

SINCE 1984  **Brilliant**<sup>®</sup>  
STUDY CENTRE, PALA

# **JEE MAIN 2026**

## **SESSION-1**

### **SHIFT-1 MORNING**



SCAN ME

## **VIDEO SOLUTION**

# **MEMORY BASED QUESTIONS**

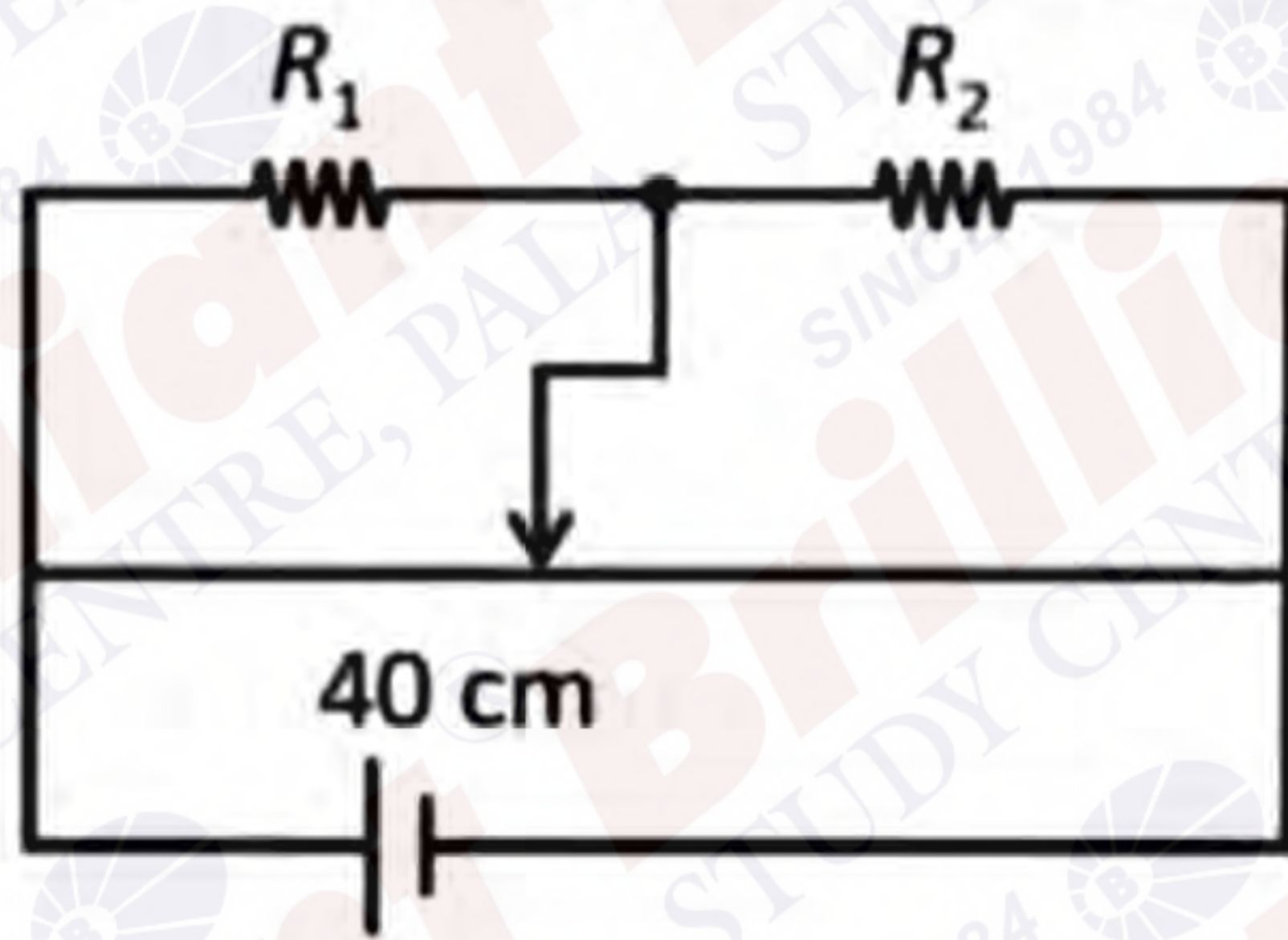
**QN** Two disc having same moment of inertia about their axis. Thickness is  $t_1$  and  $t_2$  and they have same density. If  $R_1/R_2 = 1/2$ , then find  $t_1/t_2$

- 1) 1/16                      2) 16                      3) 1/4                      4) 4

**QN** In series R-L circuit, voltage of battery is 10 V. Resistance and inductance are  $10 \Omega$  and 10 mH respectively. Find energy stored in the inductor when current reaches  $\frac{1}{e}$  times of maximum value

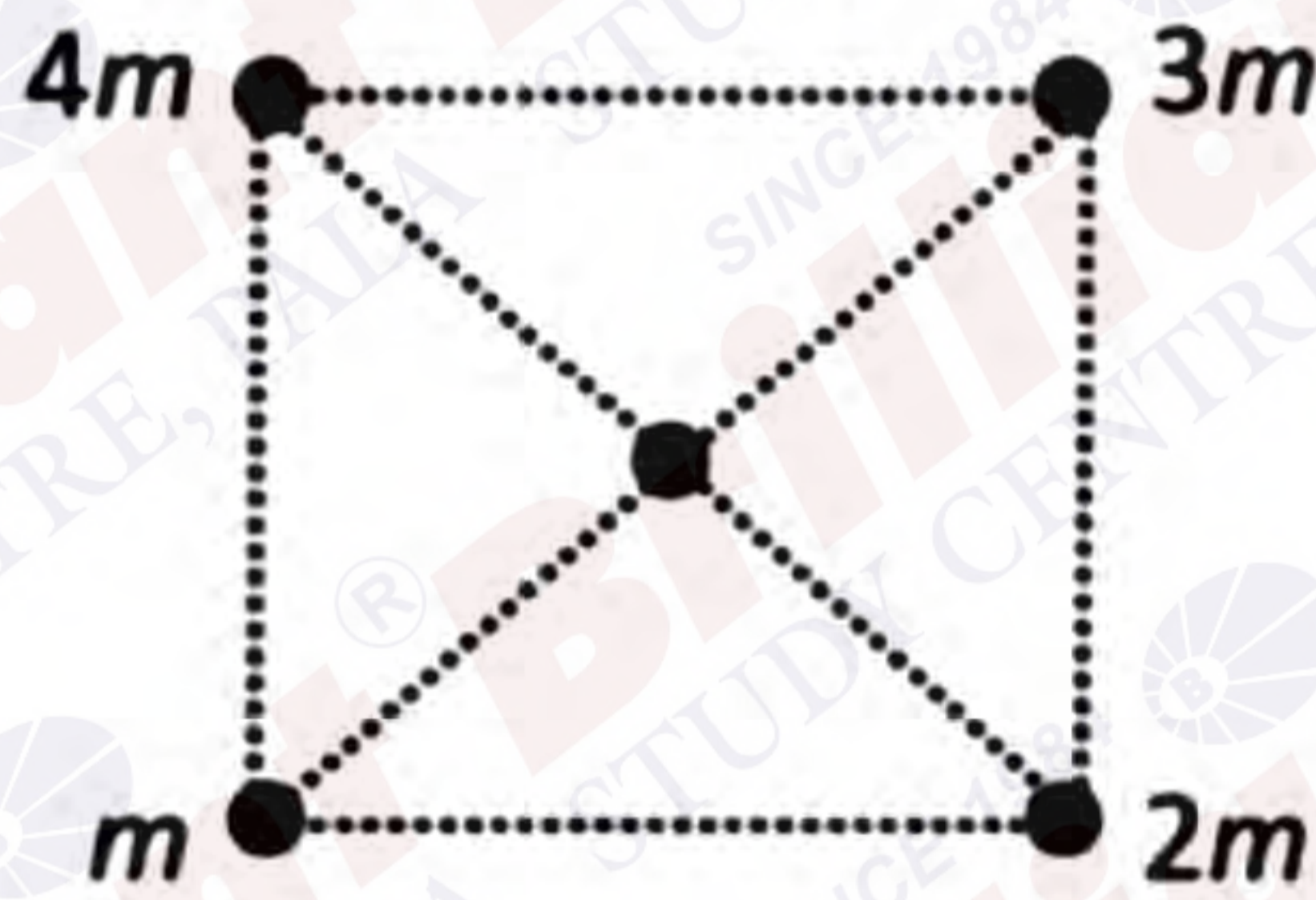
- 1) 0.67 mJ                      2) 1.33 mJ                      3) 0.33 mJ                      4) 0.50 mJ

**QN** In a potentiometer null point for two resistance  $R_1$  and  $R_2$  is at 40 cm as shown. If  $16 \Omega$  is connected in parallel to  $R_2$  then null point is at 50 cm then  $R_1$  and  $R_2$  are respectively.



- 1)  $16 \Omega, 48 \Omega$                       2)  $32 \Omega, 32/3 \Omega$                       3)  $16/3 \Omega, 8 \Omega$                       4)  $32/3 \Omega, 32 \Omega$

**QN** In the given situation force at centre on 1 kg mass is  $F_1$ . Now if 4m and 3m is interchanged the force is  $F_2$ . Given :  $\frac{F_1}{F_2} = \frac{2}{\sqrt{\alpha}}$ . Find  $\alpha$ .



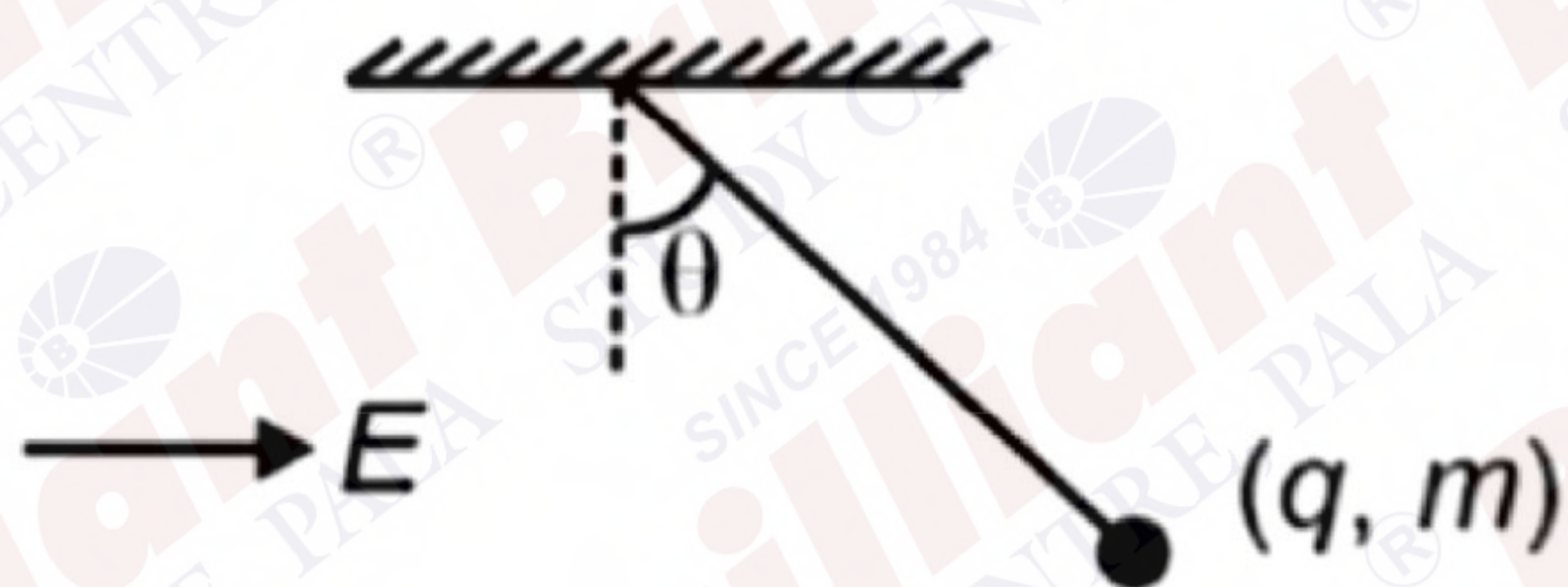
- 1)  $\alpha = 5$                       2)  $\alpha = 3$                       3)  $\alpha = 7$                       4)  $\alpha = 1$

