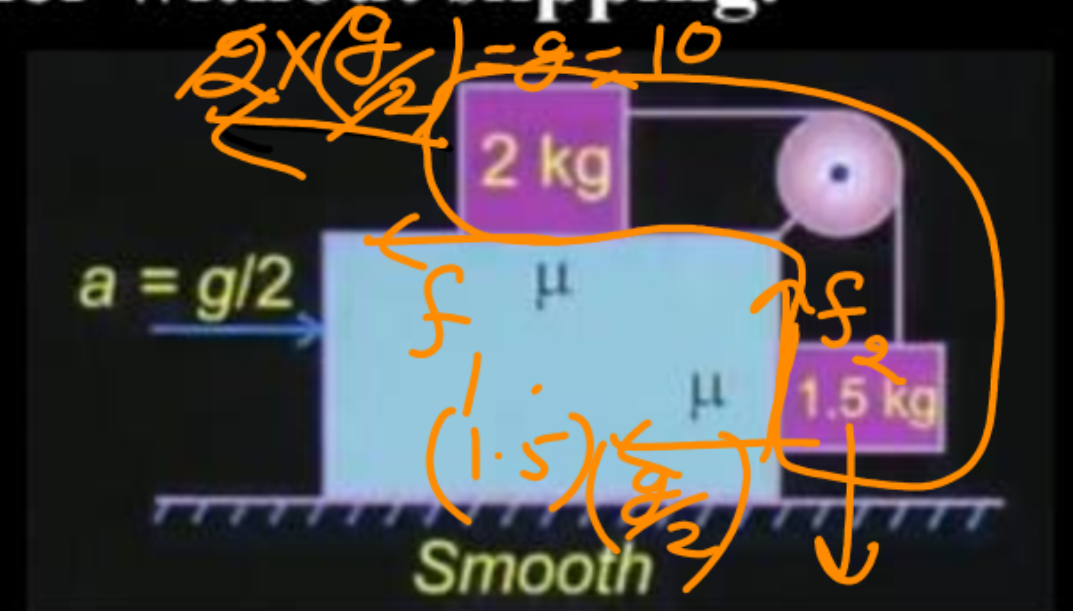
$$\phi = 30^\circ$$

Ans. (B)

Q) Find least value of  $\mu$  such that system move together without slipping.

