

JEE MAIN 2025 (ONLINE) 4TH APRIL EVENING SHIFT — QUESTION PAPER

Max. Marks: 300
Questions: 75

Section A (MCQ) — 60 questions

- Q.1** A finite size object is placed normal to the principal axis at a distance of 30 cm from a convex mirror of focal length 30 cm. A plane mirror is now placed in such a way that the image produced by both the mirrors coincide with each other. The distance between the two mirrors is :

[JEE Main 2025 (Online) 4th April Evening Shift]

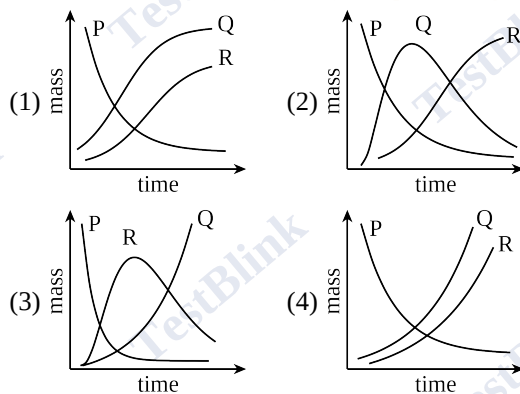
- (1) 45 cm (2) 15 cm (3) 22.5 cm (4) 7.5 cm

Scan or tap for the full solution



- Q.2** A radioactive material P first decays into Q and then Q decays to non-radioactive material R. Which of the following figure represents time dependent mass of P, Q and R ?

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- Q.3** Displacement of a wave is expressed as $x(t) = 5\cos\left(628t + \frac{\pi}{2}\right)$ m. The wavelength of the wave when its velocity is 300 m/s is : ($\pi = 3.14$)

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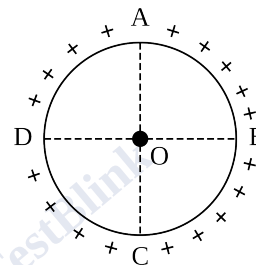
- (1) 0.33 m (2) 0.5 m (3) 3 m (4) 5 m

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- Q.4** A metallic ring is uniformly charged as shown in figure. AC and BD are two mutually perpendicular diameters. Electric field due to arc AB at 'O' is 'E' in magnitude. What would be the magnitude of electric field at 'O' due to arc ABC ?

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- (1) 2E (2) Zero (3) E/2 (4) $\sqrt{2}$ E

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- Q.5** A wheel is rolling on a plane surface. The speed of a particle on the highest point of the rim is 8 m/s. The speed of the particle on the rim of the wheel at the same level as the centre of the wheel, will be :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) $4\sqrt{2}$ m/s (2) 8 m/s
 (3) 4 m/s (4) $8\sqrt{2}$ m/s

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- Q.6** In an electromagnetic system, a quantity defined as the ratio of electric dipole moment and magnetic dipole moment has dimension of $[M^P L^Q T^R A^S]$. The values of P and Q are :

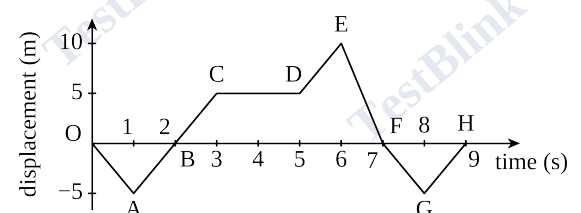
[JEE Main 2025 (Online) 4th April Evening Shift]

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

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- Q.7** The displacement x versus time graph is shown below.



- A. The average velocity during 0 to 3 s is 10 m/s

- B. The average velocity during 3 to 5 s is 0 m/s
 C. The instantaneous velocity at $t = 2$ s is 5 m/s
 D. The average velocity during 5 to 7 s and instantaneous velocity at $t = 6.5$ s are equal
 E. The average velocity from $t = 0$ to $t = 9$ s is zero
 Choose the correct answer from the options given below : [JEE Main 2025 (Online) 4th April Evening Shift]
- (1) (B), (C), (D) only (2) (B), (D), (E) only
 (3) (A), (D), (E) only (4) (B), (C), (E) only

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- Q.8** Consider a rectangular sheet of solid material of length $l = 9$ cm and width $d = 4$ cm. The coefficient of linear expansion is $\alpha = 3.1 \times 10^{-5} \text{ K}^{-1}$ at room temperature and one atmospheric pressure. The mass of sheet $m = 0.1$ kg and the specific heat capacity $C_v = 900 \text{ J kg}^{-1} \text{ K}^{-1}$. If the amount of heat supplied to the material is $8.1 \times 10^2 \text{ J}$ then change in area of the rectangular sheet is :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) $2.0 \times 10^{-6} \text{ m}^2$ (2) $6.0 \times 10^{-7} \text{ m}^2$
 (3) $3.0 \times 10^{-7} \text{ m}^2$ (4) $4.0 \times 10^{-7} \text{ m}^2$