**QN** Match the column

	Column-I		Column-II
(A)	Thermal Conductivity	(P)	$[ML^2T^{-2}K^{-1}]$
(B)	Boltzmann Constant	(Q)	$[M^1L^{-1}T^{-2}]$
(C)	Spring constant	(R)	$[M^1L^1T^{-3}K^{-1}]$
(D)	Surface tension	(S)	$[M^1L^0T^{-2}]$
		(T)	$[M^1L^2T^{-3}K^{-1}]$
		(U)	$[ML^2T^{-2}]$

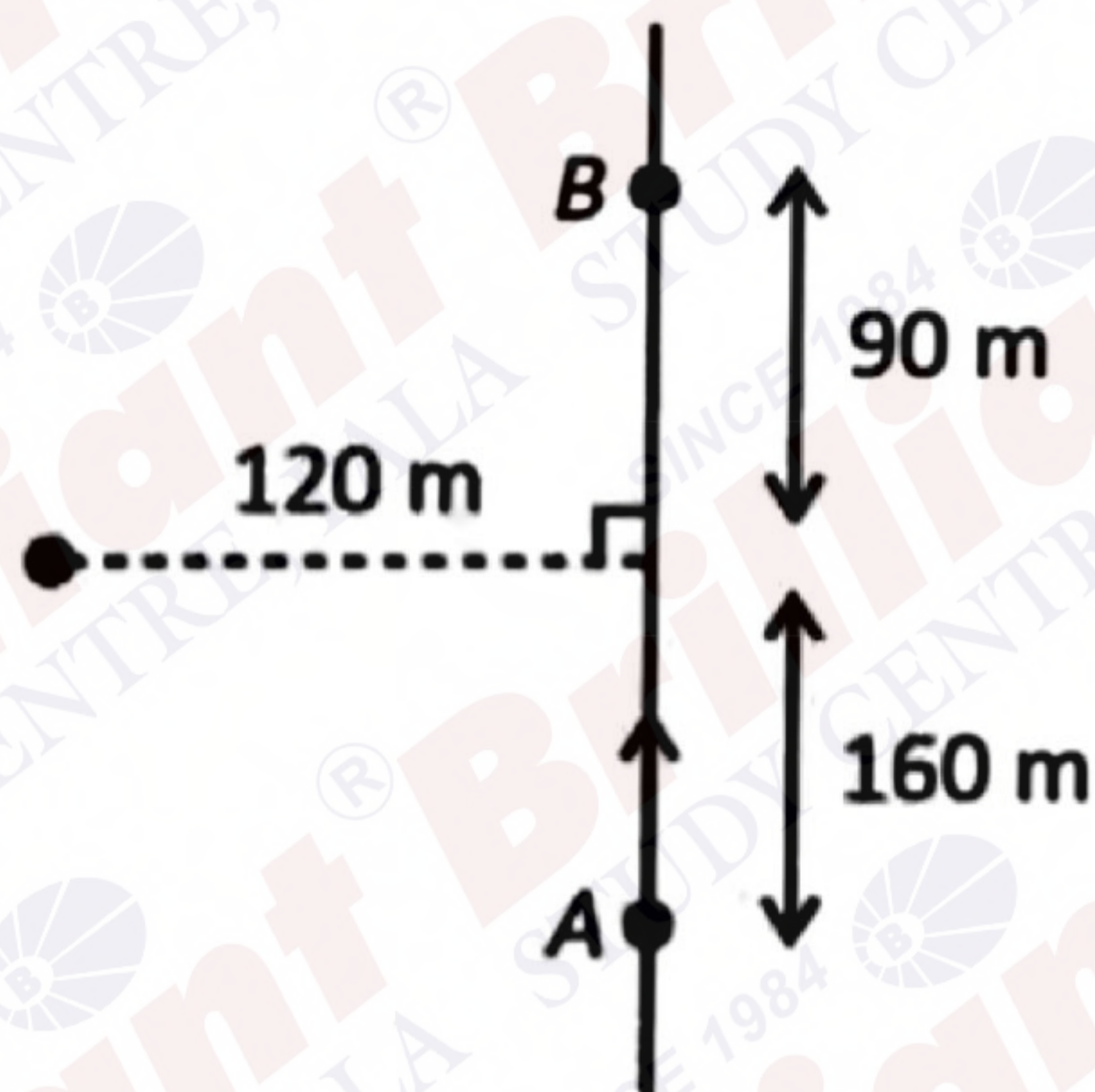
- 1) A  $\rightarrow$  R; B  $\rightarrow$  P; C  $\rightarrow$  S; D  $\rightarrow$  S                      2) A  $\rightarrow$  T; B  $\rightarrow$  P; C  $\rightarrow$  U; D  $\rightarrow$  S  
 3) A  $\rightarrow$  R; B  $\rightarrow$  T; C  $\rightarrow$  Q; D  $\rightarrow$  Q                      4) A  $\rightarrow$  T; B  $\rightarrow$  U; C  $\rightarrow$  S; D  $\rightarrow$  Q

**QN** A simple pendulum with bob (mass  $m$  & charge  $q$ ) is in equilibrium in presence of horizontal electric field  $E$  then tension in thread is



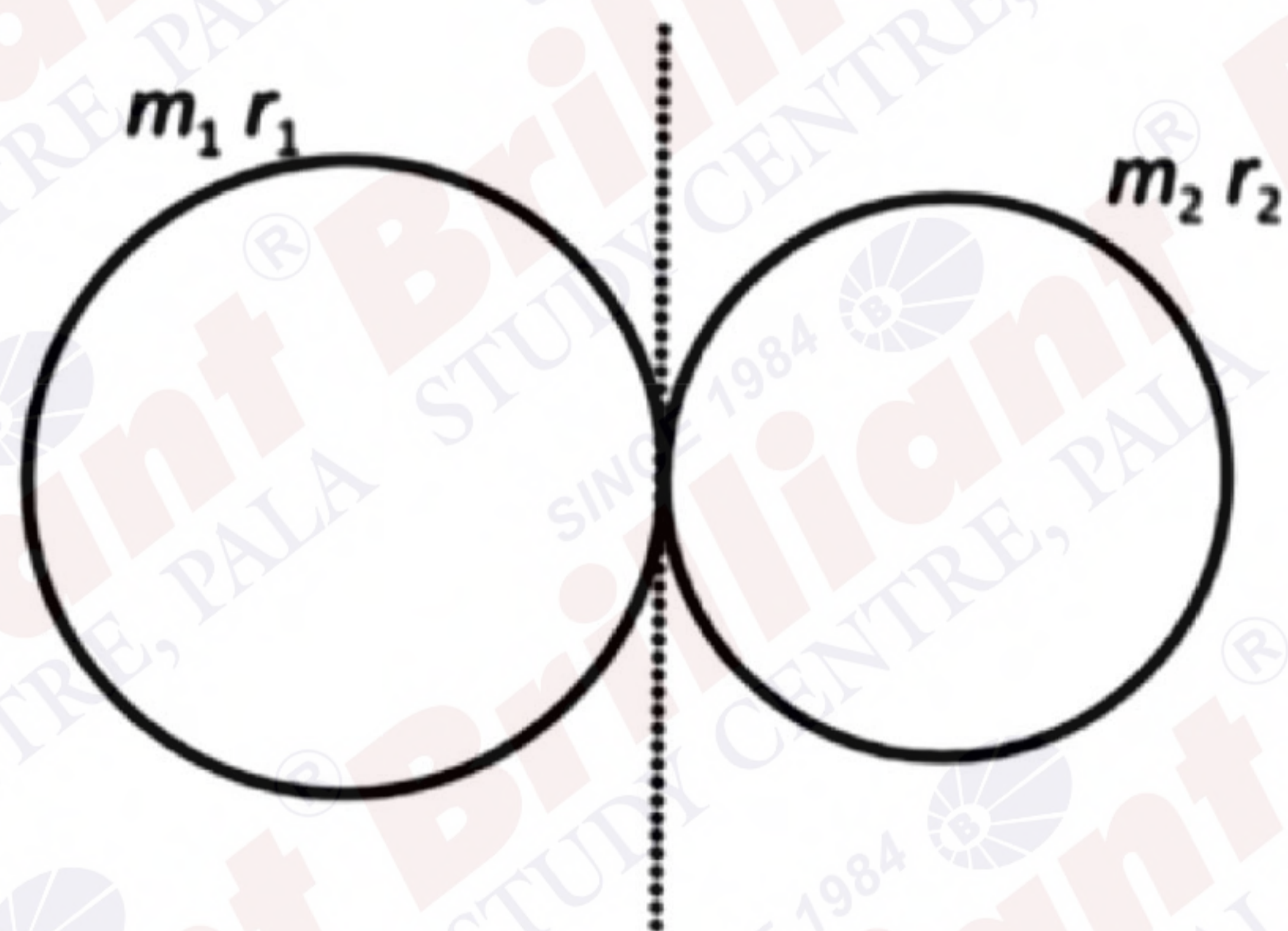
- 1)  $mg + qE$       2)  $\sqrt{m^2g^2 + q^2 + E^2}$       3)  $\sqrt{mg + qE}$       4)  $mg + qE \tan \theta$

**QN** Detector D moves from A to B and observe the frequencies are differing by 10 Hz. Source is emitting frequency  $f_0$  as shown: Speed of detector is 35 times less than speed of sound. The  $f_0$  is



- 1) 400 Hz      2) 350 Hz      3) 250 Hz      4) 150 Hz

**QN** Disk  $m_1 = 5$  kg and radius  $r_1 = 10$  cm and disk  $m_2 = 10$  kg and radius  $r_2 = 50$  cm are arranged as shown in figure. Find moment of inertia about an axis the common tangent and parallel to the plane of the disk.