- (A)  $2/11$   
(C)  $1/7$

- (B)  $3/2$   
(D)  $5/7$



$$15 = 10 + f_1 + f_2$$

$$15 = 10 + \mu(20) + \mu\left(\frac{15}{2}\right)$$

$$5 = \frac{55\mu}{2}$$

$$\mu = \frac{2}{11}$$

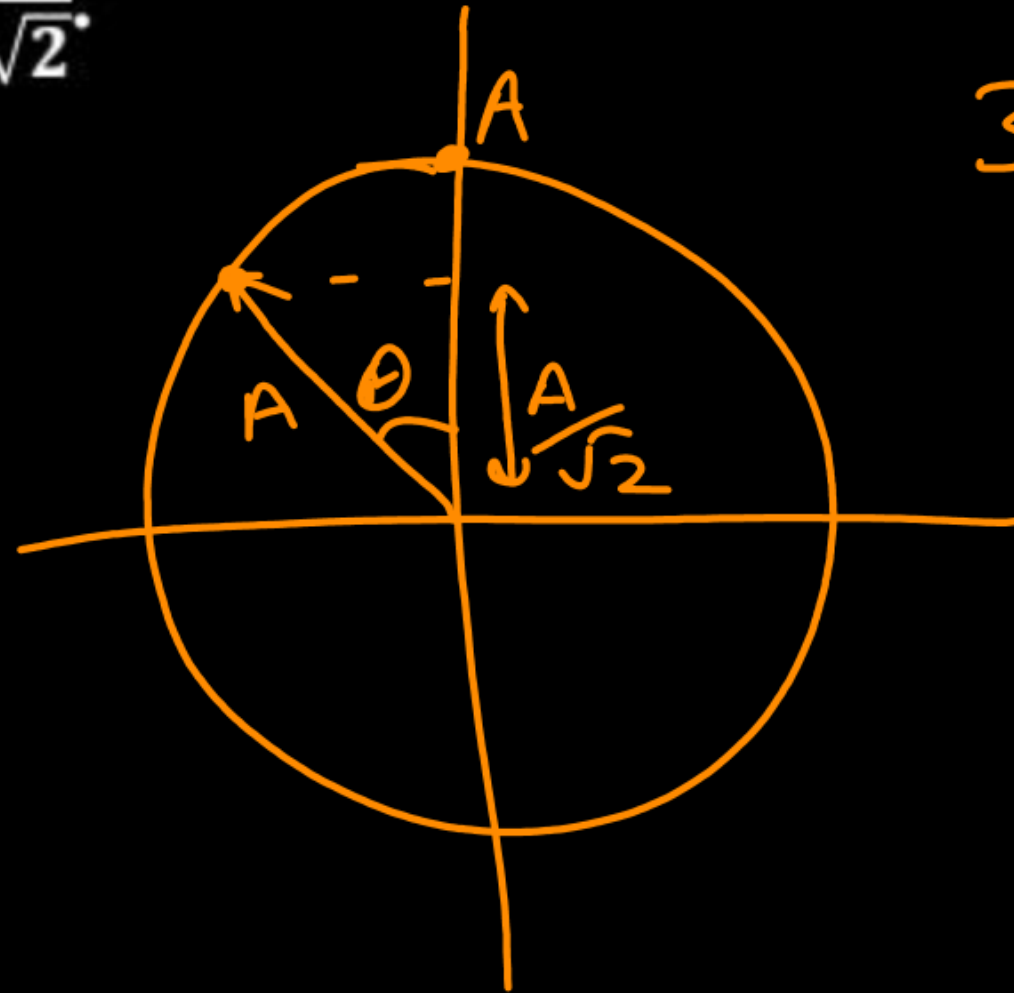
$$1.5 \times 10 = 15$$

Ans. (A)

Q) Find period of SHM of a particle is 16 sec. Find minimum time to move from  $x = A$  to  $x = \frac{A}{\sqrt{2}}$ .

$$A \cos \theta = \frac{A}{\sqrt{2}}$$

$$\theta = 45^\circ$$



$$360^\circ \longrightarrow 16$$

$$1^\circ \longrightarrow \frac{16}{360}$$

$$45^\circ \longrightarrow \frac{16^2}{360} \times 45$$

$$= 2$$

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# CHEMISTRY

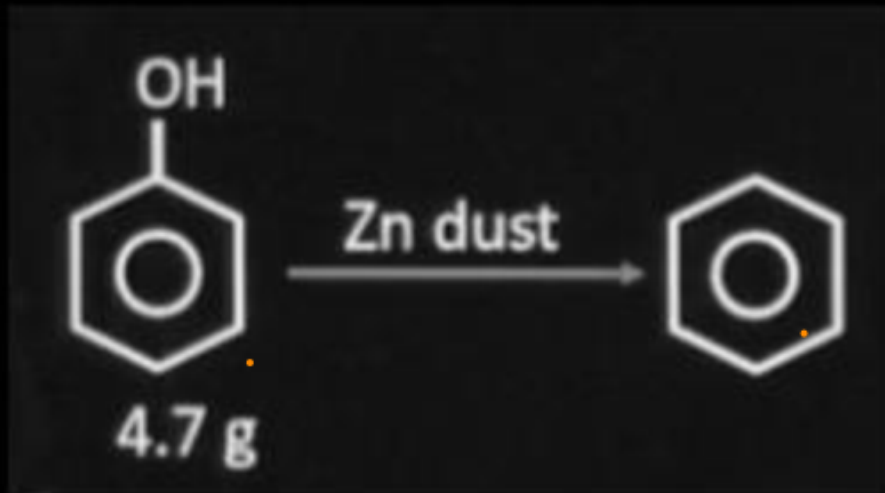
**Q) Sucrose hydrolyses in acidic medium to form glucose and fructose which follows first order kinetics. If the half life of sucrose is 3 hrs . The % of sucrose left after 6 hrs .**

$$A_0 \xrightarrow{3 \text{ hrs}} \frac{A_0}{2} \xrightarrow{3 \text{ hrs}} \frac{A_0}{4}$$

