

23/01/2026

Morning



Aakash

Medical | IIT-JEE | Foundations

Corporate Office : AESL, 3rd Floor, Incuspaze Campus-2, Plot-13, Sector-18, Udyog Vihar,
Gurugram, Haryana-122015

Memory Based Answers & Solutions

Time : 3 hrs.

for

M.M. : 300

JEE (Main)-2026 (Online) Phase-1

(Physics, Chemistry and Mathematics)

Don't guess your JEE Main score.

Calculate it Instantly

with our

JEE Main Score Calculator.

HOW TO GET YOUR SCORES

- Open your response sheet on the JEE Main Site
- Copy the link from the browser's Address bar
- Paste it into the required field in the Calculator



Scan the QR code
to know more.



jee-marks-calculator.aakash.ac.in/

Our Problem *Solvers* shine bright in **JEE 2025**

JEE (Advanced)

ADVAY
MAYANK
AIR 36



RUJUL
GARG
AIR 41



ARUSH
ANAND
AIR 64



SHREYAS
LOHIYA
AIR 6
Uttar Pradesh Topper
100 Overall



KUSHAGRA
BAINGAHA
AIR 7
Uttar Pradesh Topper
100 Overall



HARSSH
A GUPTA
AIR 15
Telangana Topper
100 Overall



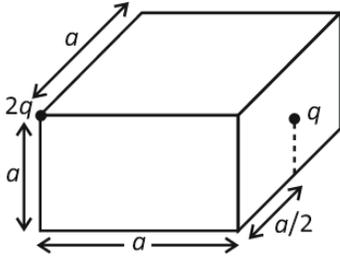
PHYSICS

SECTION - A

Multiple Choice Questions: This section contains 20 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4), out of which **ONLY ONE** is correct.

Choose the correct answer:

1. There are two point charges, one at vertex and other at face as shown the cube. Find electric flux through the cube.

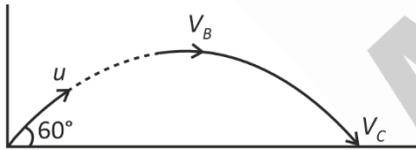


- (1) $3q/\epsilon_0$ (2) q/ϵ_0
(3) $3q/4\epsilon_0$ (4) $5q/\epsilon_0$

Answer (3)

Sol. $\phi = \frac{q_{enc}}{\epsilon_0} = \frac{\frac{2q}{8} + \frac{q}{2}}{\epsilon_0} = \frac{3q}{4\epsilon_0}$

2. If a projectile is being projected with speed v at an angle 60° with horizontal. Find the ratio of speed at highest point (V_B) to the speed at final point (V_C).



- (1) 3 : 4 (2) 1 : 3
(3) 1 : 2 (4) 1 : 12

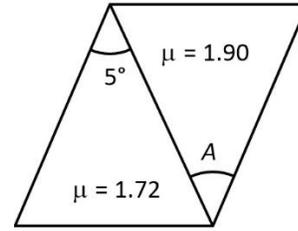
Answer (3)

Sol. $V_C = v$

$V_B = v \cos 60^\circ = \frac{v}{2}$

$\frac{V_B}{V_C} = \frac{1}{2}$

3. Find A for dispersion without deviation.



- (1) 3 (2) 4
(3) 4.5 (4) 5

Answer (2)

Sol. $A_1 (\mu_1 - 1) = A_2 (\mu_2 - 1)$

$5(0.72) = A(.9)$

$\Rightarrow A = 4$

4. For the given set of measurement find relative error.

20.00, 19.75, 18.25, 17.01

- (1) 0.12 (2) 0.06
(3) 0.09 (4) 0.17

Answer (2)

Sol. $\bar{x} = \frac{20.00 + 18.25 + 19.75 + 17.01}{4}$

$\Rightarrow \bar{x} = 18.75$

$\Rightarrow |\Delta \bar{x}| = \frac{1.25 + 0.5 + 1 + 1.74}{4} = 1.12$

$\frac{\Delta \bar{x}}{\bar{x}} = \frac{1.12}{18.75} = 0.06$

Our Problem *Solvers* shine bright in **JEE 2025**

JEE (Advanced)

ADVAY MAYANK AIR 36	RUJUL GARG AIR 41	ARUSH ANAND AIR 64
--------------------------------------	------------------------------------	-------------------------------------

JEE (MAIN)

SHREYAS LOHIYA AIR 6 Uttar Pradesh Topper 100	KUSHAGRA BAINGAHA AIR 7 Uttar Pradesh Topper 100	HARSSH A GUPTA AIR 15 Telangana Topper 100
---	--	--

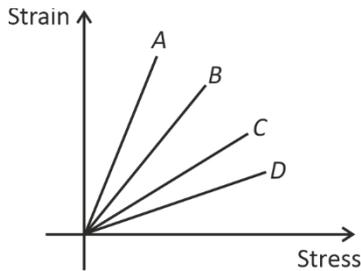
5. Find out the correct energy for the ground state or energy transition. (symbols have usual meaning & $n \rightarrow m$ gives the transition)

- (1) H (-6.8 eV) (2) Li^{2+} (-13.6 eV)
 (3) $\text{He}_{2 \rightarrow 1}^+$ (40.8 eV) (4) $\text{Be}_{2 \rightarrow 1}^{3+}$ (+13.6 eV)

Answer (3)

Sol. $E_n = 13.6 \frac{z^2}{n^2}$

6. Which of the following material has bigger Young's modulus



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

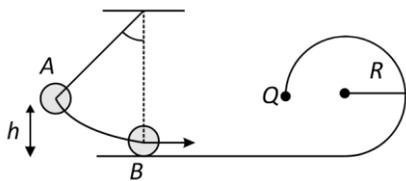
Answer (4)

Sol. Slope = $\frac{\text{Strain}}{\text{Stress}}$

$Y = \frac{1}{\text{Slope}}$

Thus D

7. Find h (in m) such that ball B just be able to reach Q after elastic collision with A. Mass of both the bodies are same m . ($R = 10 \text{ cm}$)



- (1) $\frac{3}{5}$ (2) $\frac{1}{\sqrt{5}}$
 (3) $\frac{1}{4}$ (4) $\frac{1}{5}$

Answer (3)

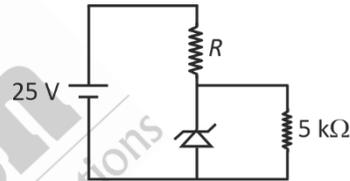
Sol. $V_A = V_B, V_A = \sqrt{5gR}$

$m_A g h = \frac{1}{2} m_A v_A^2$

$h = \frac{5}{2} R$

$h = \frac{5}{2} R = \frac{5}{2} \times \frac{1}{10} = \frac{1}{4}$

8. For the given circuit the breakdown voltage of Zener diode is $V_z = 5$ volts. And it can with stand maximum current of $I_z = 5 \text{ mA}$.