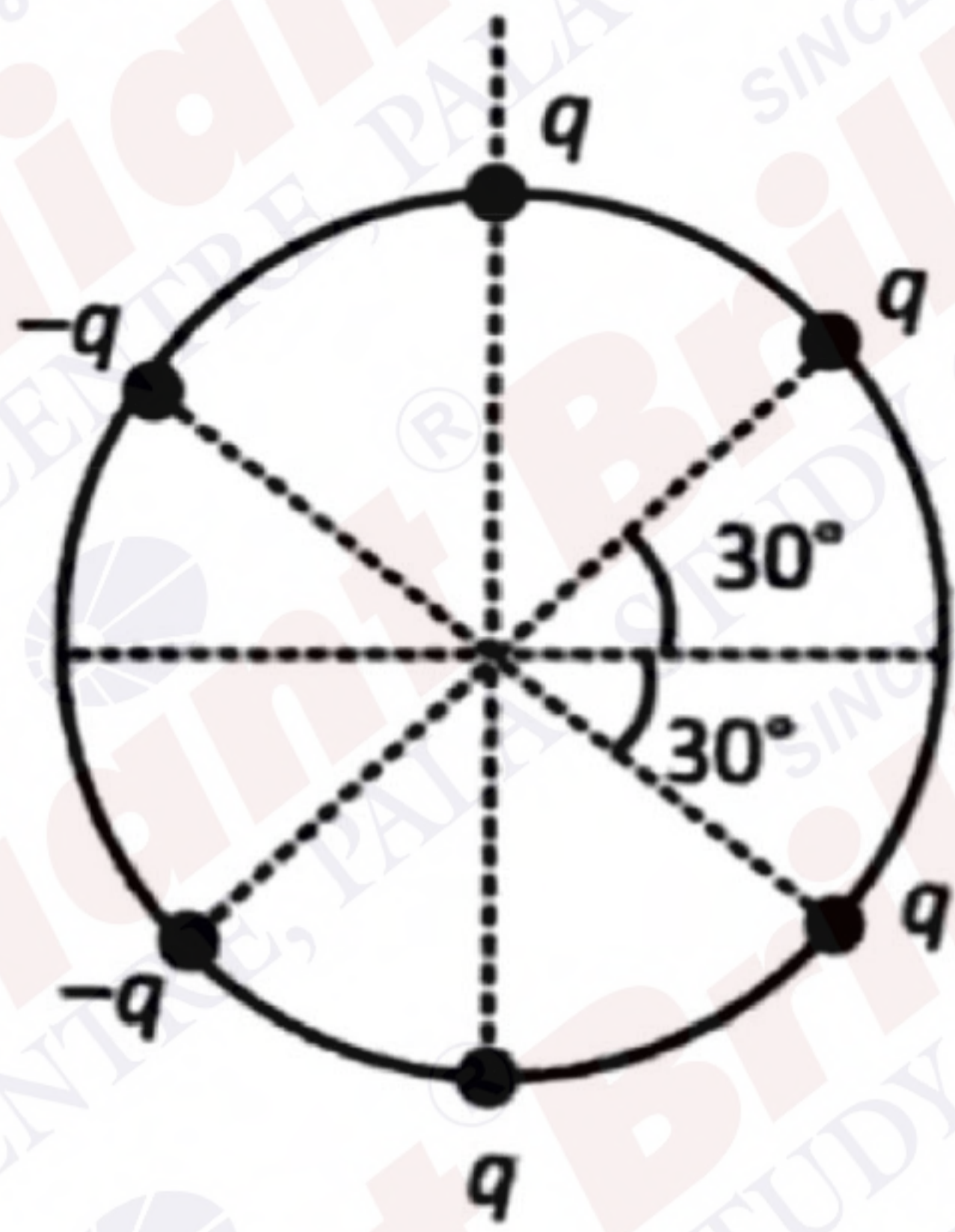


- 1)  $\frac{31}{8} \text{ kg m}^2$       2)  $\frac{57}{64} \text{ kg m}^2$       3)  $\frac{41}{8} \text{ kg m}^2$       4)  $\frac{51}{16} \text{ kg m}^2$

**QN** In adiabatic process the temperature reduces to  $\frac{1}{4}$ th and volume increases to 8 times. Find adiabatic constant of the gas

- 1)  $\frac{3}{4}$       2)  $\frac{5}{7}$       3)  $\frac{5}{3}$       4)  $\frac{8}{5}$

**QN** Six charges (fare + q, two - q) are present at circle of radius r and centred at origin as shown. Electric field at origin is



- 1)  $\frac{\sqrt{3}q}{4\pi\epsilon_0 r^2} \hat{i}$       2)  $\frac{\sqrt{3}q}{4\pi\epsilon_0 r^2} (-\hat{i})$       3)  $\frac{\sqrt{3}q}{2\pi\epsilon_0 r^2} (-\hat{i})$       4)  $\frac{\sqrt{3}q}{\pi\epsilon_0 r^2} (\hat{i})$

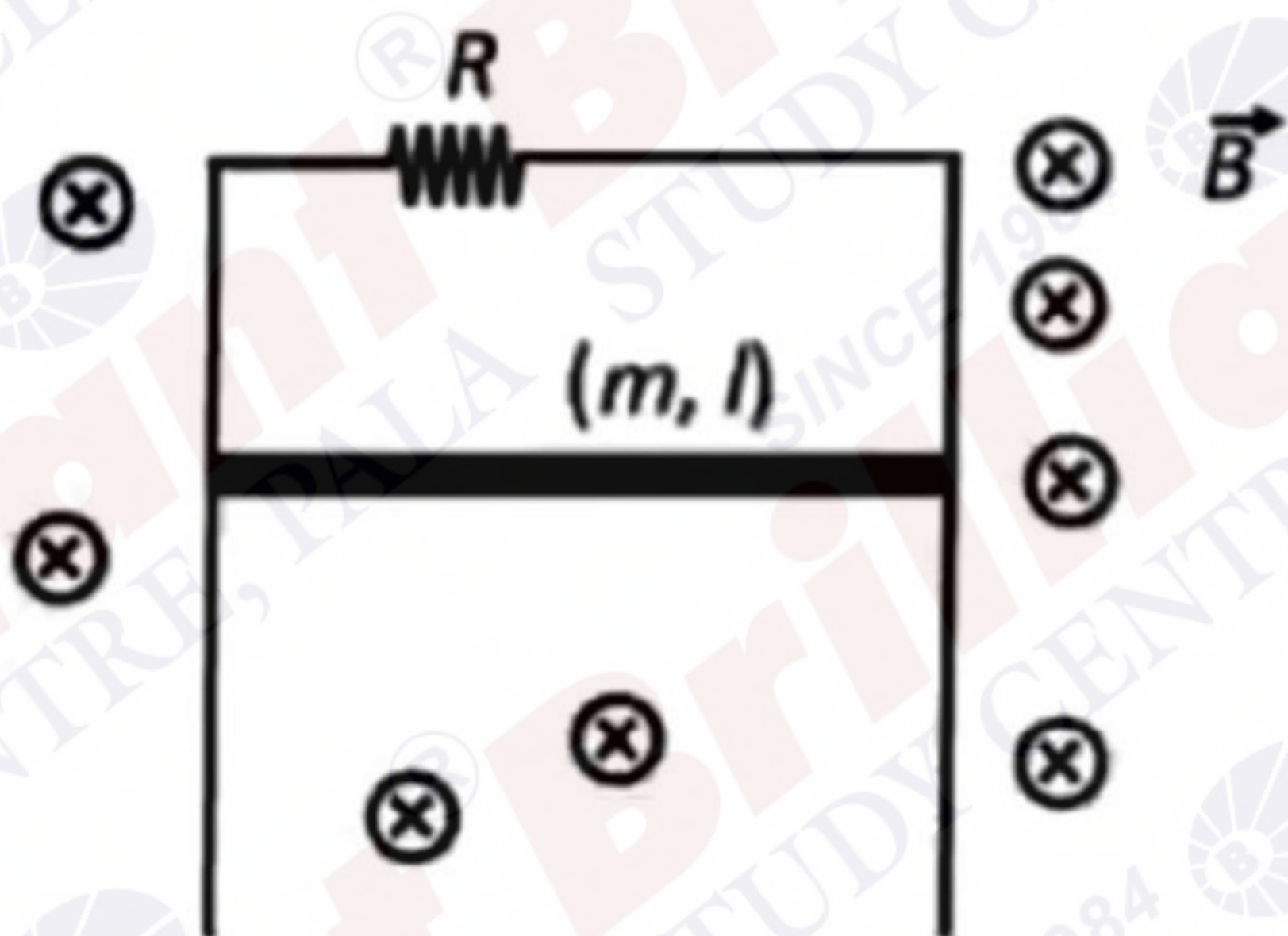
**QN** An  $\alpha$ - particle with KE 7.9 MeV is projected towards a stationary target nucleus of  $Z=79$ . Find the distance of closest approach

- 1)  $1.44 \times 10^{-14}$       2)  $2.88 \times 10^{-14}$       3)  $1.44 \times 10^{-15}$       4)  $2.88 \times 10^{-15}$

**QN** A planet 'A' having density  $\rho$  and radius R has escape velocity = 10 km/sec. Find the escape velocity (in m/s) of a planet B having density and radius both 10% that of planet A.

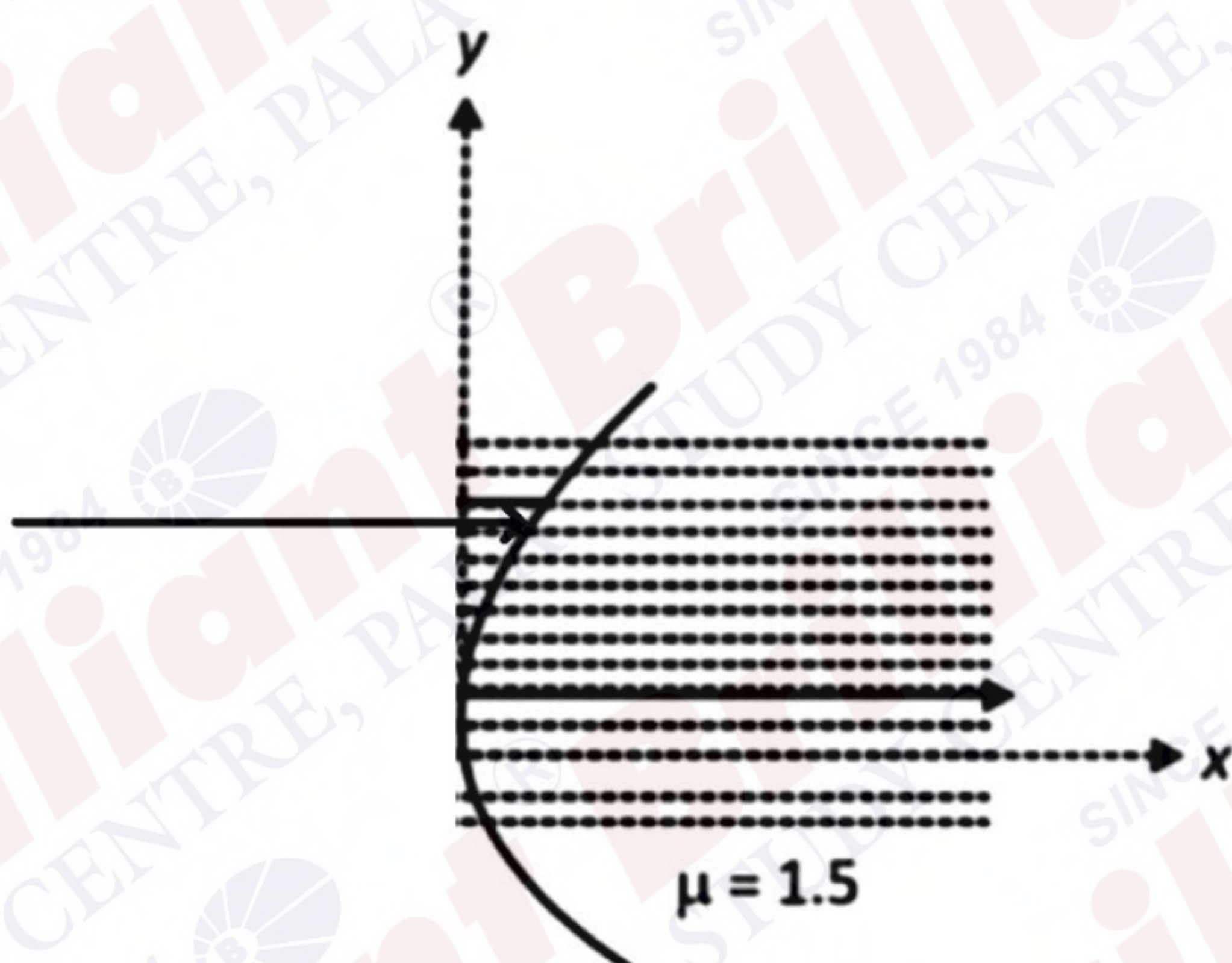
- 1)  $100\sqrt{10}$       2)  $100\sqrt{20}$       3)  $\sqrt{3000}$       4)  $\sqrt{900}$

**QN** A conducting rod of mass m length l is moving on a infinite pair of conducting rails as shown. Conducting rails are connected to a resistance R at one end. Motion is in vertical plane and horizontal magnetic field in the region is B. Find terminal speed of rod



- 1)  $V_0 = \frac{3mgR}{2B^2 l^2}$       2)  $V_0 = \frac{mgR}{2B^2 l^2}$       3)  $V_0 = \frac{mgR}{B^2 l^2}$       4)  $V_0 = \frac{2mgR}{B^2 l^2}$

**QN** A ray parallel to x axis (principal axis of curved surface. The x co-ordinate where ray cuts x-axis (in m) is : (The radius of curvature is 50 cm)



- 1) 1.5      2) 0.5      3) 1      4) 2

**QN** A sinusoidal EMW is given by  $\vec{E} = 20 \sin\left(\frac{2}{300}x - 10^6 t\right)$  is propagating in a non-magnetic material.