$\downarrow$   
25%

**Ans. (25)**

Q) Consider the reactions :



$$\frac{C_6H_6^O}{M.M \quad 94}$$
 moles of phenols =  $\frac{4.7}{94} = \frac{1}{20}$  mole

$\frac{1}{20} \rightarrow$  product mole  $\left(\frac{1}{20}\right)$

Find the no. of moles of benzene formed (If efficiency of reaction is 60%)

(A) 0.03

(B) 0.06

(C) 0.05

(D) 0.04

$$\frac{1}{20} \times \frac{60}{100}$$

Ans. (A)

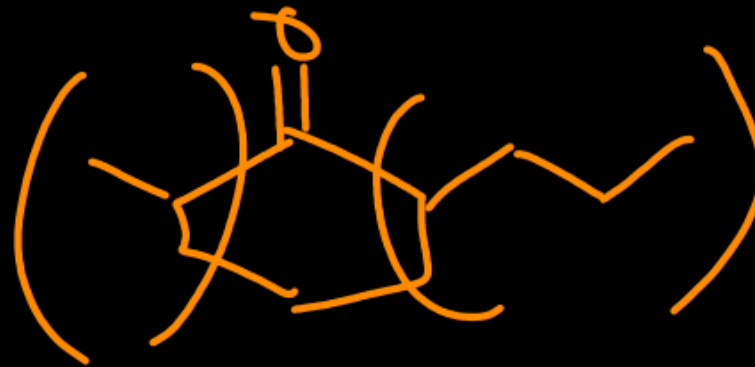
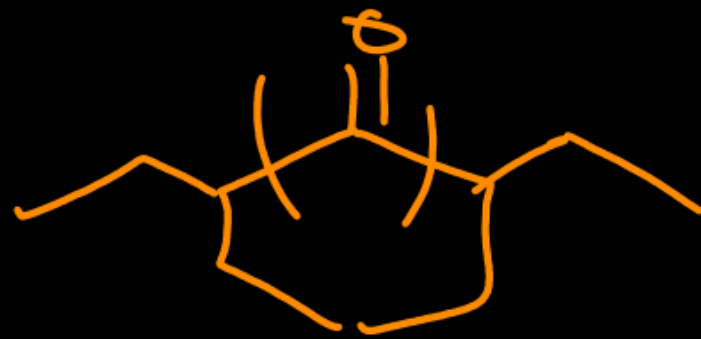
**Q) 2,6-Diethylcyclohexanone and 2-propyl-6-methyl cyclohexanone are which type of isomers**