Find the value of R.

- (1) $\frac{10}{3} \text{ k}\Omega$ (2) $5 \text{ k}\Omega$
 (3) $\frac{15}{4} \text{ k}\Omega$ (4) $8 \text{ k}\Omega$

Answer (1)

Sol. I_1 across $6 \text{ k}\Omega$ is

$I_1 = \frac{5}{5000} = 1 \text{ mA}$

So, total $I = 6 \text{ mA}$

$R = \frac{20}{6} \times 1000 = \frac{10}{3} \text{ k}\Omega$

Our Problem Solvers shine bright in **JEE 2025**

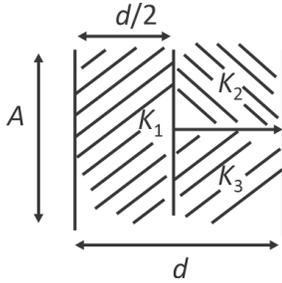
JEE (Advanced)

JEE (MAIN)

ADVAY MAYANK AIR 36 RUJUL GARG AIR 41 ARUSH ANAND AIR 64

SHREYAS LOHIYA AIR 6 KUSHAGRA BAINGAHA AIR 7 HARSSH A GUPTA AIR 15

9. Find capacitance of capacitor given below if each plate has area A and separation is d between them.

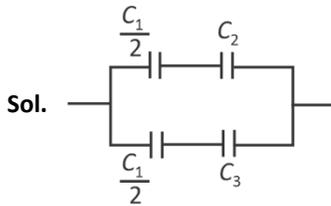


$$K_1 = 3 \quad K_2 = 5 \quad K_3 = 2$$

(1) $\frac{123\epsilon_0 A}{40d}$ (2) $\frac{140\epsilon_0 A}{6d}$

(3) $\frac{120\epsilon_0 A}{30d}$ (4) $\frac{128\epsilon_0 A}{4d}$

Answer (1)



$$C_1 = \frac{6\epsilon_0 A}{d} \quad C_2 = \frac{5\epsilon_0 A}{d} \quad C_3 = \frac{2\epsilon_0 A}{d}$$

$$C_{eq} = \frac{123\epsilon_0 A}{40d}$$

10. A simple pendulum of length 3 m completes 20 oscillations in 10 sec. What is length of another pendulum which completes 40 oscillations in same times

- (1) 0.75 m (2) 1.5 m
(3) 12 m (4) 6 m

Answer (1)

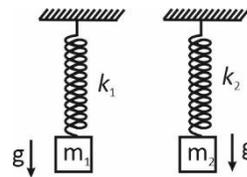
Sol. $T = 2\pi \sqrt{\frac{l}{g_{eff}}}$

$$\frac{Y_2}{Y_4} = \frac{\sqrt{3}}{\sqrt{l}}$$

$$l = \frac{3}{4} \text{ m}$$

11. Find ratio of energy stored in the two springs as shown in figure below

Given: $\frac{k_1}{k_2} = \frac{1}{2}$ and $\frac{m_1}{m_2} = \frac{1}{4}$



(1) $\frac{1}{4}$ (2) $\frac{1}{2}$

(3) $\frac{1}{8}$ (4) 1

Answer (3)

Sol. Given: $\frac{k_1}{k_2} = \frac{1}{2}$ and $\frac{m_1}{m_2} = \frac{1}{4}$

$$E = \frac{2kq}{r^2} \Rightarrow E_{net} = E\sqrt{3}$$

12. In two different YDSE setup, two different monochromatic wave are used but fringe width on the screen is same. If $\frac{\lambda_1}{\lambda_2} = \frac{1}{2}$ and $\frac{d_1}{d_2} = \frac{2}{1}$, then find the ratio of $\frac{D_1}{D_2}$ (All symbols are standard).

- (1) 1 (2) $\frac{1}{2}$
(3) 2 (4) 4

Answer (4)

Sol. $\Delta\omega = \frac{\lambda D}{d}$

So, $\frac{\lambda_1 D_1}{d_1} = \frac{\lambda_2 D_2}{d_2}$

$$\frac{D_1}{D_2} = \left(\frac{d_1}{d_2}\right) \cdot \left(\frac{\lambda_2}{\lambda_1}\right) = \left(\frac{2}{1}\right) \times \left(\frac{2}{1}\right)$$

$$\frac{D_1}{D_2} = 4$$

Our Problem *Solvers* shine bright in **JEE 2025**

JEE (Advanced)

ADVAY
MAYANK
AIR 36



RUJUL
GARG
AIR 41



ARUSH
ANAND
AIR 64



SHREYAS
LOHIYA
AIR 6
Uttar Pradesh Topper
100



KUSHAGRA
BAINGAHA
AIR 7
Uttar Pradesh Topper
100



HARSH
A GUPTA
AIR 15
Telangana Topper
100



13. A 25 kg mass moving with 30 m/s and another mass 15 kg of same material moving with 10 m/s in opposite direction, collides perfectly inelastically. Find the rise in temperature of the system.

(Given: $C = 5 \times \text{cal/g}^\circ\text{C}$ & $1 \text{ cal} = 4.2 \text{ J}$)

- (1) $\frac{1}{50}^\circ\text{C}$
- (2) $\frac{1}{112}^\circ\text{C}$
- (3) $\frac{1}{150}^\circ\text{C}$
- (4) $\frac{1}{125}^\circ\text{C}$

Answer (1)

Sol. $25 \times 30 - 15 \times 10 = 40 V_f \Rightarrow V_f = 15 \text{ m/s}$

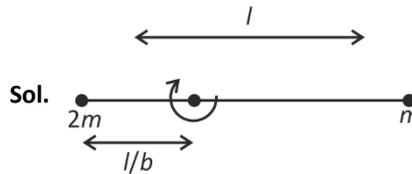
$$K\varepsilon_i - K\varepsilon_f = \frac{1}{2} \times 25 \times 900 + \frac{1}{2} \times 15 \times 100 - \frac{1}{2} \times 40 \times (225) = 7500 \text{ J}$$

$$ms\Delta T = 7500 \Rightarrow \Delta T = \frac{7500}{40 \times 5000 \times 4.2} = \frac{1}{112}^\circ\text{C}$$

14. Two point particles of masses $2m$ and m are attached to ends of a massless rod of length l . Find Angular momentum of this system about an axis passing through their center of mass and perpendicular to the rod if the system is rotating with angular velocity ω about the axis.