Dielectric constant of material is

- 1)  $9 \times 10^4$                       2)  $3 \times 10^2$                       3) 4                      4) 2

**QN** Combination of lenses are arranged in case I and case II as shown in figure. Magnification in two

cases are  $m_1$  and  $m_2$ . Find  $\left|\frac{m_1}{m_2}\right|$

- 1) 5/6                      2) 4/3                      3) 3/4                      4) 6/5

**QN** Statement-I : Fluid exerts pressure on the surface of a solid in contact with it

Statement-II : The excess potential energy of molecules at the surface of a liquid leads to surface tension.

- 1) Both statement-I and statement-II are correct  
2) Both statement-I and statement-II are incorrect  
3) Statement-I is correct and statement-II is incorrect  
4) Statement-I is incorrect and statement-II is correct

**QN** Match the column-I with the correct numerical values of energy/heat in column-II (R is universal gas constant)

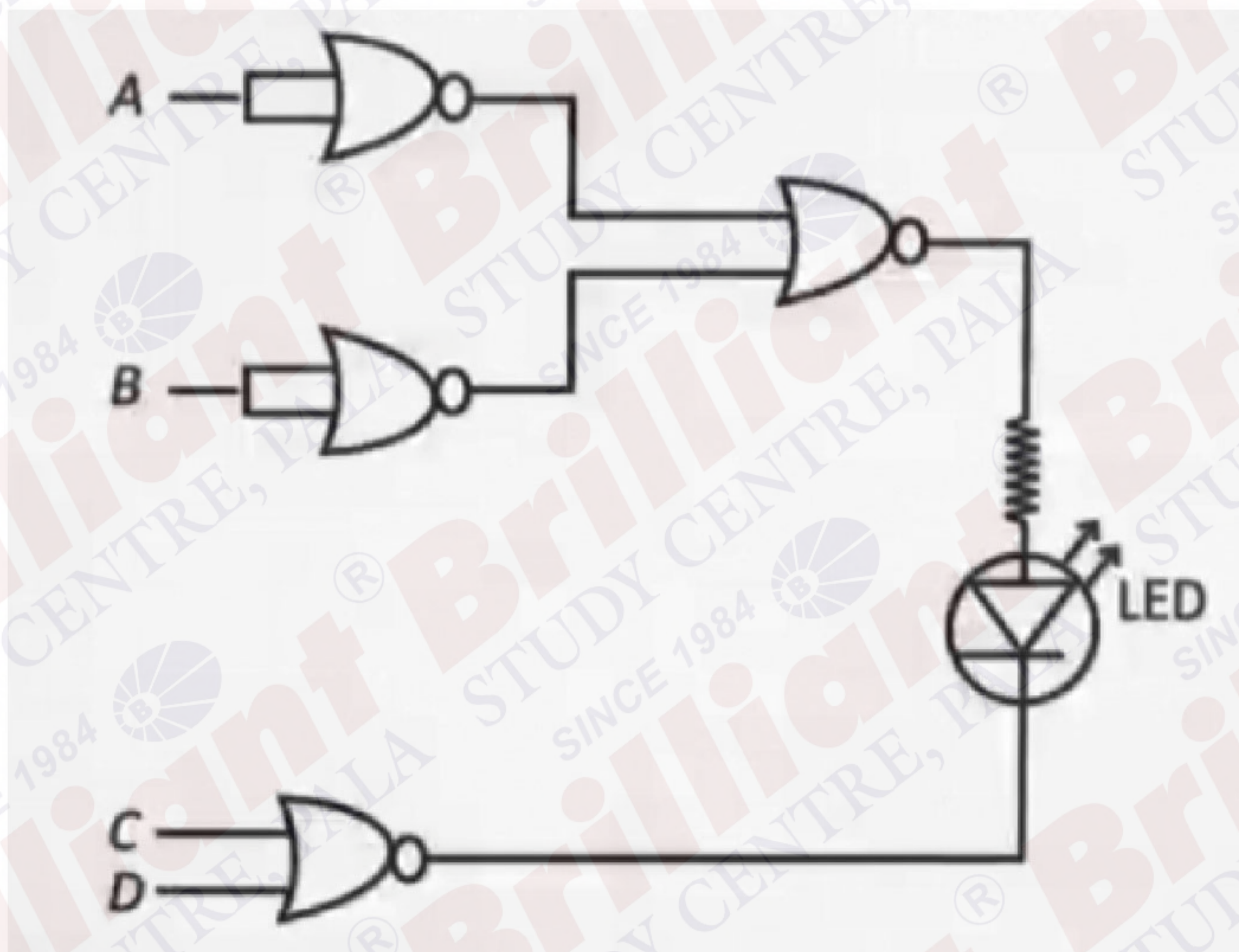
A) 1 mole of monoatomic ideal gas undergoes polytropic process  $PV^{-1/2}$  with  $\Delta T = 320$  K find  $\Delta U$                       P) 550 R

B) Find heat supplied to 2 moles of gas having heat capacity as  $\frac{5}{2}R$  and  $\Delta T = 120$  K                      Q) 800 R

C) Find the  $\Delta U$  for 1 mole diatomic gas for  $\Delta T = 230$  K                      R) 480 R

1) A-R; B-P; C-Q                      2) A-P; B-R; C-Q                      3) A-R; B-Q; C-P                      4) A-Q; B-P; C-R

**QN** In the given logic circuit shown in the figure, inputs A, B, C and D are applied as shown. An LED is connected at the output. In which of the following combinations will the LED glow

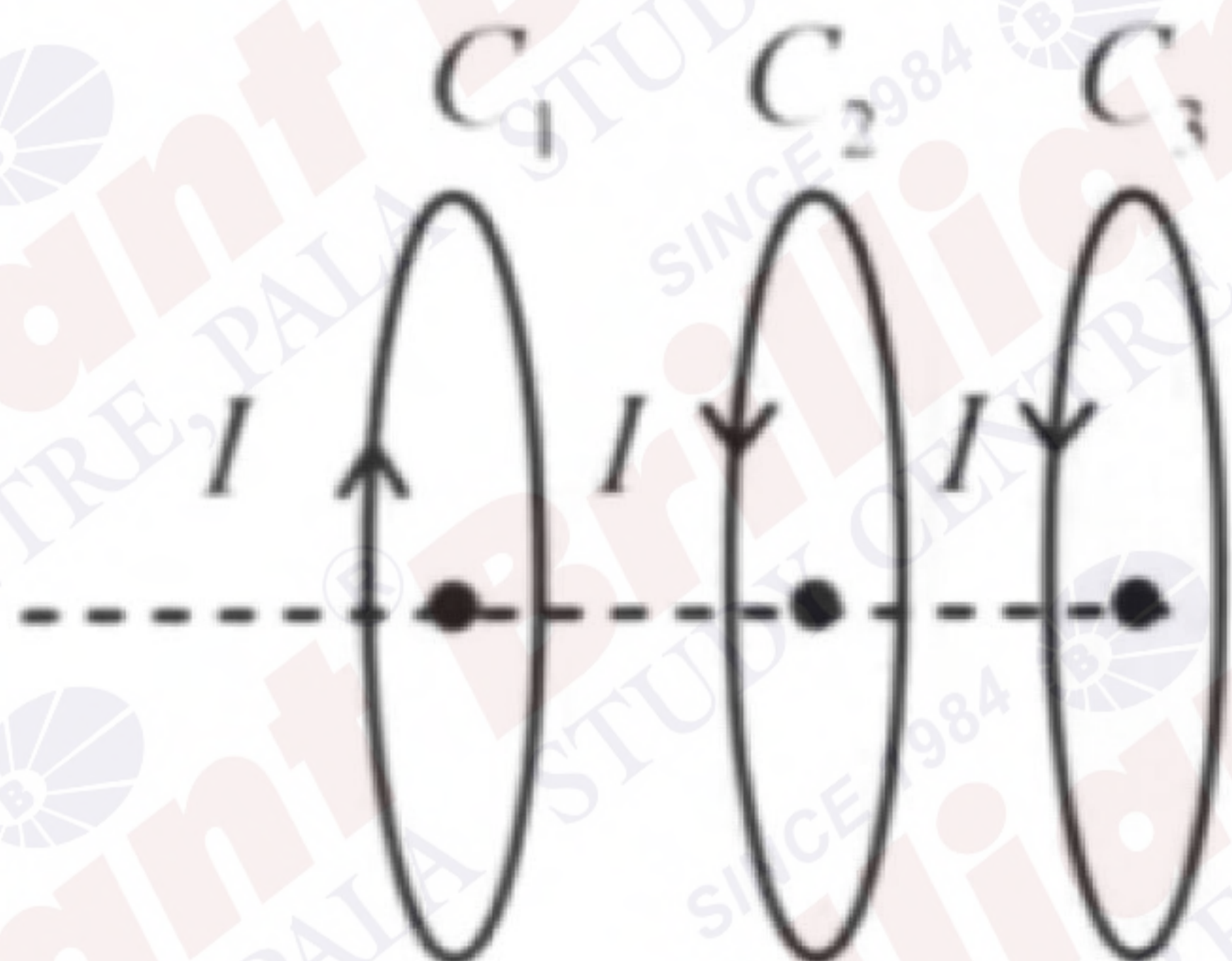


- 1)  $A = 1, B = 1, C = 0, D = 0$
- 2)  $A = 1, B = 0, C = 0, D = 0$
- 3)  $A = 0, B = 1, C = 1, D = 0$
- 4)  $A = 1, B = 1, C = 1, D = 1$