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- Q.9** An object is kept at rest at a distance of $3R$ above the earth's surface where R is earth's radius. The minimum speed with which it must be projected so that it does not return to earth is : (Assume $M =$ mass of earth, $G =$ Universal gravitational constant)

[JEE Main 2025 (Online) 4th April Evening Shift]

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

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- Q.10** A cylindrical rod of length 1 m and radius 4 cm is mounted vertically. It is subjected to a shear force of 10^5 N at the top. Considering infinitesimally small displacement in the upper edge, the angular displacement θ of the rod axis from its original position would be : (shear modulus, $G = 10^{10} \text{ N/m}^2$)

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- (1) $1/160\pi$ (2) $1/2\pi$ (3) $1/4\pi$ (4) $1/40\pi$

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- Q.11** For the determination of refractive index of glass slab, a travelling microscope is used whose main scale contains 300 equal divisions equal to 15 cm. The vernier scale attached to the microscope has 25 divisions equal to 24 divisions of main scale. The least count (LC) of the travelling microscope is (in cm) : [JEE Main 2025 (Online) 4th April Evening Shift]

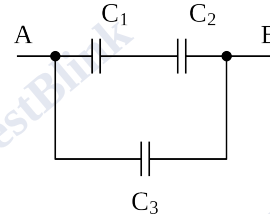
- (1) 0.002 (2) 0.0025 (3) 0.0005 (4) 0.001

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- Q.12** Three parallel plate capacitors C_1 , C_2 and C_3 each of capacitance $5 \mu\text{F}$ are connected as shown in figure. The effective capacitance between points A and B, when the space between the parallel plates of C_1 capacitor is filled with a dielectric medium having dielectric constant of 4, is :

[JEE Main 2025 (Online) 4th April Evening Shift]



- (1) $9 \mu\text{F}$ (2) $30 \mu\text{F}$ (3) $7.5 \mu\text{F}$ (4) $22.5 \mu\text{F}$

Scan or tap for the full solution



- Q.13** A block of mass 25 kg is pulled along a horizontal surface by a force at an angle 45° with the horizontal. The friction coefficient between the block and the surface is 0.25. The block travels at a uniform velocity. The work done by the applied force during a displacement of 5 m of the block is :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 490 J (2) 970 J (3) 735 J (4) 245 J

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- Q.14** There are two vessels filled with an ideal gas where volume of one is double the volume of the other. The large vessel contains the gas at 8 kPa at 1000 K while the smaller vessel contains the gas at 7 kPa at 500 K. If the vessels are connected to each other by a thin tube allowing the gas to flow and the temperature of both vessels is maintained at 600 K, at steady state the pressure in the vessels will be (in kPa).

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- (1) 24 (2) 4.4 (3) 18 (4) 6

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- Q.15** Two polarisers P_1 and P_2 are placed in such a way that the intensity of the transmitted light will be zero. A third polariser P_3 is inserted in between P_1 and P_2 , at particular angle between P_2 and P_3 . The transmitted intensity of the light passing through all three polarisers is maximum. The angle between the polarisers P_2 and P_3 is :

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- (1) $\pi/6$ (2) $\frac{\pi}{3}$ (3) $\frac{\pi}{4}$ (4) $\pi/8$

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Q.16 Match **List - I** with **List - II**.

ΔQ = Heat supplied

ΔW = Work done by the system

ΔU = Change in internal energy

P = Pressure of the system

ΔV = Change in volume of the system

List - I		List - II	
A.	Isobaric	I.	$\Delta Q = \Delta W$
B.	Isochoric	II.	$\Delta Q = \Delta U$
C.	Adiabatic	III.	$\Delta Q = \text{zero}$
D.	Isothermal	IV.	$\Delta Q = \Delta U + P\Delta V$

Choose the correct answer from the options given below : [JEE Main 2025 (Online) 4th April Evening Shift]

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

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

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

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

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Q.17 There are 'n' number of identical electric bulbs, each is designed to draw a power p independently from the mains supply. They are now joined in series across the mains supply. The total power drawn by the combination is :

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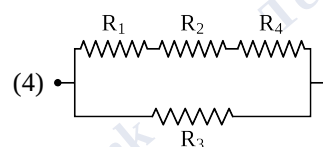
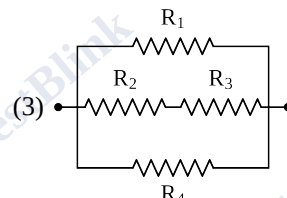
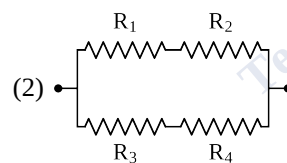
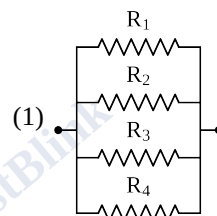
(1) np (2) p (3) $\frac{p}{n^2}$ (4) $\frac{p}{n}$

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Q.18 From the combination of resistors with resistance values $R_1 = R_2 = R_3 = 5 \Omega$ and $R_4 = 10 \Omega$, which of the following combination is the best circuit to get an equivalent resistance of 6Ω ?