- (1) $\frac{2}{3}m\omega l^2$
- (2) $\frac{1}{3}m\omega l^2$
- (3) $\frac{m\omega l^2}{9}$
- (4) $m\omega l^2$

Answer (1)

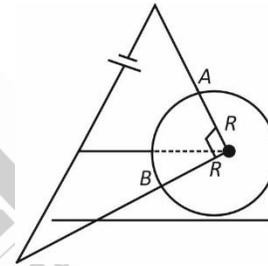


Sol.

$$L = 2m\omega\left(\frac{l}{3}\right)^2 + m\omega\left(\frac{2l}{3}\right)^2$$

$$L = \frac{2}{9}m\omega l^2 + \frac{4}{9}m\omega l^2 = \frac{2}{3}m\omega l^2$$

15. A uniform wire is bent into the shape of a circle of radius R has resistance per unit length = λ . A battery is connected across point A and B which subtends an angle of 90° at its centre as shown. Find the equivalent resistance of this circuit.



- (1) $\frac{3\pi}{4}\lambda R$
- (2) $\frac{\pi}{2}\lambda R$
- (3) $\frac{3\pi}{8}\lambda R$
- (4) $\frac{\pi}{4}\lambda R$

Answer (3)

Sol. $R_1 = \lambda \frac{3\pi R}{2}; R_2 = \frac{\lambda \pi R}{2}$

$$R_{eq} = \frac{\lambda \frac{\pi R}{2} \lambda \frac{3\pi R}{2}}{\pi \frac{\pi R}{2} + \lambda \frac{3\pi R}{2}} = \frac{\lambda^2 \frac{3\pi^2 R^2}{4}}{\lambda \times 2\pi R}$$

$$R_{eq} = \frac{3\pi}{8}\lambda R$$

Our Problem Solvers shine bright in **JEE 2025**

JEE (Advanced)

 ADVAY MAYANK AIR 36	 RUJUL GARG AIR 41	 ARUSH ANAND AIR 64
--	--	---

JEE (MAIN)

 SHREYAS LOHIYA AIR 6 Uttar Pradesh Topper 100	 KUSHAGRA BAINGAHA AIR 7 Uttar Pradesh Topper 100	 HARSH A GUPTA AIR 15 Telangana Topper 100
---	--	---

CHEMISTRY

SECTION - A

Multiple Choice Questions: This section contains 20 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4), out of which **ONLY ONE** is correct.

Choose the correct answer:

1. The correct order of ionisation energy of

Cl, S, P, Al, Si is

- (1) $Cl > P > S > Si > Al$
 (2) $P > Cl > S > Al > Si$
 (3) $Cl > S > P > Si > Al$
 (4) $Cl > Al > Si > P > S$

Answer (1)

Sol. **kJ/mol**

Cl \Rightarrow 1256

S \Rightarrow 999

P \Rightarrow 1012

Al \Rightarrow 577

Si \Rightarrow 786

2. Consider the statements below :

Statement I : $[CoBr_4]^{2-}$ absorbs lesser energy than $[CoCl_4]^{2-}$.

Statement II : $[CoCl_4]^{2-}$ has higher crystal field splitting energy than $[CoBr_4]^{2-}$.

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

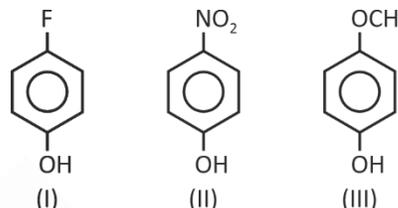
Answer (1)

Sol. Order of ligand strength $Cl^- > Br^-$

$[CoCl_4]^{2-}$ absorb more energy than $[CoBr_4]^{2-}$

$[CoCl_4]^{2-}$ has more CFSE value due to strength of ligand.

3. Arrange in increasing order of acid strength.



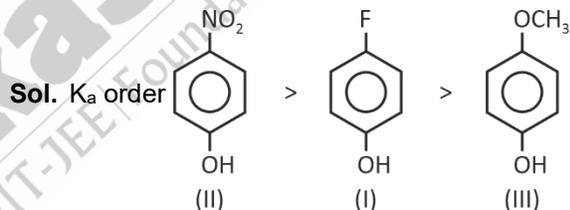
(1) (II) > (I) = (III)

(2) (I) > (II) > (III)

(3) (II) > (I) > (III)

(4) (II) = (I) > (III)

Answer (3)



4. Which of the following undergo nitration at fastest rate?

- (1) $C_6H_5NO_2$
 (2) $C_6H_5CH_3$
 (3) C_6H_5COOH
 (4) C_6H_5Br

Answer (2)

Sol. Methyl group is activating group

Our Problem *Solvers* shine bright in **JEE 2025**

JEE (Advanced)

ADVAY
MAYANK
AIR 36



RUJUL
GARG
AIR 41



ARUSH
ANAND
AIR 64



SHREYAS
LOHIYA
AIR 6
Uttar Pradesh Topper
100% in Overall



KUSHAGRA
BAINGAHA
AIR 7
Uttar Pradesh Topper
100% in Overall



HARSH
A GUPTA
AIR 15
Telangana Topper
100% in Overall



8. Match the List-I with List-II and choose the correct option :

	List-I		List-II
(a)	2 nd orbit of He ⁺ ion	(i)	$-1.96 \times 10^{-17} \text{ J}$
(b)	3 rd orbit of H-atom	(ii)	$-2.42 \times 10^{-19} \text{ J}$
(c)	1 st orbit of Li ²⁺ ion	(iii)	$-2.178 \times 10^{-18} \text{ J}$
(d)	2 nd orbit of Li ²⁺ ion	(iv)	$-4.9 \times 10^{-18} \text{ J}$

- (1) (a)-(iii); (b)-(ii); (c)-(i); (d)-(iv)
 (2) (a)-(iii); (b)-(ii); (c)-(iv); (d)-(i)
 (3) (a)-(iv); (b)-(iii); (c)-(ii); (d)-(i)
 (4) (a)-(i); (b)-(ii); (c)-(iii); (d)-(iv)

Answer (1)

Sol. $E_n = -2.178 \times 10^{-18} \frac{z^2}{n^2} \text{ J}$

- (a) $z = 2, n = 2$
 (b) $z = 1, n = 3$
 (c) $z = 3, n = 1$
 (d) $z = 3, n = 2$

9. Given below are two statements.

Statement I: Sublimation is a purification technique that is used to separate those solid substances which changes from solid to vapour state without passing through liquid state.