(A) F.G.I

(C) Tautomers

✓ (B) Metamers

(D) Position isomers



**Ans. (B)**

**Q) Match list-I to list-II**

**List-I (Vitamins)**

(A) Ascorbic acid

(B) Retinol

(C) Riboflavin

(D) Pyridoxine

**List-II (Deficiency Diseases)**

(P) Xerophthalmia

(Q) Cheilosis

(R) Scurvy

(S) Convulsions

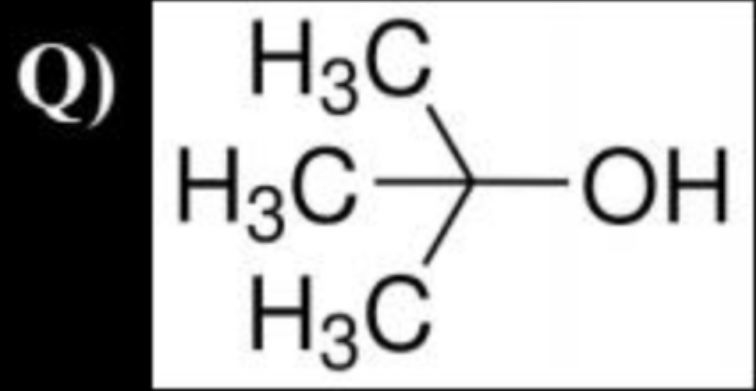