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Q.19 Consider an n-type semiconductor in which n_e and n_h are number of electrons and holes, respectively.

A. Holes are minority carriers

B. The dopant is a pentavalent atom

C. $n_e n_h \neq n_i^2$

(where n_i is number of electrons or holes in semiconductor when it is in intrinsic form)

D. $n_e n_h \geq n_i^2$

E. The holes are not generated due to the donors

Choose the correct answer from the options given below : [JEE Main 2025 (Online) 4th April Evening Shift]

(1) (A), (B), (E) only (2) (A), (C), (E) only

(3) (A), (B), (C) only (4) (A), (C), (D) only

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Q.20 Given below are two statements :

Statement-I: The dimensions of Planck's constant and angular momentum are the same.

Statement-II: In Bohr's model electrons revolve around the nucleus only in those orbits for which angular momentum is integral multiple of Planck's constant.

In the light of the above statements, choose the most appropriate answer from the options given below :

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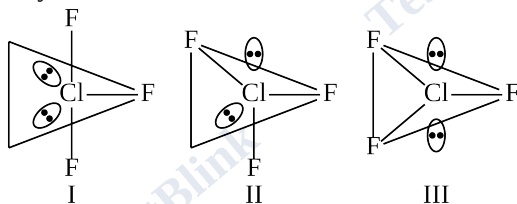
- (1) Both Statement-I and Statement-II are correct
 (2) Statement-I is correct but Statement-II is incorrect
 (3) Both Statement-I and Statement-II are incorrect
 (4) Statement-I is incorrect but Statement-II is correct

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Q.21 Given below are two statements:

Statement-I: For ClF_3 , all three possible structures may be drawn as follows.



Statement-II: Structure III is most stable, as the orbitals having the lone pairs are axial, where the lp – bp repulsion is minimum.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

[JEE Main 2025 (Online) 4th April Evening Shift]

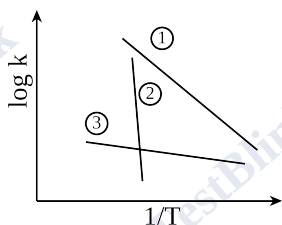
- (1) Both Statement-I and Statement-II are correct
 (2) Both Statement-I and Statement-II are incorrect
 (3) Statement-I is correct but Statement-II is incorrect
 (4) Statement-I is incorrect but Statement-II is correct

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Q.22 Consider the following plots of log of rate constant k ($\log k$) vs $\frac{1}{T}$ for three different reactions. The correct order of activation energies of these reactions is :

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- (1) $E_{a2} > E_{a1} > E_{a3}$ (2) $E_{a1} > E_{a3} > E_{a2}$
 (3) $E_{a3} > E_{a2} > E_{a1}$ (4) $E_{a1} > E_{a2} > E_{a3}$

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Q.23 Match **List-I** with **List-II**

List-I (Separation of)		List-II (Separation Technique)	
A.	Aniline from aniline-water mixture	I.	Simple distillation
B.	Glycerol from spent-lye in soap industry	II.	Fractional distillation
C.	Different fractions of crude oil in petroleum industry	III.	Distillation at reduced pressure
D.	Chloroform-Aniline mixture	IV.	Steam distillation

Choose the correct answer from the options given below : [JEE Main 2025 (Online) 4th April Evening Shift]

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

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Q.24 Given below are two statements :

Statement-I: The first ionisation enthalpy of group 14 elements is higher than the corresponding elements of group 13.

Statement-II: Melting points and boiling points of group 13 elements are in general much higher than those of corresponding elements of group 14.

In the light of the above statements, choose the most appropriate answer from the options given below :

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

Scan or tap for the full solution



Q.25 Which among the following compounds give yellow solid when reacted with NaOI/NaOH ?

- A. $\text{CH}_3-\text{CH}(\text{OH})-\text{C}_2\text{H}_5$ B. $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{OH}$
 C. $\text{CH}_3-\text{C}(=\text{O})-\text{C}_2\text{H}_5$ D. $\text{CH}_3-\text{C}(=\text{O})-\text{OH}$
 E. $\text{CH}_3-\text{CH}_2-\text{C}(=\text{O})-\text{H}$

Choose the correct answer from the options given below : [JEE Main 2025 (Online) 4th April Evening Shift]

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

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Q.26 Consider the ground state of chromium atom ($Z = 24$). How many electrons are with Azimuthal quantum number $l = 1$ and $l = 2$ respectively ?