**QN**  $\vec{E} = 10\hat{i} + 5\hat{j}$  potential at (10, 20) is 500 V. Find potential at origin

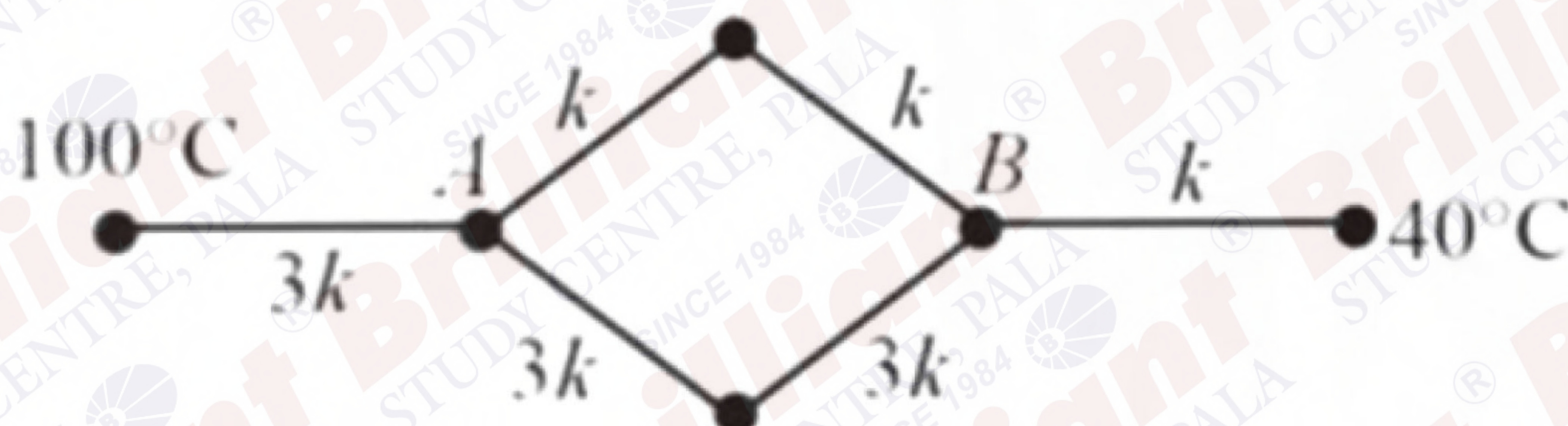
**QN** A particle is projected at an angle of  $60^\circ$  with ground at speed  $u$ . When projectile makes an angle of  $45^\circ$  with horizontal its speed becomes  $20\sqrt{2}$  m/s. Value of  $u$  is ..... m/s

**QN** Three coils  $C_1, C_2$  and  $C_3$  carry currents as shown in the figure. Coils are identical in shape and each carries same magnitude of current if  $C_2$  is released then it will

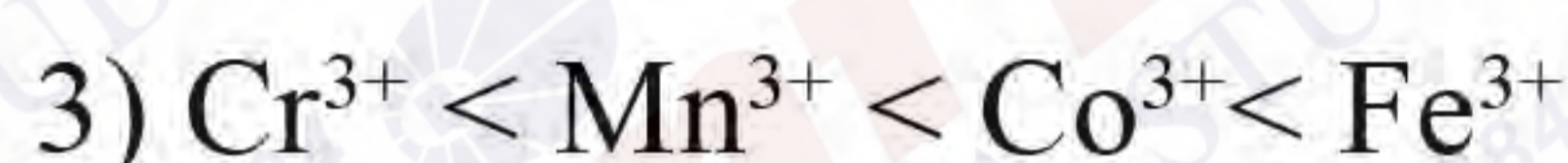
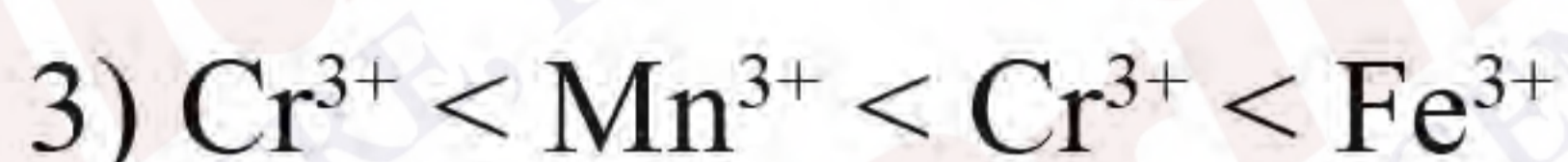
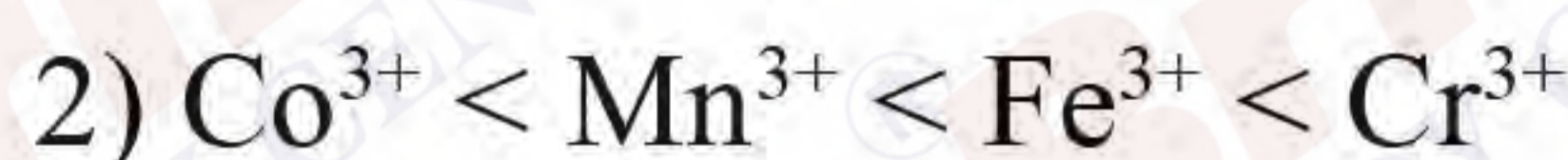
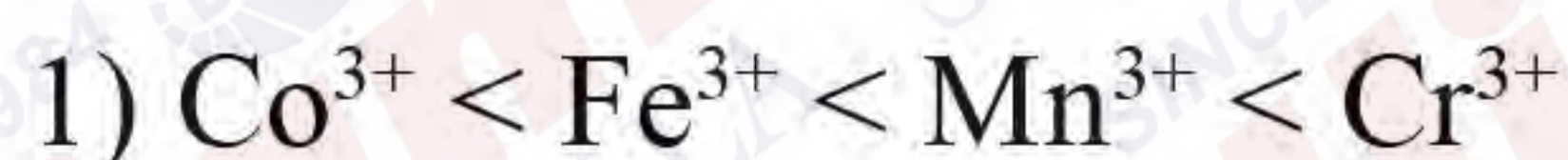


- 1) move rightwards
- 2) move leftwards
- 3) will not move
- 4) cannot say

**QN** Six rods of identical length and area of cross section area ttached across  $40^\circ\text{C}$  and  $100^\circ\text{C}$  as shown in figure. Their respectie thermal conductivity are as shown in diagram. What is the temeprature difference between points A and B



**QN** Arrange the given metal ions in number in increasing order of unpaired electrons in low spin complex



**QN** Match the following and choose the correct option

List-I

List-II



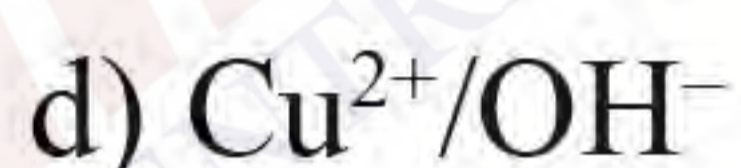
i) Fehling's solution



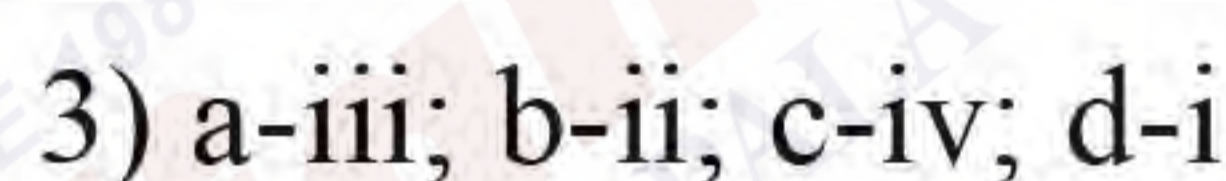
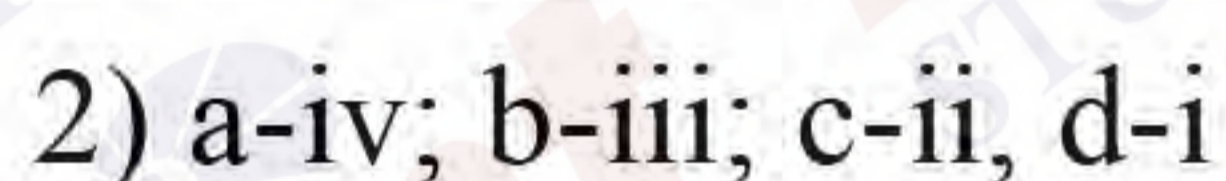
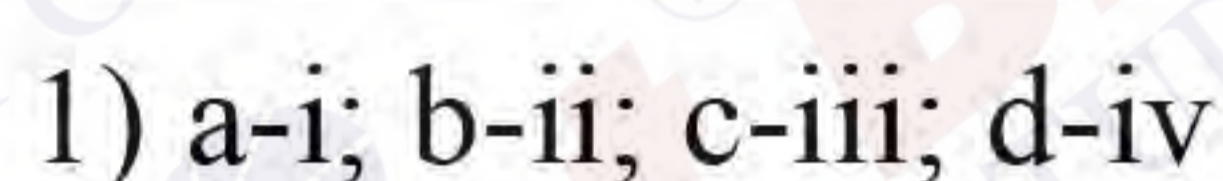
ii) Clemmenson's reduction



iii) Tollen's reagent



iv) Wolff-Kishner reduction



**QN** Statement-I : Sucrose is dextrorotatory and upon hydrolysis it becomes laevorotatory

Statement-II : Sucrose on hydrolysis gives glucose and fructose such that the laevorotation of glucose is more than dextrorotation of fructose

1) Both statement-I and statement-II are correct

2) Both statement-I and statement-II are incorrect

3) Statement-I is correct and statement-II is incorrect

4) Statement-I is incorrect and statement-II is correct

**QN** Statement-I : Ortho and para nitro phenol can be differentiated by steam distillation

Statement-II : Glycerol is separated from spent lie by distillation under reduced pressure

Statement-II : Chromatography separation based on differential affinities of component for stationary phase

Statement-IV : Aniline is commonly separated from mix from water by crystallisation

Select correct option

1) only i And IV

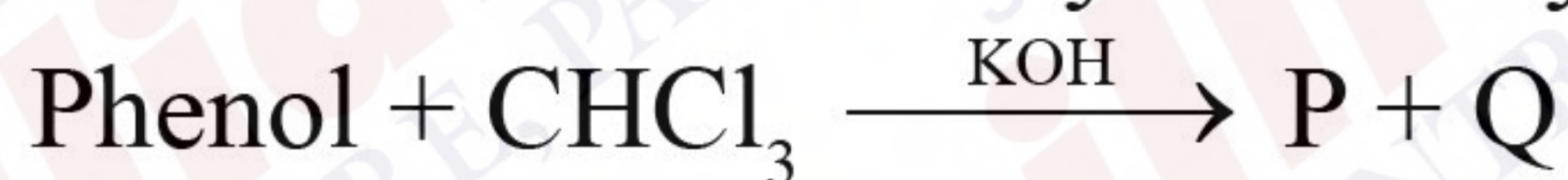
2) only I, II, and III

3) only I, III

4) All of these

**QN** Statement-I : When phenol reacts with chloroform in a presence of KOH then product P and Q formed.

Statement-II : o-salicylic aldehyde and p-salicylic aldehyde can be isolated by steam distillation