(A) A → P ; B → Q ; C → R ; D → S

(B) A → S ; B → R ; C → Q ; D → P

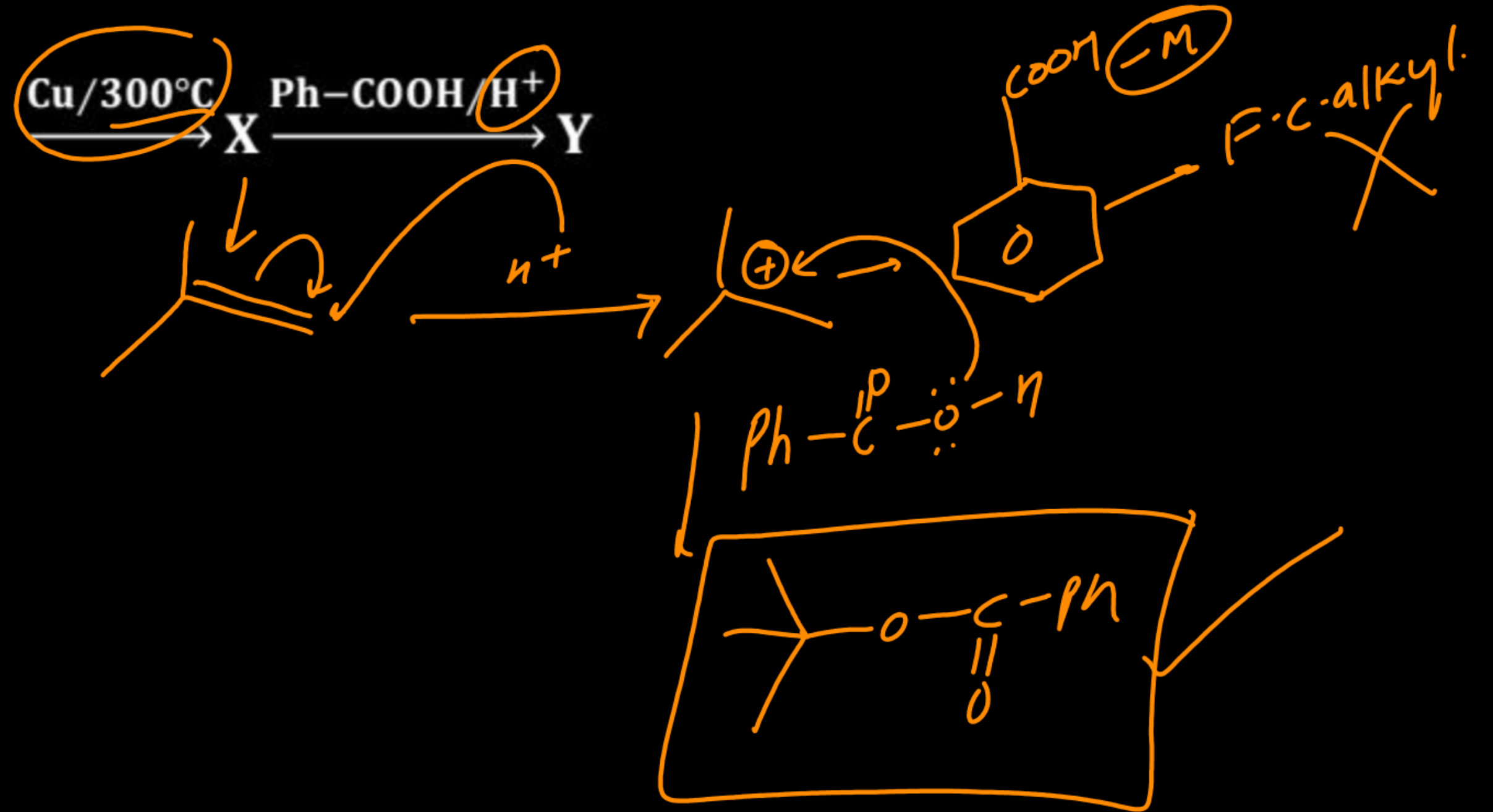
(C) A → S ; B → P ; C → Q ; D → R

(D) A → R ; B → P ; C → Q ; D → S ✓

**Ans. (D)**



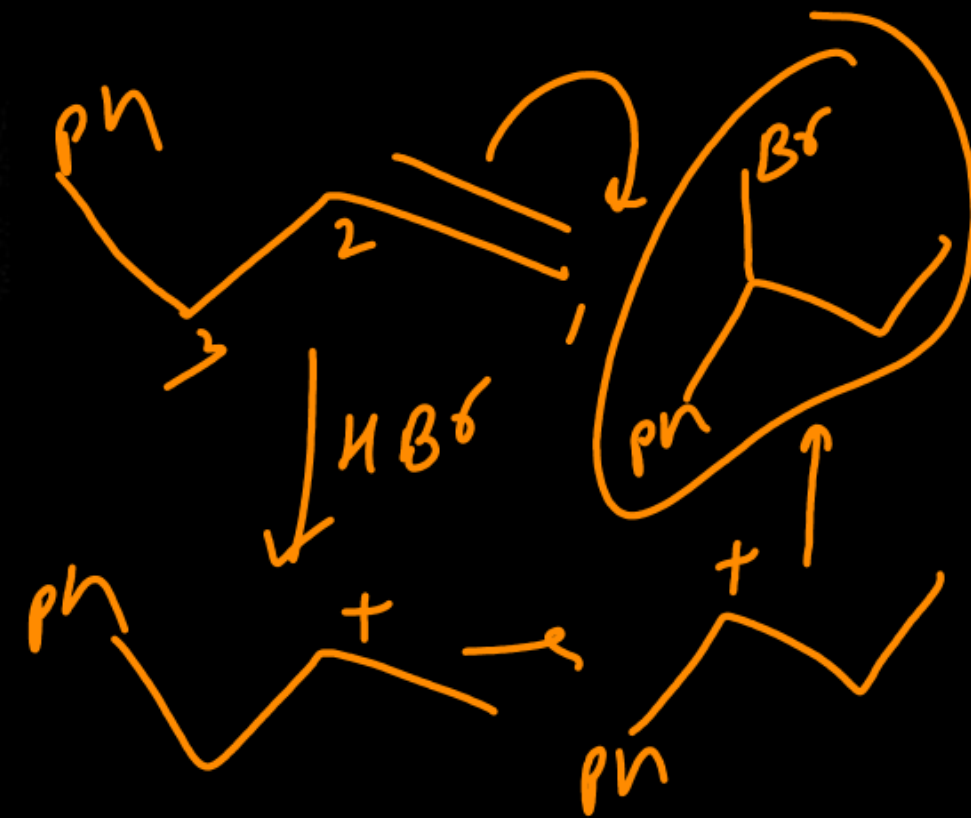
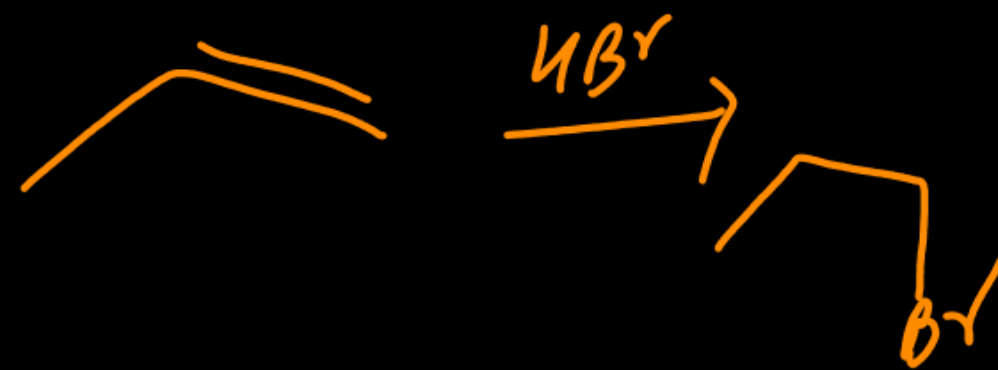
Compound Y is ?