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- (1) 16 and 5 (2) 12 and 5 (3) 12 and 4 (4) 16 and 4

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Q.27 Given below are two statements:

Statement-I: Molal depression constant K_f is given by $\frac{M_1 RT_f}{\Delta S_{fus}}$, where symbols have their usual meaning.

Statement-II: K_f for benzene is less than the K_f for water.

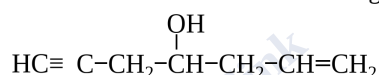
In the light of the above statements, choose the most appropriate answer from the options given below :

[JEE Main 2025 (Online) 4th April Evening Shift]

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

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Q.28 The IUPAC name of the following compound is:



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- (1) 4-Hydroxyhept-6-en-1-yne
 (2) Hept-1-en-6-yn-4-ol
 (3) Hept-6-en-1-yn-4-ol
 (4) 4-Hydroxyhept-1-en-6-yne

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Q.29 Half life of zero order reaction $A \longrightarrow \text{product}$ is 1 hour, when initial concentration of reactant is 2.0 mol L^{-1} . The time required to decrease concentration of A from 0.50 to 0.25 mol L^{-1} is :

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- (1) 0.5 hour (2) 15 min (3) 60 min (4) 4 hour

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Q.30 The incorrect relationship in the following pairs in relation to ionisation enthalpies is :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) $\text{Mn}^{2+} < \text{Fe}^{2+}$ (2) $\text{Mn}^+ < \text{Mn}^{2+}$
 (3) $\text{Mn}^+ < \text{Cr}^+$ (4) $\text{Fe}^{2+} < \text{Fe}^{3+}$

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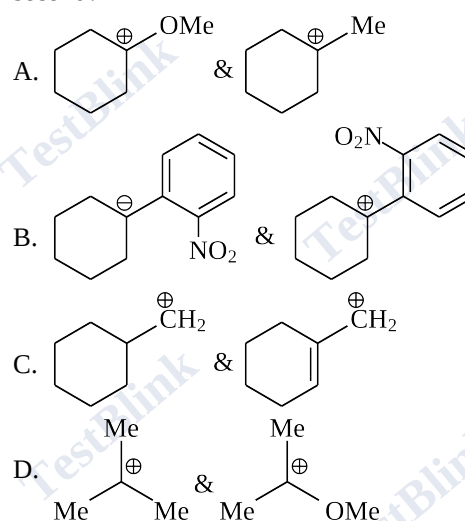
Q.31 A toxic compound "A" when reacted with NaCN in aqueous acidic medium yields an edible cooking component and food preservative "B". "B" is converted to "C" by diborane and can be used as an additive to petrol to reduce emission. "C" upon reaction with oleum at 140°C yields an inhalable anesthetic "D". Identify "A", "B", "C" & "D", respectively :

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- (1) Methanol; acetic acid; ethanol; diethyl ether
 (2) Ethanol; acetonitrile; ethylamine; ethylene
 (3) Methanol; formaldehyde; methyl chloride; chloroform
 (4) Acetaldehyde; 2-hydroxypropanoic acid; propanoic acid; dipropyl ether

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Q.32 In which pairs, the first ion is more stable than the second?



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

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Q.33 'X' is the number of electrons in t_{2g} orbitals of the most stable complex ion among $[\text{Fe}(\text{NH}_3)_6]^{3+}$, $[\text{FeCl}_6]^{3-}$, $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{3-}$ and $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$. The nature of oxide of vanadium of the type V_2O_x is :

[JEE Main 2025 (Online) 4th April Evening Shift]

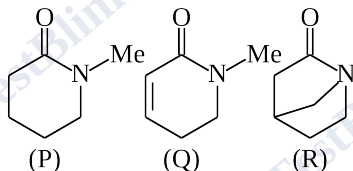
- (1) Amphoteric (2) Acidic
(3) Basic (4) Neutral

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Q.34 The correct order of basicity for the following molecules is :

[JEE Main 2025 (Online) 4th April Evening Shift]

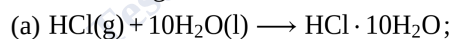


- (1) $R > P > Q$ (2) $P > Q > R$
(3) $R > Q > P$ (4) $Q > P > R$

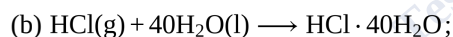
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Q.35 Consider the given data :



$\Delta H = -69.01 \text{ kJ mol}^{-1}$



$\Delta H = -72.79 \text{ kJ mol}^{-1}$

Choose the correct statement :

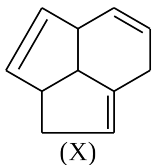
[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) The heat of dilution for the HCl ($\text{HCl} \cdot 10\text{H}_2\text{O}$ to $\text{HCl} \cdot 40\text{H}_2\text{O}$) is 3.78 kJ mol^{-1} .
(2) Dissolution of gas in water is an endothermic process.
(3) The heat of solution depends on the amount of solvent.
(4) The heat of formation of HCl solution is represented by both (a) and (b).