Statement II: If external atmospheric pressure is reduced, then boiling point of substance is decreased.

In the light of the above statements, choose the correct option.

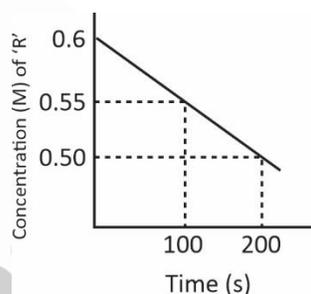
- (1) Both statement I and statement II are correct
 (2) Both statement I and statement II are incorrect
 (3) Statement I is correct but statement II is incorrect
 (4) Statement I is incorrect but statement II is correct

Answer (1)

Sol. Sublimable compounds are those compounds which changes from solid to vapour state without passing through liquid state.

Boiling point depends on external atmospheric pressure.

10. Consider the following graph of concentration vs time, of a reaction, $R \rightarrow P$



Find half-life of reaction.

- (1) 600 s
 (2) 200 s
 (3) 300 s
 (4) 100 s

Answer (1)

Sol. The graph shows straight line for concentration vs time.

For zero order

$$A_t = -kt + A_0$$

At, $t = 100 \text{ s}$, conc. = 0.55

At $t = 200 \text{ s}$, conc. = 0.5

Our Problem Solvers shine bright in **JEE 2025**

JEE (Advanced)

ADVAY MAYANK AIR 36		RUJUL GARG AIR 41		ARUSH ANAND AIR 64	
-------------------------------	--	-----------------------------	--	------------------------------	--

JEE (MAIN)

SHREYAS LOHIYA AIR 6 Uttar Pradesh Topper 100 Overall		KUSHAGRA BAINGAHA AIR 7 Uttar Pradesh Topper 100 Overall		HARSSH A GUPTA AIR 15 Telangana Topper 100 Overall	
---	--	--	--	--	--

$$k = -\frac{\text{Change in concentration}}{\text{Change in time}}$$

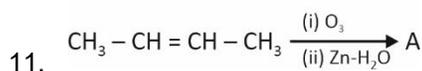
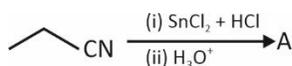
$$= \frac{0.5 - 0.55}{200 - 100} = \frac{0.05}{100}$$

$$k = 5 \times 10^{-4} \text{ ms}^{-1}$$

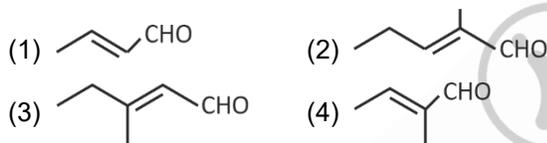
$$t_{\frac{1}{2}} = \frac{A_0}{2k}$$

$$= \frac{0.6}{2 \times 5 \times 10^{-4}}$$

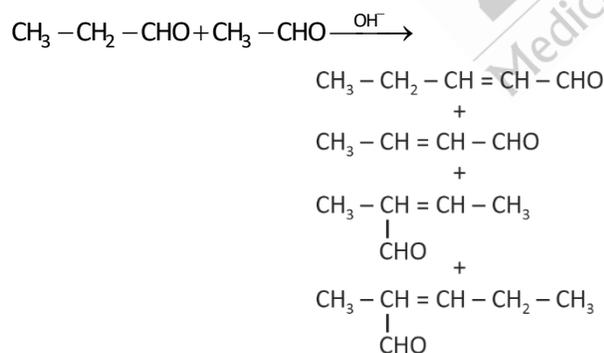
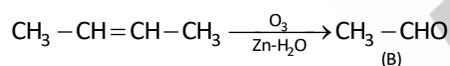
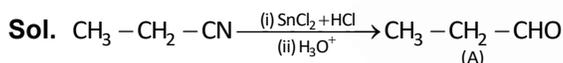
$$= \frac{6000}{100} = 600 \text{ s}$$



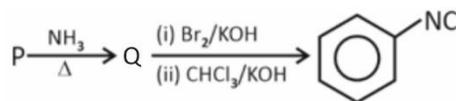
A and B are mixed and treated with dil. base to give mixture of products. Choose the incorrect product.



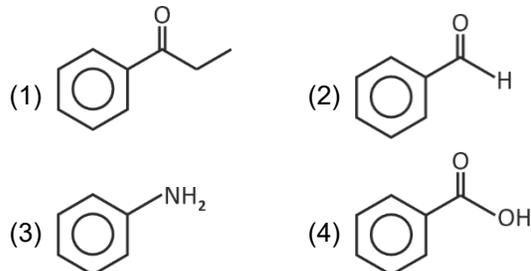
Answer (3)



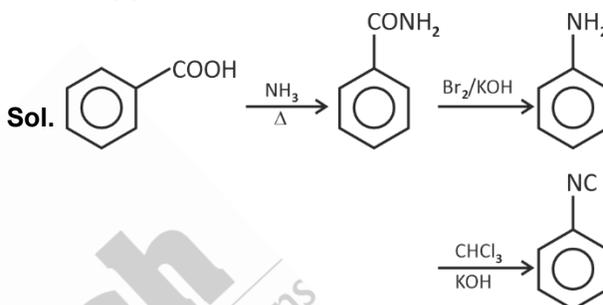
12. Consider the following reaction :



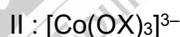
The structure of 'P' is



Answer (4)



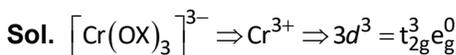
13. Consider the two complexes



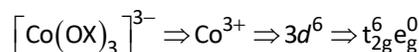
Find the ratio of CFSE of I to II complex (neglect pairing energy and consider Δ_o for both complexes to be x)

- (1) 2 (2) $\frac{1}{2}$
 (3) $\frac{1}{3}$ (4) $\frac{2}{3}$

Answer (2)



$$\text{CFSE} = 3 \times (-0.4) \Delta_o = -1.2\Delta_o$$



Our Problem Solvers shine bright in **JEE 2025**

JEE (Advanced)

ADVAY
MAYANK
AIR 36



RUJUL
GARG
AIR 41



ARUSH
ANAND
AIR 64



SHREYAS
LOHIYA
AIR 6
Uttar Pradesh Topper
100% in Overall



KUSHAGRA
BAINGAHA
AIR 7
Uttar Pradesh Topper
100% in Overall



HARSSH
A GUPTA
AIR 15
Telangana Topper
100% in Overall



$$CFSE = -0.4 \times 6 \Delta_o = -2.4 \Delta_o$$

$$\text{Ratio of CFSE} = \frac{-1.2\Delta_o}{-2.4\Delta_o} = \frac{1}{2}$$

14. Select the correct statement about 13th group elements.

- A. Electronegativity decreases regularly down the graph.
 B. Ionic radii decreases down the graph.
 C. Boron has highest ionisation energy.
 D. Trichloride of aluminium are covalent in nature.