Q) **Statement-I** : 3-phenyl pro-1-ene react with HBr give 1° bromide as a major product. F

**Statement-II** : Propene react with HBr in the presence of peroxide give 1° bromide as a major product. ✓ T

- (A) Statement I is correct but statement II is incorrect
- ~~(B) Statement I is incorrect but statement II is correct~~
- (C) Both statement I and statement II are correct
- (D) Both statement I and statement II are incorrect



Ans. (C)

Q) Electrolyte

BaCl<sub>2</sub>

H<sub>2</sub>SO<sub>4</sub>

HCl

-

-

-

-

$\Lambda_m^\infty$

$x_1$

$x_2$

$x_3$

Conductivity of BaSO<sub>4</sub> = x. Find  $K_{sp}$  (BaSO<sub>4</sub>) = ?

$$\begin{aligned}\Lambda_m^\infty(\text{BaSO}_4) &= \lambda_m^\infty(\text{Ba}^{2+}) + \lambda_m^\infty(\text{SO}_4^{2-}) \\ &= \Lambda_m^\infty(\text{BaCl}_2) + \Lambda_m^\infty(\text{H}_2\text{SO}_4) \\ &\quad - 2 \times \Lambda_m^\infty(\text{HCl}) \\ &= x_1 + x_2 - 2x_3\end{aligned}$$

$$\Lambda_m = \frac{K \times 1000}{M}$$

$$\Lambda_m^\infty = \frac{K_{\text{BaSO}_4} \times 1000}{S}$$

$$S = \frac{x \times 1000}{(x_1 + x_2 - 2x_3)}$$



$$K_{sp} = S^2$$

$$K_{sp} = \frac{x^2 \times 10^6}{(x_1 + x_2 - 2x_3)^2}$$

Q) What will be the empirical formula of compound, if compound has 69.9% Fe and rest is oxygen?

(A)  $\text{FeO}_2$

(B)  $\text{FeO}$

(C)  $\text{Fe}_2\text{O}_3$

(D)  $\text{Fe}_3\text{O}_4$

Fe	O			
69.9	30.1	$\frac{1.25}{1.25} = 1$	$\frac{1.88}{1.25} = \frac{3}{2}$	$\text{Fe}_2\text{O}_3$
$\frac{69.9}{56}$	$\frac{30.1}{16}$	2	3	
= 1.25	= 1.88			

Ans. (C)

**MATH**

**Q) The value of  $1^3 - 2^3 + 3^3 - 4^3 + \dots + 15^3$  is equal to:**

**(A) 1854**

**(B) 1856**

**(C) 1786**

**(D) 1826**

$$= (1^3 + 2^3 + 3^3 + 4^3 + \dots + 15^3) - 2 \cdot 2^3 - 2 \cdot 4^3 - \dots - 2 \cdot 14^3$$

$$= (1^3 + 2^3 + 3^3 + \dots + 15^3) - 2 \cdot 2^3 \cdot (1^3 + 2^3 + \dots + 7^3)$$

$$= \left(\frac{15 \cdot 16}{2}\right)^2 - 16 \cdot \left(\frac{7 \cdot 8}{2}\right)^2$$

$$= (120)^2 - 16 \cdot (28)^2$$

$$1^3 + 2^3 + \dots + n^3 = \left(\frac{n(n+1)}{2}\right)^2$$

**Ans. (B)**

$$\text{Q) } \lim_{x \rightarrow 0} \frac{x^2 \sin^2 x}{x^2 - \sin^2 x} \left( \frac{0}{0} \right) = \lim_{x \rightarrow 0} \frac{x^2 \cdot \left( \frac{\sin x}{x} \right)^2 \cdot x^2}{x^2 - \sin^2 x} = \lim_{x \rightarrow 0} \frac{x^4}{x^2 - \left( x - \frac{x^3}{3!} \right)^2}$$

$$\frac{x^4}{x^2 - \sin^2 x}$$

$$\frac{4x^3}{2x - \sin 2x}$$

$$= \lim_{x \rightarrow 0} \frac{x^4}{x^2 - \left( x^2 - \frac{x^4}{3} \right)}$$

$$= \underline{\underline{3}}$$

**Ans. (3)**

Q)  $\int_{-\pi/4}^{\pi/4} \frac{32\cos^4\theta}{1+e^{\sin\theta}} d\theta$  is equal to:

(A)  $3\pi + 4$

(B)  $3\pi + 8$

(C)  $4\pi + 8$

(D)  $4\pi + 4$

$$= \int_0^{\pi/4} \frac{32\cos^4\theta}{1+e^{\sin\theta}} + \frac{32\cos^4\theta}{1+e^{-\sin\theta}} d\theta$$

$$= \int_0^{\pi/4} 32\cos^4\theta \cdot \left( \frac{1}{1+e^s} + \frac{e^s}{e^s+1} \right) d\theta$$

Ans. (B)

$$\int_{-a}^a f(x) dx = \int_0^a f(x) + f(-x) dx$$

$$= \int_0^{\pi/4} 32\cos^4\theta d\theta = \int_0^{\pi/4} (2\cos^2\theta)^2 \cdot 8 d\theta$$

$$= \int_0^{\pi/4} (1+\cos 2\theta)^2 \cdot 8 d\theta = 8 \int_0^{\pi/4} (1+2\cos 2\theta + \cos^2 2\theta) d\theta$$

$$= 4 \int_0^{\pi/4} (2+4\cos 2\theta + 1+\cos 4\theta) d\theta$$

Q) If  $x_1, x_2, \dots, x_{25}$  be 25 observations such that  $\sum_{i=1}^{25} (x_i + 5)^2 = 2500$  and  $\sum_{i=1}^{25} (x_i - 5)^2 = 1000$ . Then, the ratio of Mean and Standard deviation of the given observations is:

- (A)  $\frac{1}{2}$      
  (B)  $\frac{1}{3}$      
  (C)  $\frac{1}{4}$      
  (D)  $\frac{1}{5}$      
  $20B = 1500$

$$\sum x_i^2 = A$$

$$\sum x_i = B$$

$$A + 10B + 625 = 2500 \Rightarrow A + 10B = 1875$$

$$A - 10B + 625 = 1000 \Rightarrow A - 10B = 375$$

$$A = 1125, B = 75$$

$$\bar{x} = \frac{\sum x_i}{n} = 3$$

$$\sigma^2 = \frac{\sum x_i^2}{n} - (\bar{x})^2 = 45 - (3)^2 = 36 \Rightarrow \sigma = 6$$

$$\frac{\bar{x}}{\sigma} = \frac{3}{6} = \frac{1}{2}$$

Ans. (A)

Q) In the expansion of  $(1 + \alpha x)^{26}$  and  $(1 - \alpha x)^{28}$ , the coefficient of middle term is same, then the value of  $\alpha$  is:

✓✓ (A)  $\frac{7}{27}$

(B)  $\frac{7}{25}$

(C)  $\frac{4}{27}$

(D)  $\frac{3}{22}$

$${}^{26}C_{13} (\alpha)^{13} = {}^{28}C_{14} (-\alpha)^{14}$$

$$\alpha = \frac{{}^{26}C_{13}}{{}^{28}C_{14}} = \frac{7}{27}$$

$$\begin{aligned} n = \text{even} \quad \text{mid term} &= \frac{n+2}{2} \\ &= 14, 15 \end{aligned}$$

**Ans. (A)**

Q)  $a_1, a_2, a_3, \dots, a_n$  are in A.P. and sum of first 10 terms is 160.  $g_1, g_2, g_3, \dots, g_n$  are in G.P., where  $g_1 + g_2 = 8$ . If the first term of A.P. is equal to common ratio of G.P. and first term of G.P. is equal to common difference of A.P., then sum of all possible values of  $g_1$  is equal to