Scan or tap for the full solution

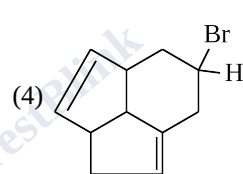
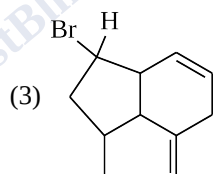
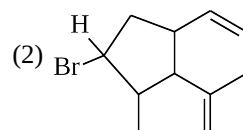
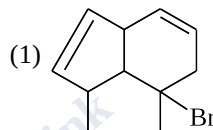


Q.36 Consider the following molecule(X).



The major product formed when the given molecule (X) is treated with HBr (1 eq) is :

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Q.37 The correct order of $[\text{FeF}_6]^{3-}$, $[\text{CoF}_6]^{3-}$, $[\text{Ni}(\text{CO})_4]$ and $[\text{Ni}(\text{CN})_4]^{2-}$ complex species based on the number of unpaired electrons present is:

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- (1) $[\text{CoF}_6]^{3-} > [\text{FeF}_6]^{3-} > [\text{Ni}(\text{CO})_4] > [\text{Ni}(\text{CN})_4]^{2-}$
(2) $[\text{FeF}_6]^{3-} > [\text{CoF}_6]^{3-} > [\text{Ni}(\text{CN})_4]^{2-} > [\text{Ni}(\text{CO})_4]$
(3) $[\text{FeF}_6]^{3-} > [\text{CoF}_6]^{3-} > [\text{Ni}(\text{CN})_4]^{2-} = [\text{Ni}(\text{CO})_4]$
(4) $[\text{Ni}(\text{CN})_4]^{2-} > [\text{FeF}_6]^{3-} > [\text{CoF}_6]^{3-} > [\text{Ni}(\text{CO})_4]$

Scan or tap for the full solution



Q.38 Given below are two statements :

Statement-I: Alcohols are formed when alkyl chlorides are treated with aqueous potassium hydroxide by elimination reaction.

Statement-II: In alcoholic potassium hydroxide, alkyl chlorides form alkenes by abstracting the hydrogen from the β -carbon.

In the light of the above statements, choose the most appropriate answer from the options given below :

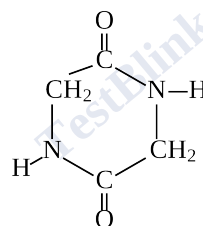
[JEE Main 2025 (Online) 4th April Evening Shift]

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

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Q.39 A dipeptide, "x" on complete hydrolysis gives "y" and "z". "y" on treatment with aq. HNO_2 produces lactic acid. On the other hand "z" on heating gives the following cyclic molecule.



Based on the information given, the dipeptide "x" is :

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- (1) alanine-alanine (2) valine-glycine
(3) valine-leucine (4) alanine-glycine

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Q.40 The elements of Group 13 with highest and lowest first ionisation enthalpies are respectively :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) B & Tl (2) Tl & B (3) B & In (4) B & Ga

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Q.41 Let $A = \{-3, -2, -1, 0, 1, 2, 3\}$ and R be a relation on A defined by xRy if and only if $2x - y \in \{0, 1\}$. Let l be the number of elements in R . Let m and n be the minimum number of elements required to be added in R to make it reflexive and symmetric relations, respectively. Then $l + m + n$ is equal to:

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 17 (2) 18 (3) 15 (4) 16

Scan or tap for the full solution



Q.42 Let the domains of the functions $f(x) = \log_4 \log_3 \log_7 (8 - \log_2 (x^2 + 4x + 5))$ and $g(x) = \sin^{-1} \left(\frac{7x + 10}{x - 2} \right)$ be (α, β) and $[\gamma, \delta]$, respectively. Then $\alpha^2 + \beta^2 + \gamma^2 + \delta^2$ is equal to :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 15 (2) 13 (3) 16 (4) 14

Scan or tap for the full solution



Q.43 Let the mean and the standard deviation of the observations 2, 3, 3, 4, 5, 7, a , b be 4 and $\sqrt{2}$ respectively. Then the mean deviation about the mode of these observations is :

[JEE Main 2025 (Online) 4th April Evening Shift]

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

Scan or tap for the full solution



Q.44 Let the sum of the focal distances of the point $P(4, 3)$ on the hyperbola $H: \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ be $8\sqrt{\frac{5}{3}}$. If for H , the length of the latus rectum is l and the product of the focal distances of the point P is m , then $9l^2 + 6m$ is equal to :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 187 (2) 184 (3) 186 (4) 185