- (1) A, B, C only (2) C, D only
 (3) A, C, D only (4) B, C, D only

Answer (2)

Sol. (A) is false

$$EN \rightarrow B > Al < Ga < In < Tl$$

$$2 \quad 1.5 \quad 1.6 \quad 1.7 \quad 1.8$$

(B) is false

$$\text{Ionic radii} \rightarrow B^{3+} < Al^{3+} < Ga^{3+} < In^{3+} < Tl^{3+}$$

(C) is true

$$I.E. \rightarrow B \quad Al \quad Ga \quad In \quad Tl$$

$$(\text{kJ/mol}^{-1}) \quad 800 \quad 577 \quad 579 \quad 558 \quad 589$$

15. Match List-I with List-II.

	List-I		List-II
A.	Bayer's unsaturation test	(I)	Violet/purple colour
B.	Cerric ammonium nitrate test of alcohols	(II)	Red colour
C.	Tollen's reagent test	(III)	Silver mirror obtained
	FeCl ₃ test of phenol	(IV)	Pink colour discharge

Select the correct option.

- (1) A(II), B(I), C(IV), D(III)
 (2) A(II), B(I), C(III), D(IV)
 (3) A(IV), B(II), C(III), D(I)
 (4) A(IV), B(III), C(II), D(I)

Answer (3)

- Sol.** A. Bayer's unsaturation test → Pink colour discharges
 B. Cerric ammonium nitrate test of alcohols → The colour of solution changes from yellow to red
 C. Tollen's reagent test → Silver mirror (Ag↓) is observed
 D. FeCl₃ test of phenol → Violet colour complex is formed

16. Consider the given cell

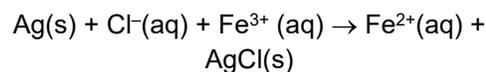
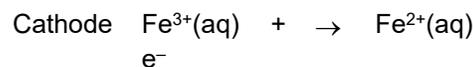
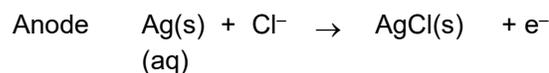


In which of the following cases, E_{cell} will increase

- (1) [Fe²⁺] increases
 [Cl⁻] increases
 (2) [Fe²⁺] increases
 [Cl⁻] decreases
 (3) [Fe³⁺] & [Cl⁻] increase
 (4) [Fe²⁺] decreases
 [Fe³⁺] decreases

Answer (3)

Sol.



$$Q = \frac{[Fe^{2+}]}{[Fe^{3+}][Cl^-]}$$

Our Problem *Solvers* shine bright in **JEE 2025**

JEE (Advanced)

ADVAY
MAYANK
AIR 36



RUJUL
GARG
AIR 41



ARUSH
ANAND
AIR 64



SHREYAS
LOHIYA
AIR 6
Uttar Pradesh Topper
100



KUSHAGRA
BAINGAHA
AIR 7
Uttar Pradesh Topper
100



HARSH
A GUPTA
AIR 15
Telangana Topper
100



$$E_{\text{cell}} = E^{\circ}_{\text{cell}} - \frac{0.06}{1} \log \frac{[\text{Fe}^{2+}]}{[\text{Fe}^{3+}][\text{Cl}^{-}]}$$

E_{cell} increase if $[\text{Fe}^{3+}]$ & $[\text{Cl}^{-}]$ increases

E_{cell} decreases if $[\text{Fe}^{2+}]$ increases

17. Consider the following statements and choose the correct option(s)

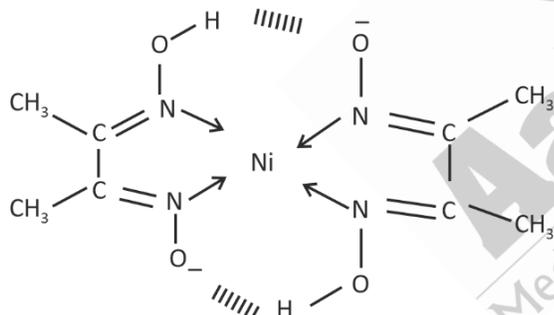
- (A) Ni^{2+} forms cherry red colour complex with dimethyl glyoximate ligand (dmg)
 (B) Ni^{2+} complex with dmg contains two ring of five membered
 (C) Ni^{2+} has 2 unpaired electron in d-orbitals in the complex
 (D) Ni^{2+} complex with dmg is soluble at $\text{pH} = 9$

- (1) Only A & B
 (2) Only B & C
 (3) Only A & C
 (4) Only A, C and D

Answer (1)

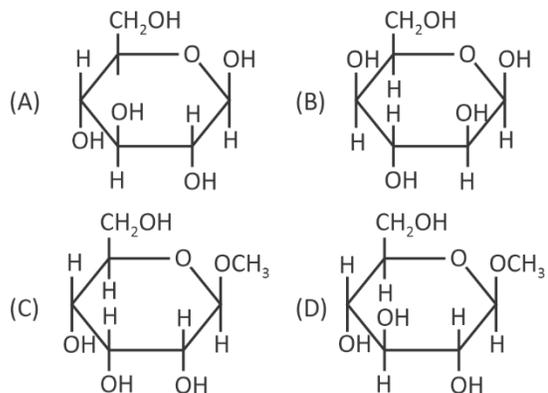
Sol. $\text{Ni}^{2+} + 2\text{dmg} \rightarrow [\text{Ni}(\text{dmg})_2]$

1. $[\text{Ni}(\text{dmg})_2]$ is of pink colour



2. 2 five membered ring is present.
 3. Ni^{2+} with dmg for dsp^2 hybridised square planar complex
 $\text{Ni}^{2+} \Rightarrow 3d^8$
 no unpaired electron
 4. $[\text{Ni}(\text{dmg})_2]$ is soluble at low pH

18. Consider the following molecules.



The examples of non-reducing sugar(s) are

- (1) A, B only (2) A, C only
 (3) B, D only (4) C, D only

Answer (4)

Sol. (A), (B) are reducing sugars as it contains hemiacetal linkage.