(A)  $\frac{23}{3}$

(B)  $\frac{28}{9}$

(C)  $\frac{34}{9}$

(D)  $\frac{28}{5}$

$a_1 = r$

$g_1 = d$

$S_{10} = 160$   
 $\frac{n}{2} [2a + (n-1)d] = 160$   
 $5 [2a + 9d] = 160$   
 $2a + 9d = 32$

$g + gr = 8$   
 $g(1+r) = 8$   
 $g(1+a) = 8$

$a = \frac{8}{g} - 1$

$2 \left( \frac{8}{g} - 1 \right) + 9g - 32 = 0$

$\frac{16}{g} + 9g - 34 = 0$

$gg^2 - 34g + 16 = 0$

$g_1 + g_2 = \frac{34}{9}$

$g_1 g_2 = \frac{16}{9}$

$g_1$   
 $g_2$

Ans. (C)

$|e_H| > 1$

Q) Consider  $e_1$  and  $e_2$  be roots of the equation  $x^2 - ax + 2 = 0$ . Set of values of  $a$  for which  $e_1$  and  $e_2$  are eccentricities of hyperbolas then  $a \in [\alpha, \beta)$  and set of values of  $a$  for which  $e_1$  and  $e_2$  are eccentricity of a hyperbola and an ellipse is  $(\gamma, \infty)$  then  $\alpha^2 + \beta^2 + \gamma^2$  is equal to

$e > 1$  &  $0 < e < 1$

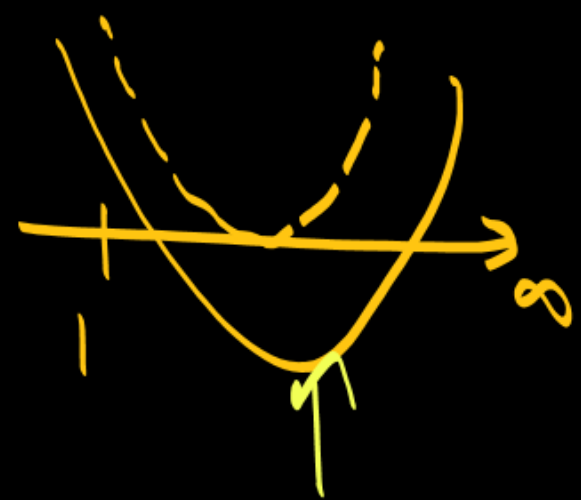
(A) 18

(B) 24

(C) 26

(D) 32

Both roots  $e_1, e_2 > 1$



$f(1) > 0$   
 $D \geq 0$   
 $+\frac{(a)}{2} > 1$

$a \in [2\sqrt{2}, 3)$



$f(1) < 0$   
 $3 < a$

Ans. (C)

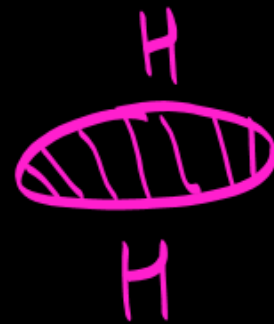
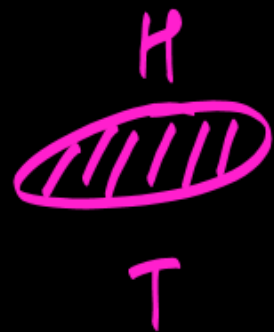
Q) There are  $(n + 1)$  coins. ' $n$ ' coins are unbiased coins and one coin has two heads. A coin is randomly chosen and tossed once. If the probability of getting head is  $\frac{9}{16}$ , then the value of  $n$  is:

(A) 8

(B) 7

(C) 6

(D) 5



$$\begin{aligned} \text{unbiased} \times \text{H} + \text{biased} \times \text{H} &= \frac{9}{16} \\ \frac{n}{n+1} \times \frac{1}{2} + \frac{1}{n+1} \times 1 &= \frac{9}{16} \end{aligned}$$

$$\frac{1}{n+1} \left( \frac{3}{2} + 1 \right) = \frac{9}{16}$$

$$n = 7$$

Ans. (B)

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