Scan or tap for the full solution



Q.45 Let $a > 0$. If the function $f(x) = 6x^3 - 45ax^2 + 108a^2x + 1$ attains its local maximum and minimum values at the points x_1 and x_2 respectively such that $x_1x_2 = 54$, then $a + x_1 + x_2$ is equal to :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 15 (2) 13 (3) 24 (4) 18

Scan or tap for the full solution



Q.46 Let the matrix $A = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ satisfy

$A^n = A^{n-2} + A^2 - I$ for $n \geq 3$. Then the sum of all the elements of A^{50} is :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 44 (2) 39 (3) 52 (4) 53

Scan or tap for the full solution



Q.47 If a curve $y = y(x)$ passes through the point $\left(1, \frac{\pi}{2}\right)$ and satisfies the differential equation

$$(7x^4 \cot y - e^x \operatorname{cosec} y) \frac{dy}{dx} = x^5, \quad x \geq 1, \text{ then at } x = 2,$$

the value of $\cos y$ is :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) $\frac{2e^2 + e}{64}$ (2) $\frac{2e^2 - e}{64}$ (3) $\frac{2e^2 - e}{128}$ (4) $\frac{2e^2 + e}{128}$

Scan or tap for the full solution



Q.48 If the sum of the first 20 terms of the series

$$\frac{4 \cdot 1}{4 + 3 \cdot 1^2 + 1^4} + \frac{4 \cdot 2}{4 + 3 \cdot 2^2 + 2^4} + \frac{4 \cdot 3}{4 + 3 \cdot 3^2 + 3^4} + \frac{4 \cdot 4}{4 + 3 \cdot 4^2 + 4^4} + \dots$$

is $\frac{m}{n}$, where m and n are coprime, then $m + n$ is equal to :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 423 (2) 421 (3) 422 (4) 420

Scan or tap for the full solution



Q.49 Let for two distinct values of p the lines $y = x + p$

touch the ellipse $E: \frac{x^2}{4^2} + \frac{y^2}{3^2} = 1$ at the points A and

B . Let the line $y = x$ intersect E at the points C and D . Then the area of the quadrilateral $ABCD$ is equal to :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 48 (2) 20 (3) 24 (4) 36

Scan or tap for the full solution



Q.50 If $1^2 \cdot {}^{15}C_1 + 2^2 \cdot {}^{15}C_2 + 3^2 \cdot {}^{15}C_3 + \dots + 15^2 \cdot {}^{15}C_{15} = 2^m \cdot 3^n \cdot 5^k$, where $m, n, k \in \mathbb{N}$, then $m + n + k$ is equal to :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 20 (2) 19 (3) 18 (4) 21

Scan or tap for the full solution



- Q.51** The centre of a circle C is at the centre of the ellipse $E: \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, $a > b$. Let C pass through the foci F_1 and F_2 of E such that the circle C and the ellipse E intersect at four points. Let P be one of these four points. If the area of the triangle PF_1F_2 is 30 and the length of the major axis of E is 17, then the distance between the foci of E is :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 12 (2) 26 (3) 13 (4) $\frac{13}{2}$

Scan or tap for the full solution 

- Q.52** A line passing through the point $A(-2, 0)$ touches the parabola $P: y^2 = x - 2$ at the point B in the first quadrant. The area of the region bounded by the line AB, parabola P and the x-axis, is :

[JEE Main 2025 (Online) 4th April Evening Shift]

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

Scan or tap for the full solution 

- Q.53** Let the product of $\omega_1 = (8 + i)\sin\theta + (7 + 4i)\cos\theta$ and $\omega_2 = (1 + 8i)\sin\theta + (4 + 7i)\cos\theta$ be $\alpha + i\beta$, $i = \sqrt{-1}$. Let p and q be the maximum and the minimum values of $\alpha + \beta$ respectively. Then $p + q$ is equal to :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 130 (2) 150 (3) 160 (4) 140

Scan or tap for the full solution 

- Q.54** Let A be the point of intersection of the lines $L_1: \frac{x-7}{1} = \frac{y-5}{0} = \frac{z-3}{-1}$ and $L_2: \frac{x-1}{3} = \frac{y+3}{4} = \frac{z+7}{5}$. Let B and C be the points on the lines L_1 and L_2 respectively such that $AB = AC = \sqrt{15}$. Then the square of the area of the triangle ABC is :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 63 (2) 57 (3) 60 (4) 54

Scan or tap for the full solution 

- Q.55** The sum of the infinite series

$$\cot^{-1}\left(\frac{7}{4}\right) + \cot^{-1}\left(\frac{19}{4}\right) + \cot^{-1}\left(\frac{39}{4}\right) + \cot^{-1}\left(\frac{67}{4}\right) + \dots$$

is : [JEE Main 2025 (Online) 4th April Evening Shift]

