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JEE MAIN 2025 (ONLINE) 7TH APRIL MORNING SHIFT

Question Paper · answer key at the end

Time: 3 Hours **Max. Marks:** 300 **Questions:** 75

General Instructions:

1. The duration of the paper is 3 hours. It has 75 questions: Physics 25, Chemistry 25, Mathematics 25.
2. Each subject has Section A (multiple-choice questions, only one correct answer) and Section B (numerical-value questions).
3. Marking: +4 for each correct answer, −1 for each wrong answer, 0 for a question not answered.
4. The answer key is at the end. Scan the QR code beside any question for its step-by-step solution.
5. Practise this paper as a timed test on the real exam screen, free, at pyqside.com.

Section A (MCQ) — 60 questions

Q.1 If ε_0 denotes the permittivity of free space and Φ_E is the flux of the electric field through the area bounded by the closed surface, then dimensions of $\left(\varepsilon_0 \frac{d\Phi_E}{dt}\right)$ are that of :

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) electric charge (2) electric field

(3) electric current (4) electric potential

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Q.2 The percentage increase in magnetic field (B) when space within a current carrying solenoid is filled with magnesium (magnetic susceptibility $\chi_{Mg} = 1.2 \times 10^{-5}$) is :

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) $\frac{5}{3} \times 10^{-5}\%$ (2) $\frac{5}{6} \times 10^{-4}\%$

(3) $\frac{5}{6} \times 10^{-5}\%$ (4) $\frac{6}{5} \times 10^{-3}\%$

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Q.3 An object of mass 1000 g experiences a time dependent force $\vec{F} = (2t\hat{i} + 3t^2\hat{j})$ N. The power generated by the force at time t is:

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) $(2t^2 + 18t^3)$ W (2) $(3t^3 + 5t^5)$ W

(3) $(2t^3 + 3t^5)$ W (4) $(2t^2 + 3t^3)$ W

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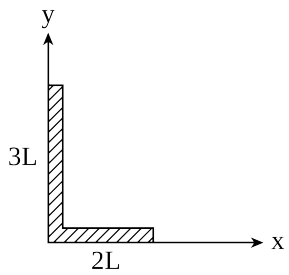
Q.4 A rod of length 5 L is bent at right angle keeping one side length as 2 L.



The position of the centre of mass of the system : (Consider L = 10 cm)

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) $4\hat{i} + 9\hat{j}$ (2) $2\hat{i} + 3\hat{j}$ (3) $5\hat{i} + 8\hat{j}$ (4) $3\hat{i} + 7\hat{j}$

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Q.5 An ac current is represented as

$i = 5\sqrt{2} + 10\cos\left(650\pi t + \frac{\pi}{6}\right)$ Amp

The r.m.s. value of the current is

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 10 Amp (2) $5\sqrt{2}$ Amp

(3) 100 Amp (4) 50 Amp

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Q.6 Two harmonic waves moving in the same direction superimpose to form a wave $x = a\cos(1.5t)\cos(50.5t)$ where t is in seconds. Find the period with which they beat. (close to nearest integer) [JEE Main 2025 (Online) 7th April Morning Shift]

(1) 1 s (2) 4 s (3) 2 s (4) 6 s

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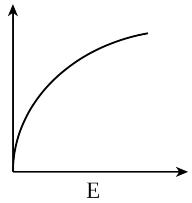
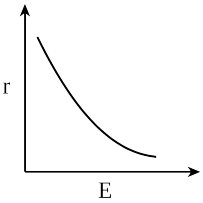
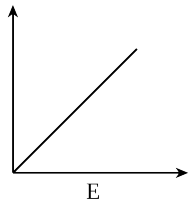
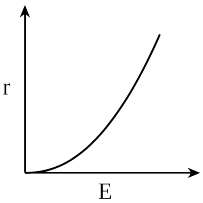
Q.7 A particle of charge q, mass m and kinetic energy E enters a magnetic field perpendicular to its velocity and undergoes a circular arc of radius (r). Which of the following curves represents the variation of r with E? [JEE Main 2025 (Online) 7th April Morning Shift]

(1) 

(2) 

(3) 

(4) 

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Q.8 A wire of resistance R is bent into a triangular pyramid as shown in figure with each segment having same length. The resistance between points A and B is R/n. The value of n is :

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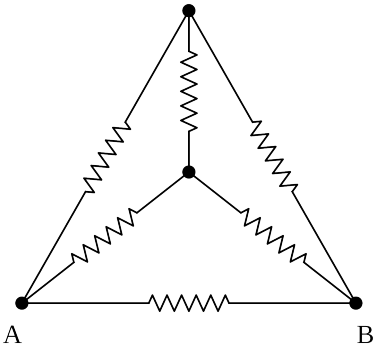

(1) 16 (2) 10 (3) 12 (4) 14

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Q.9 Two wires A and B are made of same material having ratio of lengths $\frac{L_A}{L_B} = \frac{1}{3}$ and their diameters ratio $\frac{d_A}{d_B} = 2$. If both the wires are stretched using same force, what would be the ratio of their respective elongations?

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 3:4 (2) 1:12 (3) 1:3 (4) 1:6

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Q.10 Two plane polarized light waves combine at a certain point whose electric field components are

$E_1 = E_0 \sin \omega t$

$E_2 = E_0 \sin\left(\omega t + \frac{\pi}{3}\right)$

Find the amplitude of the resultant wave.