(C), (D) are non-reducing sugar as it contain acetal linkage.

19. Following molecules are given :

HNO_3 , NF_3 , H_2SO_4 , O_3

Consider the molecule (T) having maximum number of lone pairs (on all atoms).

The bond angle ($\angle \text{XMX}$), where M is central atom in T is

- (1) 110° (2) 97°
 (3) 102° (4) 115°

Answer (3)

Sol. NF_3 has 10 lone pairs.

Bond angle is 102.3° .

20.

SECTION - B

Numerical Value Type Questions: This section contains 5 Numerical based questions. The answer to each question should be rounded-off to the nearest integer.

Our Problem Solvers shine bright in **JEE 2025**

JEE (Advanced)

ADVAY
MAYANK
AIR 36



RUJUL
GARG
AIR 41



ARUSH
ANAND
AIR 64



JEE (MAIN)

SHREYAS
LOHIYA
AIR 6
Uttar Pradesh Topper
100% in Overall



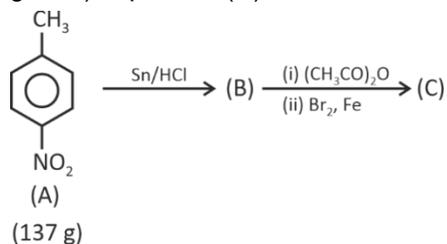
KUSHAGRA
BAINGAHA
AIR 7
Uttar Pradesh Topper
100% in Overall



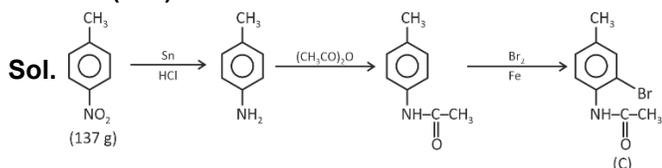
HARSH
A GUPTA
AIR 15
Telangana Topper
100% in Overall



21. In the reaction sequence, what is the mass (in grams) of product (C) formed?



Answer (228)

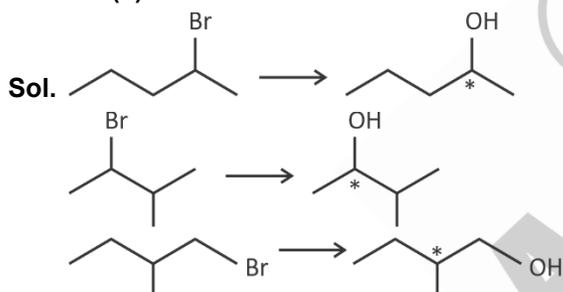


$$\text{moles of (A)} = \frac{137}{137} = 1 \text{ mole.}$$

$$\begin{aligned} \text{moles of (C) formed} &= 1 \text{ moles} \\ \text{mass of (C)} &= 1 \times 228 = 228 \text{ (g)} \end{aligned}$$

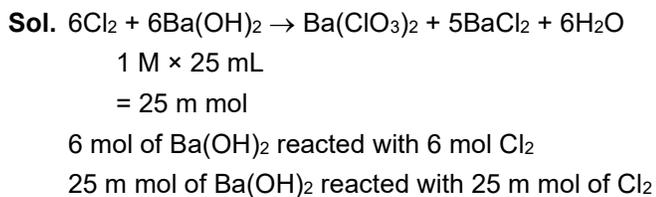
22. $\text{C}_5\text{H}_{11}\text{Br}$ reacts with aq. KOH without rearrangement. How many optically active compounds are formed.

Answer (3)



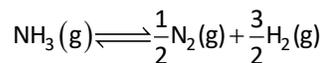
23. x g of pure Cl_2 is reacted with Ba(OH)_2 to form $\text{Ba(ClO}_3)_2$. Ba(OH)_2 concentration is 1 M and volume is 25 mL. Find x .

Answer (2)



$$\begin{aligned} \text{mol of Cl}_2 \text{ reacted} &= 25 \times 10^{-3} \text{ mol} \\ \text{mass of Cl}_2 &= 25 \times 10^{-3} \times 71 = 1.775 \text{ g} \approx 2 \text{ g} \end{aligned}$$

24. For the reaction,



$$\text{Total pressure at equilibrium} = \sqrt{3} \text{ atm}$$

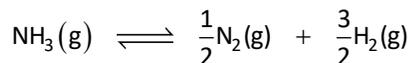
$$K_p = 9 \text{ atm}$$

$$\alpha = x \times 10^{-1}$$

$$\text{Use } \sqrt{2} = 1.41$$

Find x . (Report to nearest integer)

Answer (9)



Sol. $t=0$ P

$$t=t_{\text{eq}} \quad P - \alpha P \quad \frac{\alpha P}{2} \quad \frac{3\alpha P}{2}$$

$$P + \alpha P = \sqrt{3} \quad \dots(1)$$

$$9 = K_p = \frac{\left(\frac{3\alpha P}{2}\right)^{3/2} \left(\frac{\alpha P}{2}\right)^{1/2}}{P(1-\alpha)} \quad \dots(2)$$

$$P(1+\alpha) = \sqrt{3} \Rightarrow P = \frac{\sqrt{3}}{1+\alpha}$$

$$\Rightarrow 9 = \frac{\left[\frac{3\alpha \times \sqrt{3}}{2(1+\alpha)}\right]^{3/2} \left[\frac{\alpha \times \sqrt{3}}{1+\alpha}\right]^{1/2}}{\frac{\sqrt{3}}{1+\alpha} [1-\alpha]}$$

$$= \frac{\left[\frac{3\sqrt{3}}{2}\right]^{3/2} [\sqrt{3}]^{1/2} \left[\frac{\alpha}{1+\alpha}\right]^{3/2} \left[\frac{\alpha}{1+\alpha}\right]^{1/2}}{(\sqrt{3}) \left(\frac{1-\alpha}{1+\alpha}\right)}$$

$$\text{Solving } \alpha = 0.86$$

$$= 8.6 \times 10^{-1}$$

25.