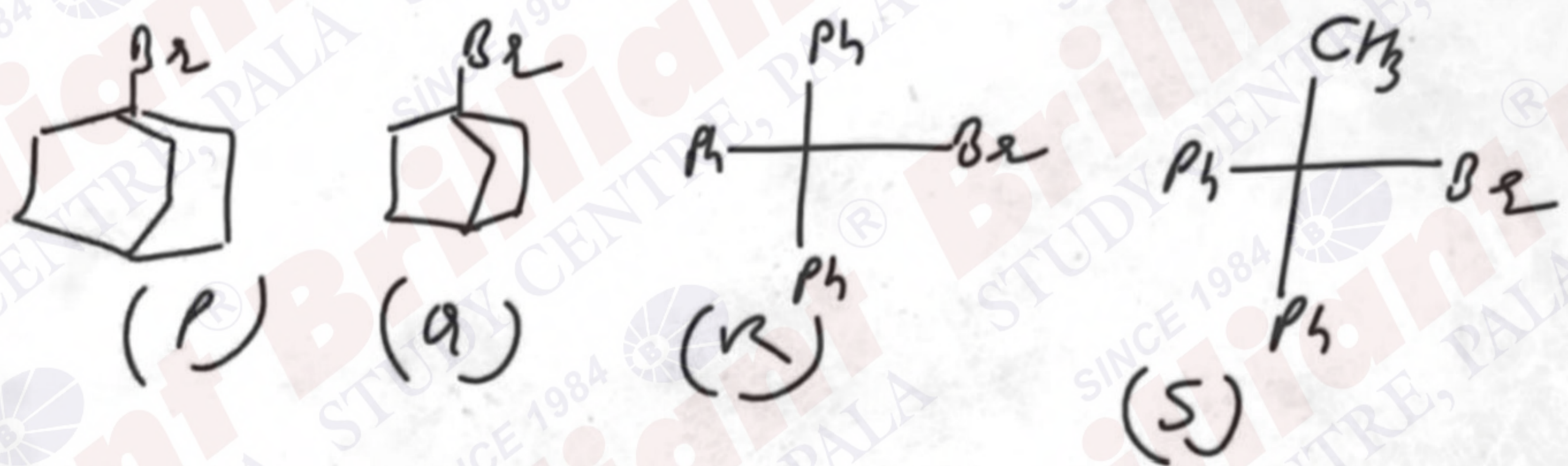


- 1) Both statement-I and statement-II are correct
- 2) Both statement-I and statement-II are incorrect
- 3) Statement-I is correct and statement-II is incorrect
- 4) Statement-I is incorrect and statement-II is correct

**QN** Which of the following is the correct order of the reactivity of given nucleophiles when treated with  $\text{CH}_3\text{Br}$  in methanol?  $\text{F}^-$ ,  $\text{I}^-$ ,  $\text{C}_2\text{H}_5\text{O}^-$ ,  $\text{C}_6\text{H}_5\text{O}^-$

- 1)  $\text{I}^- < \text{C}_2\text{H}_5\text{O}^- < \text{C}_6\text{H}_5\text{O}^- > \text{F}^-$
- 2)  $\text{I}^- < \text{F}^- > \text{C}_2\text{H}_5\text{O}^- > \text{C}_6\text{H}_5\text{O}^-$
- 3)  $\text{I}^- < \text{C}_2\text{H}_5\text{O}^- > \text{F}^- > \text{C}_6\text{H}_5\text{O}^-$
- 4)  $\text{C}_6\text{H}_5\text{O}^- > \text{F}^- > \text{I}^- > \text{C}_2\text{H}_5\text{O}^-$

**QN** Compare rate of  $\text{S}_{\text{N}}1$

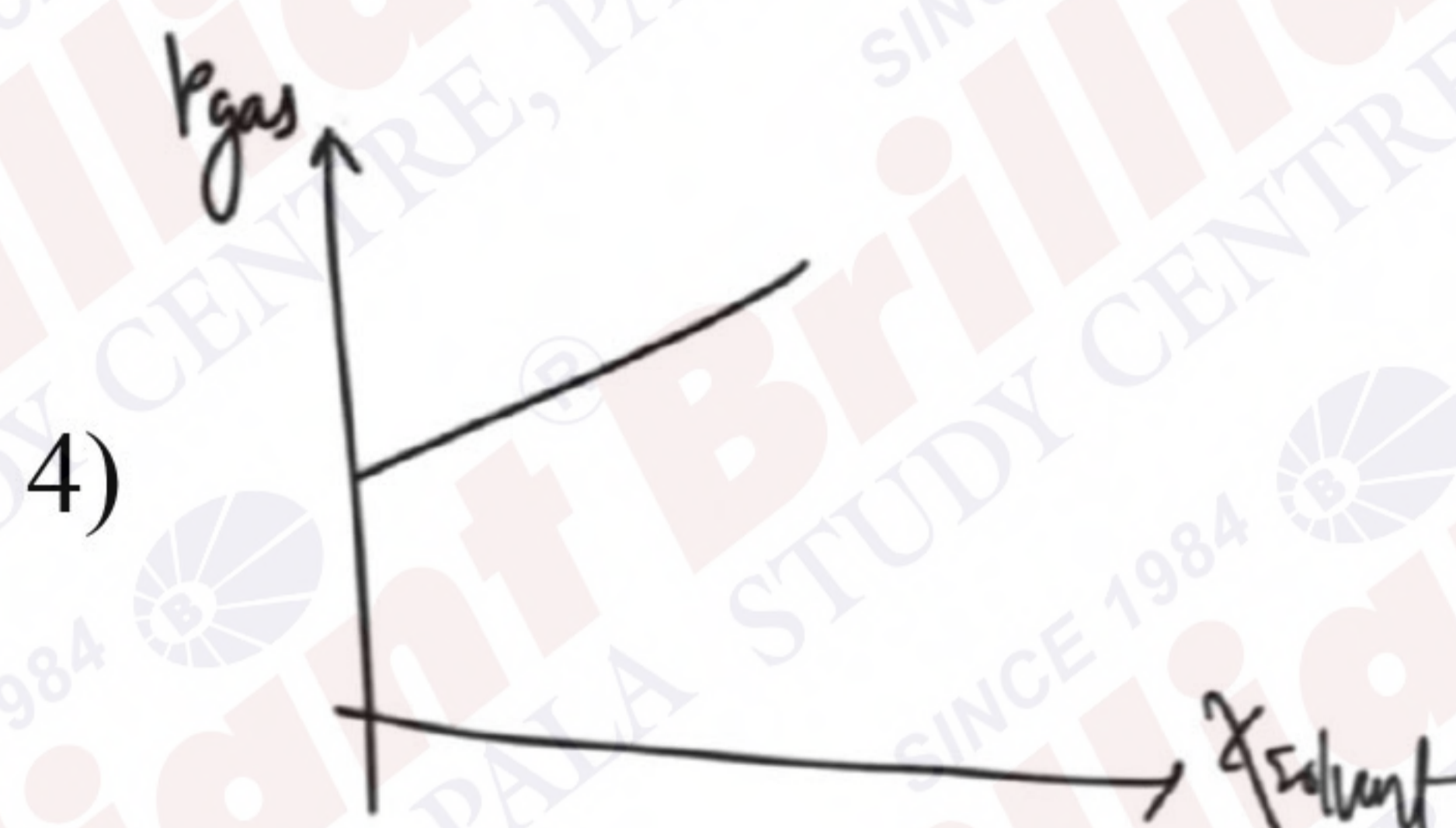
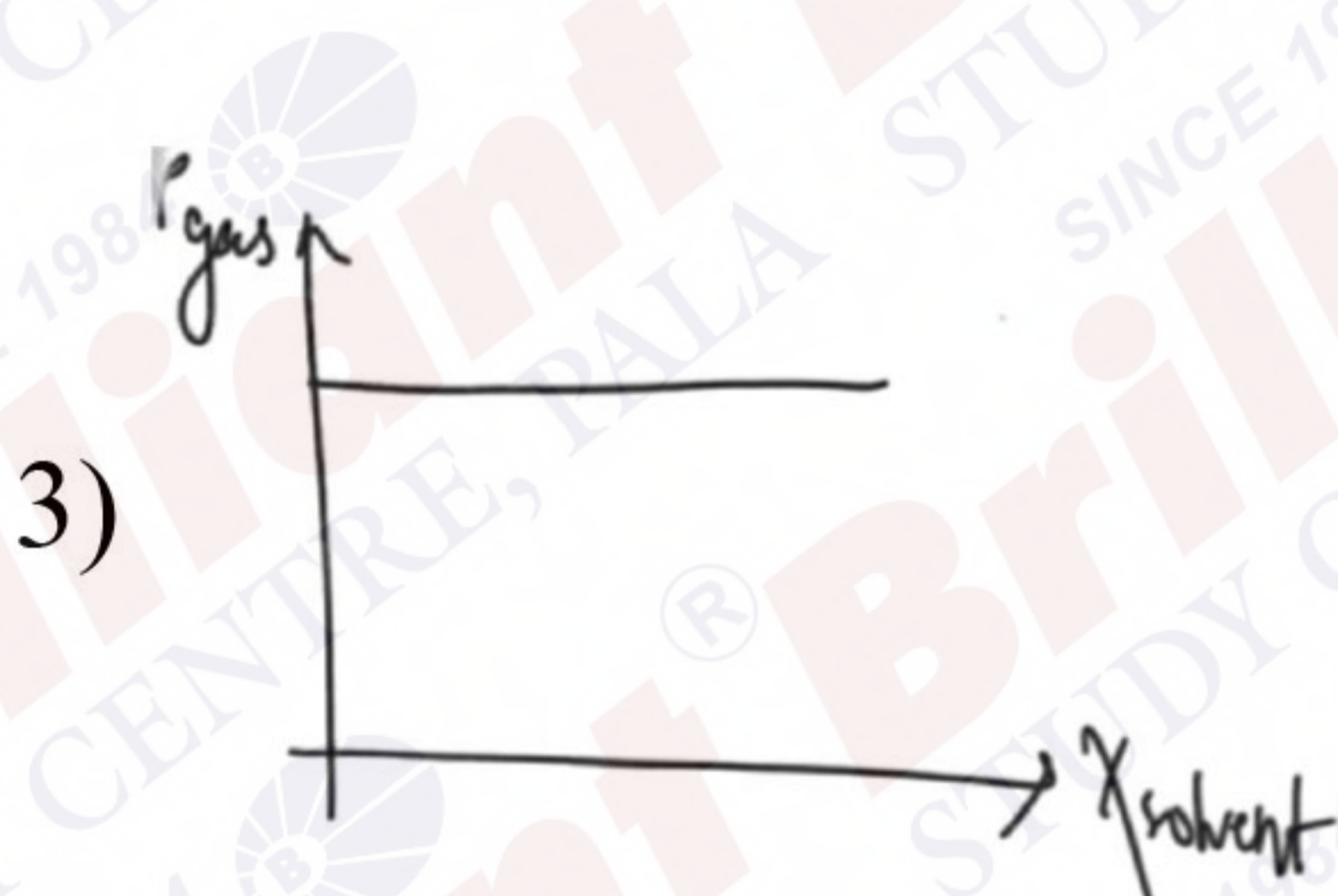
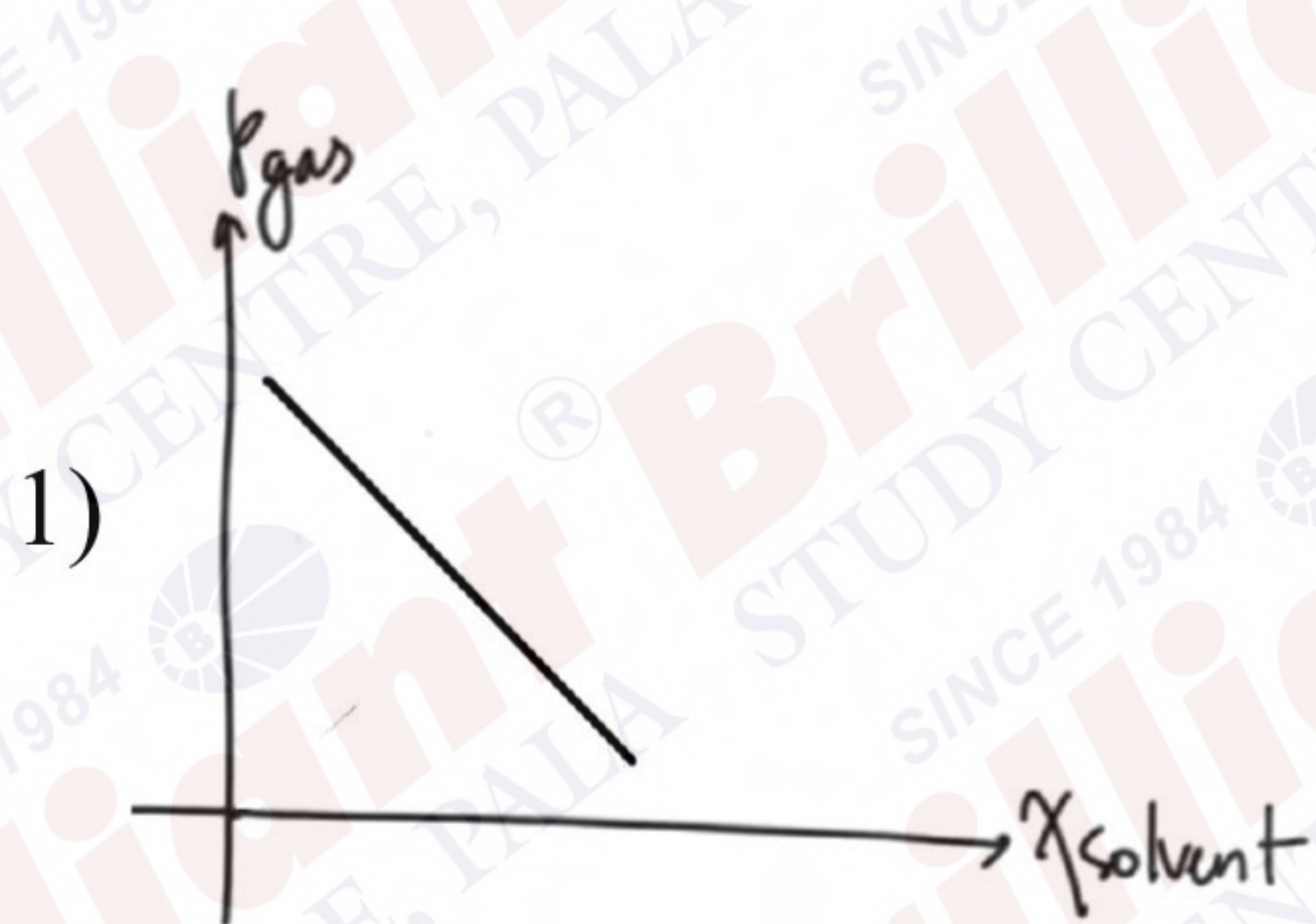