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

Scan or tap for the full solution 

- Q.56** The axis of a parabola is the line $y = x$ and its vertex and focus are in the first quadrant at distances $\sqrt{2}$ and $2\sqrt{2}$ units from the origin, respectively. If the point $(1, k)$ lies on the parabola, then a possible value of k is :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 8 (2) 3 (3) 9 (4) 4

Scan or tap for the full solution 

- Q.57** Let $f(x) + 2f\left(\frac{1}{x}\right) = x^2 + 5$ and $2g(x) - 3g\left(\frac{1}{2}\right) = x$, $x > 0$. If $\alpha = \int_1^2 f(x) dx$, and $\beta = \int_1^2 g(x) dx$, then the value of $9\alpha + \beta$ is :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 0 (2) 10 (3) 1 (4) 11

Scan or tap for the full solution 

- Q.58** Consider two sets A and B, each containing three numbers in A.P. Let the sum and the product of the elements of A be 36 and p respectively and the sum and the product of the elements of B be 36 and q respectively. Let d and D be the common differences of A.P.'s in A and B respectively such that $D = d + 3$, $d > 0$. If $\frac{p+q}{p-q} = \frac{19}{5}$, then $p - q$ is

equal to [JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 540 (2) 450 (3) 600 (4) 630

Scan or tap for the full solution 

- Q.59** Let the values of p, for which the shortest distance between the lines $\frac{x+1}{3} = \frac{y}{4} = \frac{z}{5}$ and

$$\vec{r} = (p\hat{i} + 2\hat{j} + \hat{k}) + \lambda(2\hat{i} + 3\hat{j} + 4\hat{k}) \text{ is } \frac{1}{\sqrt{6}}, \text{ be}$$

- a, b, ($a < b$). Then the length of the latus rectum of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) $\frac{3}{2}$ (2) 9 (3) 18 (4) $\frac{2}{3}$

Scan or tap for the full solution 

- Q.60** Let f be a differentiable function on R such that $f(2) = 1$, $f'(2) = 4$. Let $\lim_{x \rightarrow 0} (f(2+x))^{3/x} = e^\alpha$. Then the number of times the curve $y = 4x^3 - 4x^2 - 4(\alpha-7)x - \alpha$ meets x-axis is :

[JEE Main 2025 (Online) 4th April Evening Shift]

(1) 3 (2) 1 (3) 2 (4) 0

Scan or tap for the full solution

**Section B (Numerical) — 15 questions**

Q.61 A solid sphere with uniform density and radius R is rotating initially with constant angular velocity (ω_1) about its diameter. After some time during the rotation it starts losing mass at a uniform rate, with no change in its shape. The angular velocity of the sphere when its radius becomes $R/2$ is $x\omega_1$. The value of x is _____.

[JEE Main 2025 (Online) 4th April Evening Shift]

Scan or tap for the full solution



Q.62 An inductor of self inductance 1 H is connected in series with a resistor of $100\pi\text{ ohm}$ and an ac supply of $100\pi\text{ volt}$, 50 Hz . Maximum current flowing in the circuit is _____ A.

[JEE Main 2025 (Online) 4th April Evening Shift]

Scan or tap for the full solution



Q.63 If an optical medium possesses a relative permeability of $\frac{10}{\pi}$ and relative permittivity of $\frac{1}{0.0885}$, then the velocity of light is greater in vacuum than that in this medium by _____ times. ($\mu_0 = 4\pi \times 10^{-7}\text{ H/m}$, $\epsilon_0 = 8.85 \times 10^{-12}\text{ F/m}$, $c = 3 \times 10^8\text{ m/s}$)

[JEE Main 2025 (Online) 4th April Evening Shift]

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Q.64 A particle of charge $1.6\text{ }\mu\text{C}$ and mass $16\text{ }\mu\text{g}$ is present in a strong magnetic field of 6.28 T . The particle is then fired perpendicular to magnetic field. The time required for the particle to return to original location for the first time is _____ s (rounded off to the nearest integer). ($\pi = 3.14$)

[JEE Main 2025 (Online) 4th April Evening Shift]

Scan or tap for the full solution



Q.65 In a Young's double slit experiment, two slits are located 1.5 mm apart. The distance of screen from slits is 2 m and the wavelength of the source is 400 nm . If the 20 maxima of the double slit pattern are contained within the central maximum of the single slit diffraction pattern, then the width of each slit is $x \times 10^{-3}\text{ cm}$, where x -value is _____.

[JEE Main 2025 (Online) 4th April Evening Shift]

Scan or tap for the full solution



Q.66 Sea water, which can be considered as a 6 molar (6 M) solution of NaCl , has a density of 2 g mL^{-1} . The concentration of dissolved oxygen (O_2) in sea water is 5.8 ppm . Then the concentration of dissolved oxygen (O_2) in sea water, in terms of molality, is $x \times 10^{-4}\text{ m}$.