Our Problem Solvers shine bright in **JEE 2025**

JEE (Advanced)

ADVAY
MAYANK
AIR 36



RUJUL
GARG
AIR 41



ARUSH
ANAND
AIR 64



SHREYAS
LOHIYA
AIR 6
Uttar Pradesh Topper
100



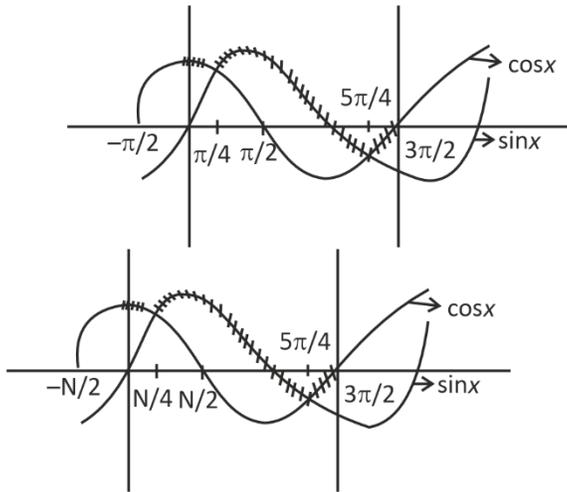
KUSHAGRA
BAINGAHA
AIR 7
Uttar Pradesh Topper
100



HARSH
A GUPTA
AIR 15
Telangana Topper
100



Sol.



$$\text{Required Area} = \int_0^{\pi/4} \cos x dx + \int_{\pi/4}^{5\pi/4} \sin x dx$$

$$\begin{aligned} &+ \int_{5\pi/4}^{3\pi/2} \cos x dx \\ &= [\sin x]_0^{\pi/4} + [-\cos x]_{\pi/4}^{5\pi/4} + [\sin x]_{5\pi/4}^{3\pi/2} \\ &= \frac{1}{\sqrt{2}} - \left[\frac{-1}{\sqrt{2}} - \frac{1}{\sqrt{2}} \right] + \left[-1 + \frac{1}{\sqrt{2}} \right] \\ &= \frac{1}{\sqrt{2}} + \sqrt{2} - 1 + \frac{1}{\sqrt{2}} \end{aligned}$$

$$A = 2\sqrt{2} - 1$$

$$A + A^2 = (2\sqrt{2} - 1) + (2\sqrt{2} - 1)^2$$

$$= 2\sqrt{2} - 1 + 8 + 1 - 4\sqrt{2} = 8 - 2\sqrt{2} \text{ sq. unit}$$

5. The value of $\frac{{}^{100}C_{50}}{51} + \frac{{}^{100}C_{51}}{52} + \dots + \frac{{}^{100}C_{100}}{101}$ is

(1) $\frac{2^{100}}{100}$ (2) $\frac{2^{101}}{101}$

(3) $\frac{2^{100}}{101}$ (4) $\frac{2^{101}}{100}$

Answer (3)

Sol. $(1+x)^{100} = {}^{100}C_0 + {}^{100}C_1x + {}^{100}C_2x^2 + \dots + {}^{100}C_{100}x^{100}$

$$\sum_{r=50}^{100} \frac{{}^{100}C_r}{r+1} = \frac{1}{101} \sum_{r=50}^{100} {}^{101}C_{r+1}$$

$$\Rightarrow \frac{1}{101} \sum_{r=51}^{101} {}^{101}C_r$$

$$\Rightarrow \frac{2^{100}}{101}$$

6. For given vectors $\vec{a} = -\hat{i} + \hat{j} + 2\hat{k}$ and $\vec{b} = 2\hat{i} - \hat{j} + \hat{k}$ where $\vec{c} = \vec{a} \times \vec{b}$ and $\vec{d} = \vec{c} \times \vec{b}$. Then the value of $(\vec{a} - \vec{b}) \cdot \vec{d}$ is

(1) -35 (2) 53

(3) -52 (4) 25

Answer (1)

Sol. $\vec{a} = -\hat{i} + \hat{j} + 2\hat{k}$

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

$$\vec{c} = \vec{a} \times \vec{b} = 3\hat{i} + 5\hat{j} - \hat{k}$$

$$\vec{d} = \vec{c} \times \vec{b}$$

Now

$$(\vec{a} - \vec{b}) \cdot \vec{d} = (\vec{a} - \vec{b}) \cdot (\vec{c} \times \vec{b})$$

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

$$= -[\vec{a} \vec{b} \vec{c}]$$

$$= -35$$

$$\vec{a} \times \vec{b} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{vmatrix} = 3\hat{i} + 5\hat{j} - \hat{k}$$

$$\text{And } [\vec{a} \vec{b} \vec{c}] = \begin{vmatrix} -1 & 1 & 2 \\ 2 & -1 & 1 \\ 3 & 5 & -1 \end{vmatrix} = 35$$

$$\Rightarrow -[\vec{a} \vec{b} \vec{c}] = -35$$

Our Problem Solvers shine bright in **JEE 2025**

JEE (Advanced)

ADVAY
MAYANK
AIR 36



RUJUL
GARG
AIR 41



ARUSH
ANAND
AIR 64



SHREYAS
LOHIYA
AIR 6
Uttar Pradesh Topper
100 Overall



KUSHAGRA
BAINGAHA
AIR 7
Uttar Pradesh Topper
100 Overall



HARSH
A GUPTA
AIR 15
Telangana Topper
100 Overall

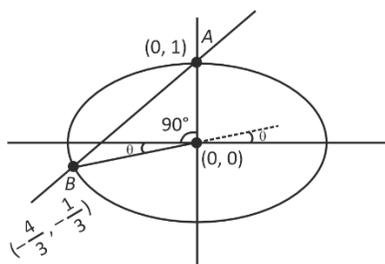


7. The line $y = x + 1$ intersects the ellipse $\frac{x^2}{2} + \frac{y^2}{1} = 1$ at A and B . Find the angle subtended by segment AB and centre of ellipse is

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

Answer (1)

Sol.