**QN** Statement-I : HX bond length is higher in HCl than HF

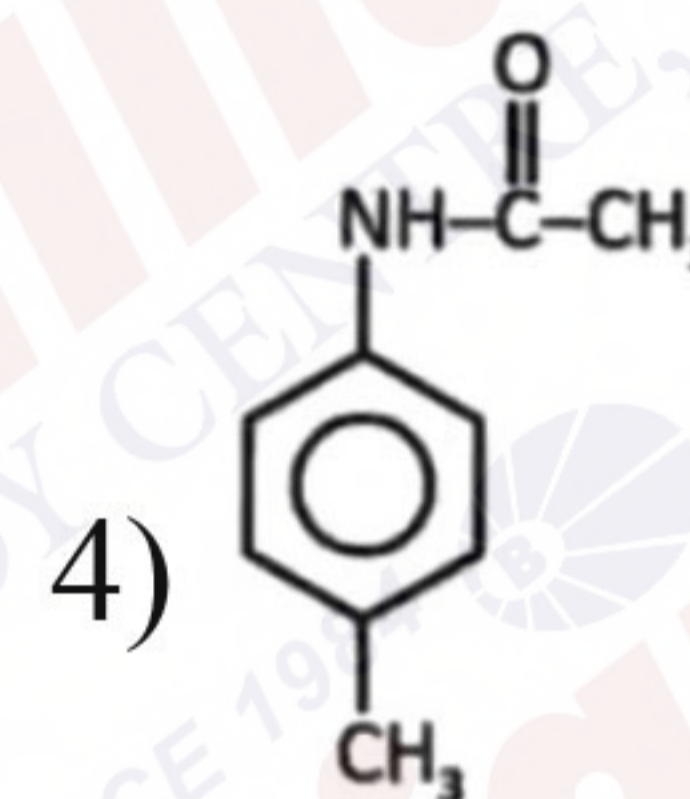
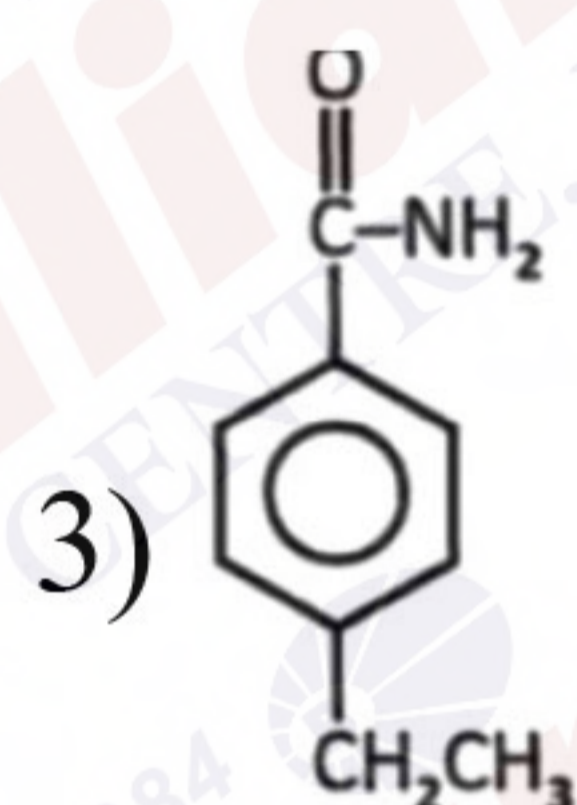
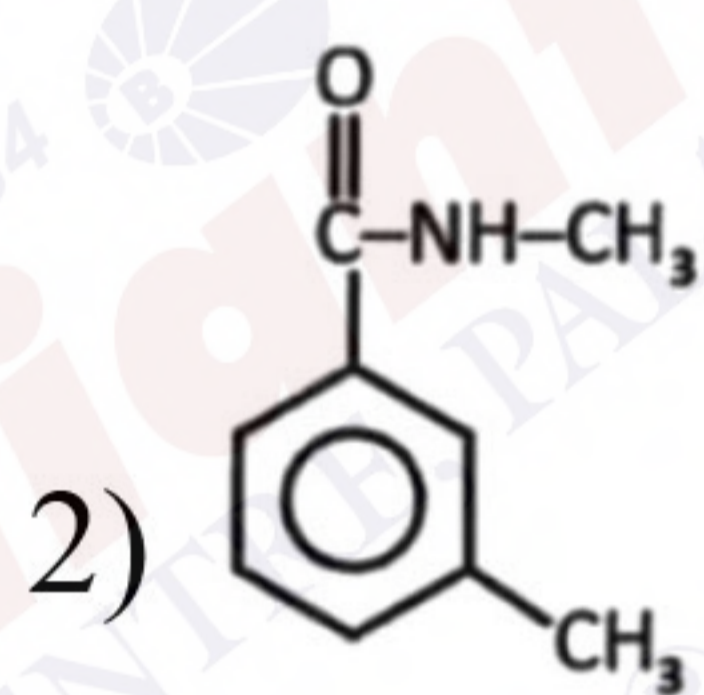
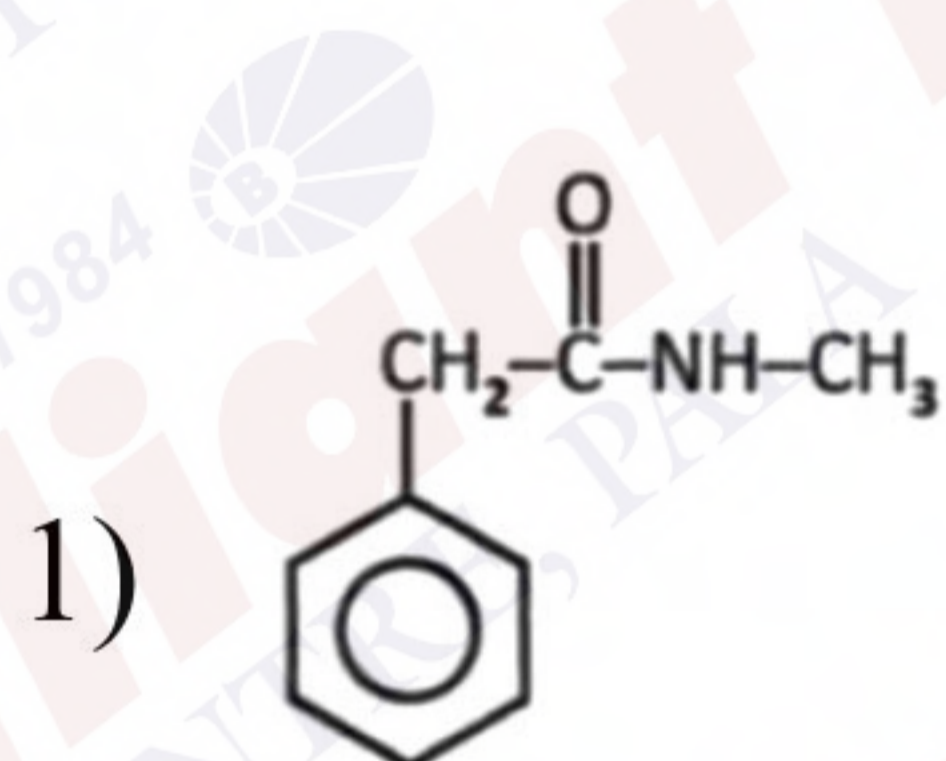
Statement-II : The lowest boiling point in hydride of group 15 element is having covalency 4

- 1) Both statement-I and statement-II are correct
- 2) Both statement-I and statement-II are incorrect
- 3) Statement-I is correct and statement-II is incorrect
- 4) Statement-I is incorrect and statement-II is correct