 $x =$ _____. (Nearest integer)Given: Molar mass of NaCl is 58.5 g mol^{-1} Molar mass of O_2 is 32 g mol^{-1}

[JEE Main 2025 (Online) 4th April Evening Shift]

Scan or tap for the full solution



Q.67 The amount of calcium oxide produced on heating 150 kg limestone (75% pure) is _____ kg. (Nearest integer)

Given: Molar mass (in g mol^{-1}) of Ca -40, O -16, C -12

[JEE Main 2025 (Online) 4th April Evening Shift]

Scan or tap for the full solution



Q.68 A metal complex with a formula $\text{MCl}_4 \cdot 3\text{NH}_3$ is involved in sp^3d^2 hybridisation. It upon reaction with excess of AgNO_3 solution gives ' x ' moles of AgCl . Consider ' x ' is equal to the number of lone pairs of electrons present in the central atom of BrF_5 . Then the number of geometrical isomers exhibited by the complex is _____.

[JEE Main 2025 (Online) 4th April Evening Shift]

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Q.69 The molar conductance of an infinitely dilute solution of ammonium chloride was found to be $185\text{ S cm}^2\text{ mol}^{-1}$ and the ionic conductances of hydroxide and chloride ions are 170 and $70\text{ S cm}^2\text{ mol}^{-1}$, respectively. If molar conductance of 0.02 M solution of ammonium hydroxide is $85.5\text{ S cm}^2\text{ mol}^{-1}$, its degree of dissociation is given by $x \times 10^{-1}$. The value of x is _____. (Nearest integer)

[JEE Main 2025 (Online) 4th April Evening Shift]

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Q.70 $x\text{ mg}$ of $\text{Mg}(\text{OH})_2$ (molar mass = 58 g mol^{-1}) is required to be dissolved in 1.0 L of water to produce a pH of 10.0 at 298 K . The value of x is _____ mg. (Nearest integer)

(Given : $\text{Mg}(\text{OH})_2$ is assumed to dissociate completely in H_2O)

[JEE Main 2025 (Online) 4th April Evening Shift]

Scan or tap for the full solution



Q.71 If

$$\int \frac{(\sqrt{1+x^2} + x)^{10}}{(\sqrt{1+x^2} - x)^9} dx = \frac{1}{m} \left((\sqrt{1+x^2} + x)^n (n\sqrt{1+x^2} - x) \right) + C$$

where C is the constant of integration and $m, n \in \mathbb{N}$, then $m + n$ is equal to _____.

[JEE Main 2025 (Online) 4th April Evening Shift]

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Q.72 A card from a pack of 52 cards is lost. From the remaining 51 cards, n cards are drawn and are found to be spades. If the probability of the lost card to be a spade is $\frac{11}{50}$, then n is equal to _____.

[JEE Main 2025 (Online) 4th April Evening Shift]

Scan or tap for the full solution



Q.73 Let the three sides of a triangle ABC be given by the vectors $2\hat{i} - \hat{j} + \hat{k}$, $\hat{i} - 3\hat{j} - 5\hat{k}$ and $3\hat{i} - 4\hat{j} - 4\hat{k}$. Let G be the centroid of the triangle ABC. Then $6(|\vec{AG}|^2 + |\vec{BG}|^2 + |\vec{CG}|^2)$ is equal to _____.

[JEE Main 2025 (Online) 4th April Evening Shift]

Scan or tap for the full solution



Q.74 If α is a root of the equation $x^2 + x + 1 = 0$ and $\sum_{k=1}^n \left(\alpha^k + \frac{1}{\alpha^k} \right)^2 = 20$, then n is equal to _____.

[JEE Main 2025 (Online) 4th April Evening Shift]

Scan or tap for the full solution



Q.75 Let m and n , ($m < n$), be two 2-digit numbers. Then the total number of pairs (m, n) , such that $\gcd(m, n) = 6$, is _____.

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Scan or tap for the full solution



ANSWER KEY

Section A (MCQ) — 60 questions

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	4	2	3	4	1	2	4	1	3	1	1
Ques.	12	13	14	15	16	17	18	19	20	21	22
Ans.	1	4	4	3	2	4	2	1	2	3	1
Ques.	23	24	25	26	27	28	29	30	31	32	33
Ans.	1	1	1	2	1	2	2	1	1	1	1
Ques.	34	35	36	37	38	39	40	41	42	43	44
Ans.	3	3	1	3	3	4	3	1	1	3	4
Ques.	45	46	47	48	49	50	51	52	53	54	55
Ans.	4	4	3	2	3	2	3	3	1	4	3
Ques.	56	57	58	59	60						
Ans.	3	4	1	4	3						

Section B (Numerical) — 15 questions

Ques.	61	62	63	64	65	66	67
Ans.	32	1	6	0	15	2	63
Ques.	68	69	70	71	72	73	74
Ans.	2	3	3	379	2	164	11
Ques.	75						
Ans.	64						