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

$\Rightarrow \frac{x^2}{2} + (x+1)^2 = 1 \Rightarrow x^2 + 2x^2 + 4x = 0$

$\Rightarrow x = 0, \frac{-4}{3}$

\Rightarrow Points A and B are

$(0, 1), \left(\frac{-4}{3}, \frac{-1}{3}\right)$

$\theta = \tan^{-1}\left(\frac{-1}{-4}\right) = \tan^{-1}\left(\frac{1}{4}\right)$

$\Rightarrow \angle AOB = \frac{\pi}{2} + \tan^{-1}\left(\frac{1}{4}\right)$

8. Find $\int_{\frac{\pi}{24}}^{\frac{5\pi}{24}} \frac{dx}{1 + (\tan 2x)^{1/3}}$

- (1) $\frac{\pi}{24}$ (2) $\frac{\pi}{12}$
 (3) $\frac{\pi}{6}$ (4) $\frac{\pi}{48}$

Answer (2)

Sol. $I = \int_{\frac{\pi}{24}}^{\frac{5\pi}{24}} \frac{1}{1 + (\tan 2x)^{1/3}} dx \dots(1)$

$\Rightarrow I = \int_{\frac{\pi}{24}}^{\frac{5\pi}{24}} \frac{1}{1 + \tan\left(2\left(\frac{5\pi}{24} + \frac{\pi}{24} - 4\right)\right)^{1/3}} dx$

$I = \int_{\frac{\pi}{24}}^{\frac{5\pi}{24}} \frac{1}{1 + \tan\left(\frac{\pi}{2} - 2x\right)^{1/3}} dx \dots(2)$

From equation (1) and (2)

$2I = \int_{\frac{\pi}{24}}^{\frac{5\pi}{24}} \frac{(\tan(2x))^{1/3} + 1}{1 + (\tan 2x)^{1/3}} dx$

$= (x) \Big|_{\frac{\pi}{24}}^{\frac{5\pi}{24}} \Rightarrow I = \frac{1}{2} \times \frac{4\pi}{24} = \frac{\pi}{12}$

9. The number of solutions of $13\cos 2\theta + 8\cos\theta - 3\sqrt{3} = 0$ if $\theta \in [-3\pi, 2\pi]$ is

- (1) 4 (2) 3
 (3) 0 (4) 5

Answer (4)

Sol. $13[2\cos^2\theta - 1] + 8\cos\theta - 3\sqrt{3} = 0$

$26\cos^2\theta + 8\cos\theta - 13 - 3\sqrt{3} = 0$

$\cos\theta = \frac{-8 \pm \sqrt{64 + 4 \times 26(13 + 3\sqrt{3})}}{52}$

$= \frac{-8 \pm \sqrt{1416 + 312\sqrt{3}}}{52} \approx 0.69$

\therefore 5 Solution

Our Problem *Solvers* shine bright in **JEE 2025**

JEE (Advanced)

ADVAY
MAYANK
AIR 36



RUJUL
GARG
AIR 41



ARUSH
ANAND
AIR 64



JEE (MAIN)

SHREYAS
LOHIYA
AIR 6
Uttar Pradesh Topper
100 Overall



KUSHAGRA
BAINGAHA
AIR 7
Uttar Pradesh Topper
100 Overall



HARSH
A GUPTA
AIR 15
Telangana Topper
100 Overall



$P(1, 3, 5)$

$$AP = \sqrt{(1-1)^2 + (6-3)^2 + (3-5)^2}$$

$$= \sqrt{9+4}$$

$$= \sqrt{13}$$

$$\text{Area } (\Delta ABC) = \frac{1}{2} \times 10 \times \sqrt{13}$$

$$= 5\sqrt{13}$$

- 16.
- 17.
- 18.
- 19.
- 20.

SECTION - B

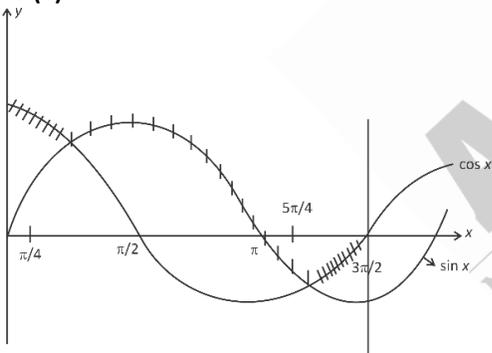
Numerical Value Type Questions: This section contains 5 Numerical based questions. The answer to each question should be rounded-off to the nearest integer.

21. The area (in square units) bounded by the curve $f(x) = \text{Max}\{\sin x, \cos x\}$ and x-axis between $x = 0$ and $x = \frac{3\pi}{2}$ is

A. Then, the value of $A + A^2$ is

Answer (3)

Sol.



$$\text{Required area} = \int_0^{\pi/4} \cos x \, dx + \int_{\pi/4}^{\pi} \sin x \, dx$$

$$+ \int_{\pi}^{5\pi/4} (-\sin x) \, dx + \int_{5\pi/4}^{3\pi/2} (-\cos x) \, dx$$

$$= [\sin x]_0^{\pi/4} + [-\cos x]_{\pi/4}^{\pi} + [\cos x]_{\pi}^{5\pi/4} - [\sin x]_{5\pi/4}^{3\pi/2}$$

$$= \frac{1}{\sqrt{2}} \left[1 + \frac{1}{\sqrt{2}} \right] + \left[-\frac{1}{\sqrt{2}} + 1 \right] - \left[-1 + \frac{1}{\sqrt{2}} \right]$$

$$= \sqrt{2} + 1 - \frac{1}{\sqrt{2}} + 1 + 1 - \frac{1}{\sqrt{2}}$$

$$= 3$$

22. The mean and variance of the 8 observations $-10, -7, -1, x, y, 16, 2, 9$ are $\frac{7}{2}$ and $\frac{293}{4}$ respectively. Then, the mean of $x, y, x + y + 1, |x - y|$ is

Answer (11)

Sol. Mean = $\frac{7}{2}$

$$\frac{-10 - 7 - 1 + x + y + 16 + 2 + 9}{8} = \frac{7}{2}$$

$$\Rightarrow x + y + 9 = 28$$

$$\Rightarrow \boxed{x + y = 19}$$

$$\text{Var} = \frac{293}{4}$$

$$\frac{100 + 49 + 1 + x^2 + y^2 + 256 + 4 + 8}{8} - \frac{49}{4} = \frac{293}{4}$$

$$\frac{491 + x^2 + y^2}{8} = \frac{342}{4} \times 2$$

$$x^2 + y^2 = 193$$

$$\Rightarrow (x, y) = (7, 12) \text{ or } (12, 7)$$

$$\text{Mean} = \frac{x + y + x + y + 1 + (x - y)}{4}$$

$$= \frac{19 + 20 + 5}{4}$$

$$= 11$$

- 23.
- 24.
- 25.



Our Problem *Solvers* shine bright in **JEE 2025**

JEE (Advanced)

ADVAY
MAYANK
AIR 36



RUJUL
GARG
AIR 41



ARUSH
ANAND
AIR 64



JEE (MAIN)

SHREYAS
LOHIYA
AIR 6
Uttar Pradesh Topper
100 Overall



KUSHAGRA
BAINGAHA
AIR 7
Uttar Pradesh Topper
100 Overall



HARSH
A GUPTA
AIR 15
Telangana Topper
100 Overall