**QN** Which of the following graph(s) is/are correct?



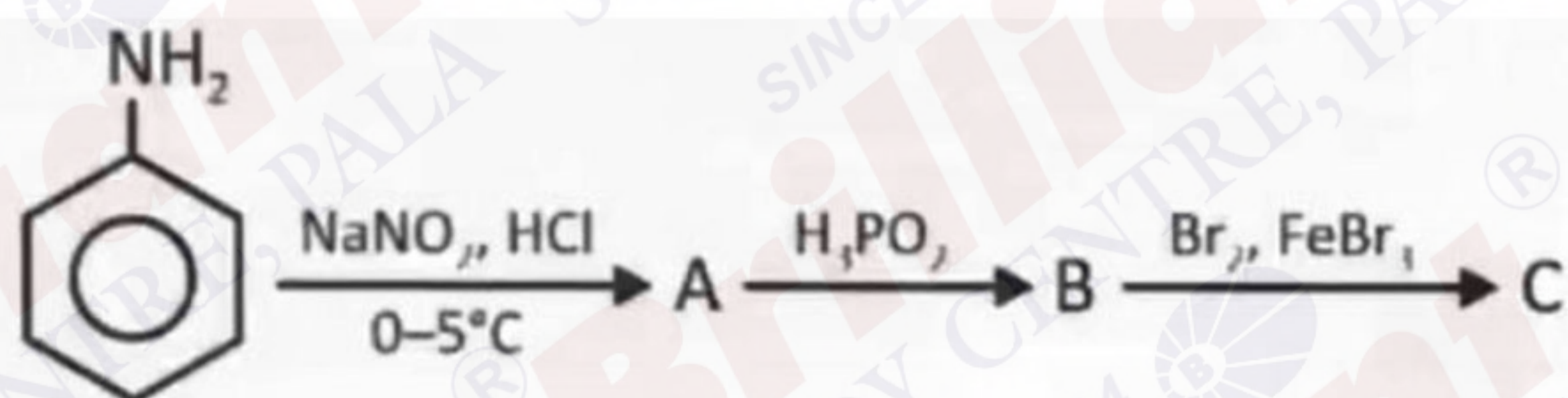
**QN** A compound 'A' with molecular formula  $C_9H_{11}NO$  reacts with  $Br_2/NaOH$  to give (X). (X) on reaction with  $NaNO_2$  in dil.HCl gives compounds (Y). When (Y) is treated with  $CuCN$ , followed by hydrolysis gives (Z). The compound (A) on hydrolysis also gives compound (Z). Identify compound (A)



**QN** Which of the following statement is correct regarding the nature and directive influence of  $-NO_2$  group in nitration of benzene

- 1) It is an activating group and ortho/para director
- 2) It is a reactivating group and ortho/para director
- 3) It is a deactivating group and meta director
- 4) It is an activating group and meta director

**QN** Consider the following sequence of reaction and identify A, B and C respectively



- 1)  $C_6H_5OH, C_6H_6, C_6H_4Br_2$
- 2)  $C_6H_5N_2^+Cl^-, C_6H_6, C_6H_5Br$
- 3)  $C_6H_5NO_2, C_6H_5OH, C_6H_5Br$
- 4)  $C_6H_5Cl, C_6H_5OH, C_6H_6$

**QN** Statement-I :  $K_H$  is constant with change in concentration of gas till solution is dilute at given temperature.

Statement-II : According to Henry's law, partial pressure of gas in vapour phase is inversely proportional to mole fraction of gas in solution.

- 1) Both statement-I and statement-II are correct
- 2) Both statement-I and statement-II are incorrect
- 3) Statement-I is correct and statement-II is incorrect
- 4) Statement-I is incorrect and statement-II is correct

**QN** Consider a first order reaction  $A \rightarrow \text{products}$

3 different solutions are taken rate of reaction

Solution -1 : 100 mL 10 M 'A' -  $r_1$

Solution -2 : 100 mL 10 M 'A' -  $r_2$

Solution-3 : 100 mL 10 M 'A' + 100 mL water -  $r_3$

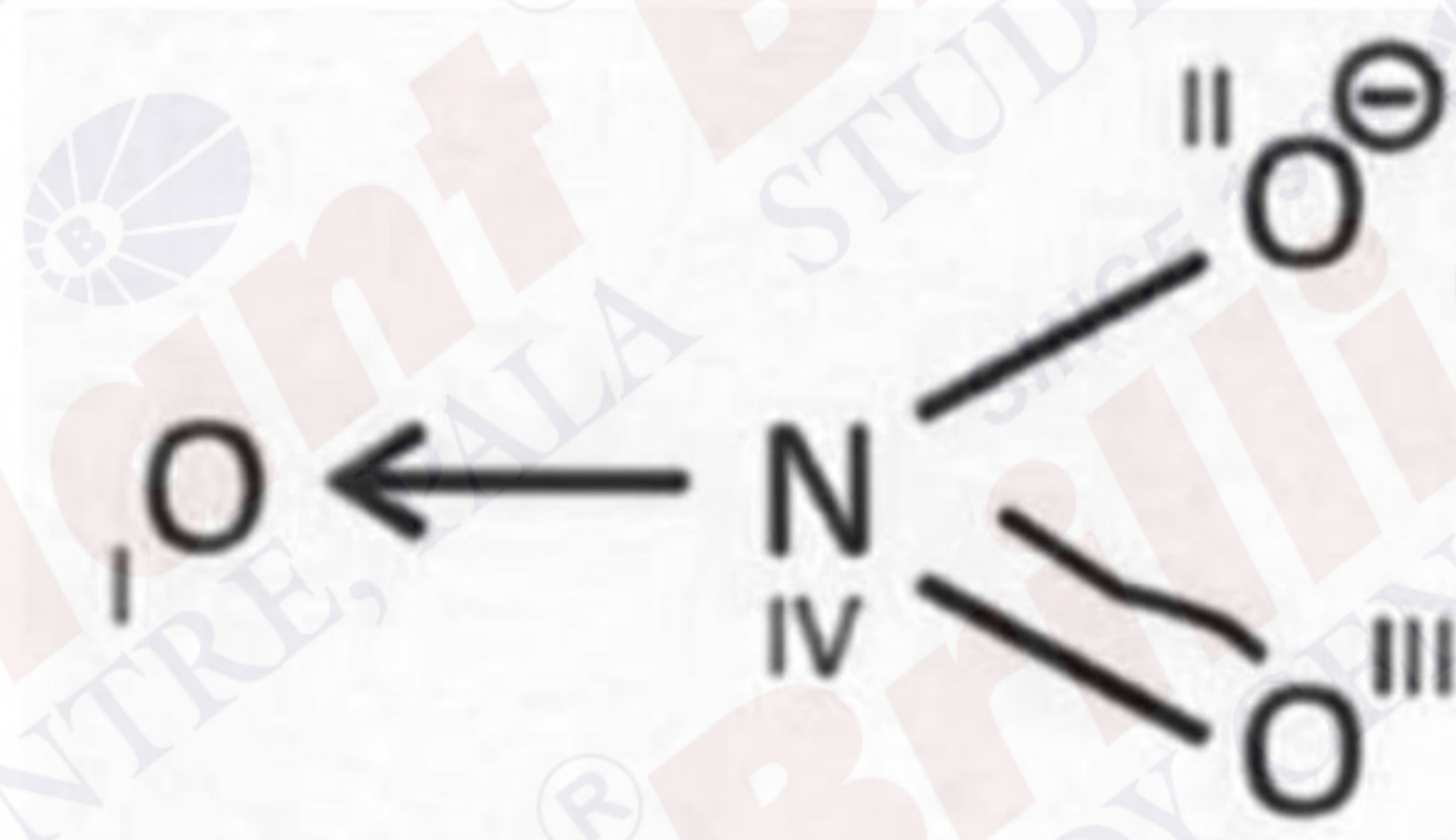
The correct order of the rates of reactions is

- 1)  $r_1 = r_2 = r_3$       2)  $r_1 = r_2 < r_3$       3)  $r_1 = r_2 > r_3$       4)  $r_1 < r_2 = r_3$

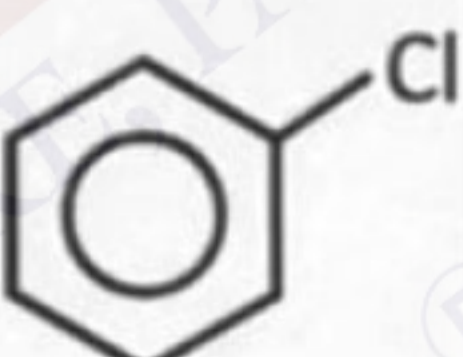
**QN** Bohr's radius of H-atom is  $2.12 \times 10^{-10}$  m. Calculate the energy at this level

- 1)  $-5.44 \times 10^{-19}$  J      2)  $-2.176 \times 10^{-18}$  J      3)  $-54.4 \times 10^{-19}$  J      4)  $-2.3 \times 10^{-19}$  J

**QN** Find the formal charge of N and O, O, O



- 1) 0, +1, -1, +2      2) +1, -1, -1, 0      3) -1, 0, +2, +1      4) +1, -1, 0, -1

**QN** For , the incorrect statement is, 'P'

- 1) 'P' is less reactive than benzyl chloride towards nucleophilic substitution reaction
- 2) In 'P' C-Cl bond has partial double bond character
- 3) 'Cl' is an ortho-para directing group towards electrophilic aromatic substitution
- 4) 'P' can undergo nucleophilic substitution reaction at normal conditions

**QN** If the image of the point P(3,2,a) reflected about the line  $\frac{x-3}{2} = \frac{y-5}{5} = \frac{z-2}{-2}$  is (s,b,c). Then the value of  $a^2 + b^2 + c^2$

**QN** The solution of the differential equation  $x dy - y dx = \sqrt{x^2 + 6 + y^2} dx$  is

**QN** If the domain of the function  $\frac{1}{\log(10-x)} + \sin^{-1}\left(\frac{x+2}{2x+3}\right)$  is  $(-\infty, -a) \cup (-1, b) \cup (b, c)$  then

$b+c+3a$  is

- 1) 22                                      2) 23                                      3) 24                                      4) 21

**QN** The coefficient of  $x^{48}$  in  $1 \times (1+x) + 2 \times (1+x)^2 + 3 \times (1+x)^3 + \dots + 100 \times (1+x)^{100}$

**QN** The value of  $\alpha$  for which the line  $\alpha x + 2y = 1$  never touches the hyperbola  $\frac{x^2}{9} - \frac{y^2}{1} = 1$  is

**QN**  $\int (\cos x)^{\frac{-5}{2}} (\sin x)^{\frac{-11}{2}} dx = \frac{p_1}{q_1} (\cot x)^{\frac{9}{2}} + \frac{p_2}{q_2} (\cot x)^{\frac{5}{2}} + \frac{p_3}{q_3} (\cot x)^{\frac{1}{2}} - \frac{p_4}{q_4} (\cot x)^{\frac{-3}{2}} + c$  then the value of  $\frac{p_1 p_2 p_3 p_4}{q_1 q_2 q_3 q_4}$  is

**QN**  $\frac{\cos^2 48^\circ - \sin^2 12^\circ}{\sin^2 24^\circ - \sin^2 6^\circ} = \frac{\alpha + \sqrt{5}\beta}{2}$ , then the value of  $\alpha + \beta$  is

**QN** Let  $M = \{1, 2, 3, \dots, 16\}$  and R be a relation on M defined by  $x R y$  if and only if  $4y = 5x - 3$ . Then, the number of elements required to be added in R to make it symmetric is

- 1) 2                                      2) 3                                      3) 4                                      4) 5

**QN** The number of values of x satisfying  $\tan^{-1} 4x + \tan^{-1} 6x = \frac{\pi}{6}$  and  $x \in \left[ \frac{-1}{2\sqrt{6}}, \frac{1}{2\sqrt{6}} \right]$  is

**QN** The value of  $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{dx}{[x]+4}$  is

- 1)  $\frac{\pi}{20} + \frac{7}{20}$                                       2)  $\frac{7\pi}{20} + \frac{7}{60}$                                       3)  $\frac{7\pi}{20} + \frac{1}{60}$                                       4)  $\frac{7\pi}{20} - \frac{1}{60}$