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 1.7 E_0 (2) E_0 (3) 0.9 E_0 (4) 3.4 E_0

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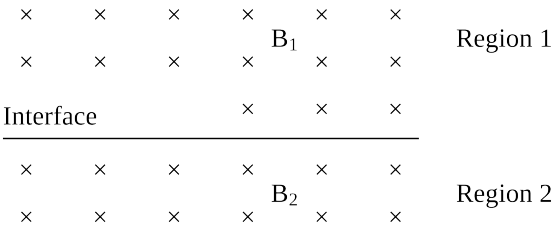
Q.11 Uniform magnetic fields of different strengths (B_1 and B_2), both normal to the plane of the paper exist as shown in the figure. A charged particle of mass m and charge q, at the interface at an instant, moves into the region 2 with velocity v and returns to the interface. It continues to move into region 1 and finally reaches the interface. What is the displacement of the particle during this movement along the interface?



(Consider the velocity of the particle to be normal to the magnetic field and $B_2 > B_1$)

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) $\frac{mv}{qB_1}\left(1 - \frac{B_1}{B_2}\right) \times 2$ (2) $\frac{mv}{qB_1}\left(1 - \frac{B_2}{B_1}\right) \times 2$

(3) $\frac{mv}{qB_1}\left(1 - \frac{B_2}{B_1}\right)$ (4) $\frac{mv}{qB_1}\left(1 - \frac{B_1}{B_2}\right)$

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Q.12 Two projectiles are fired from ground with same initial speeds from same point at angles (45° + α) and (45° − α) with horizontal direction. The ratio of their times of flights is

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) $\frac{1+\tan\alpha}{1-\tan\alpha}$ (2) $\frac{1+\sin 2\alpha}{1-\sin 2\alpha}$

(3) $\frac{1-\tan\alpha}{1+\tan\alpha}$ (4) 1

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Q.13 In a hydrogen like ion, the energy difference between the 2nd excitation energy state and ground is 108.8 eV. The atomic number of the ion is:

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

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Q.14 Two thin convex lenses of focal lengths 30 cm and 10 cm are placed coaxially, 10 cm apart. The power of this combination is:

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 5 D (2) 1 D (3) 20 D (4) 10 D

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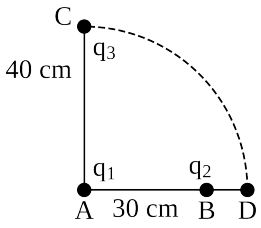
Q.15 Two charges q_1 and q_2 are separated by a distance of 30 cm. A third charge q_3 initially at 'C' as shown in the figure, is moved along the circular path of radius 40 cm from C to D. If the difference in potential energy due to movement of q_3 from C to D is given by $\frac{q_3K}{4\pi\varepsilon_0}$, the value of K is :

[JEE Main 2025 (Online) 7th April Morning Shift]



(1) $6q_2$ (2) $6q_1$ (3) $8q_1$ (4) $8q_2$

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Q.16 A lens having refractive index 1.6 has focal length of 12 cm, when it is in air. Find the focal length of the lens when it is placed in water. (Take refractive index of water as 1.28)

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 355 mm (2) 655 mm
(3) 288 mm (4) 555 mm

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Q.17 For a hydrogen atom, the ratio of the largest wavelength of Lyman series to that of the Balmer series is [JEE Main 2025 (Online) 7th April Morning Shift]

(1) 5:27 (2) 27:5 (3) 3:4 (4) 5:36

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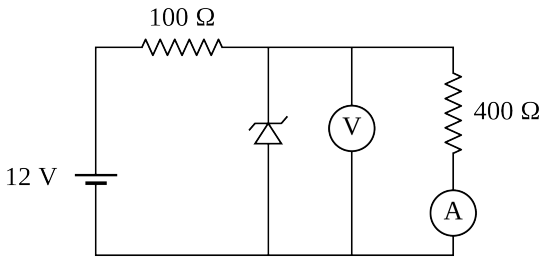
Q.18 In the following circuit, the reading of the ammeter will be
(Take Zener breakdown voltage = 4 V)

[JEE Main 2025 (Online) 7th April Morning Shift]



(1) 60 mA (2) 80 mA (3) 10 mA (4) 24 mA

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Q.19 A cubic block of mass m is sliding down on an inclined plane at 60° with an acceleration of $\frac{g}{2}$, the value of coefficient of kinetic friction is

[JEE Main 2025 (Online) 7th April Morning Shift]

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

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Q.20 Match the **List I** with **List II**

List - I		List - II	
A.	Triatomic rigid gas	I.	$\frac{C_p}{C_v}=\frac{5}{3}$
B.	Diatomic non-rigid gas	II.	$\frac{C_p}{C_v}=\frac{7}{5}$
C.	Monoatomic gas	III.	$\frac{C_p}{C_v}=\frac{4}{3}$
D.	Diatomic rigid gas	IV.	$\frac{C_p}{C_v}=\frac{9}{7}$

Choose the correct answer from the options given below: [JEE Main 2025 (Online) 7th April Morning Shift]

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

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Q.21 An aqueous solution of HCl with pH 1.0 is diluted by adding equal volume of water (ignoring dissociation of water). The pH of HCl solution would
(Given $\log 2 = 0.30$)

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) increase to 1.3 (2) reduce to 0.5
(3) increase to 2 (4) remain same

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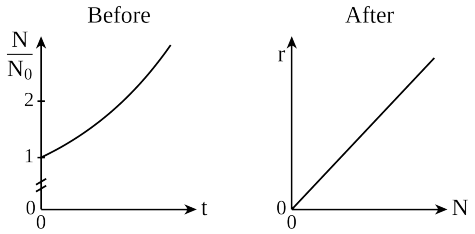
Q.22 A person's wound was exposed to some bacteria and then bacterial growth started to happen at the same place. The wound was later treated with some antibacterial medicine and the rate of bacterial decay (r) was found to be proportional with the square of the existing number of bacteria at any instance. Which of the following set of graphs correctly represents the 'before' and 'after' situation of the application of the medicine?
[Given: N = No. of bacteria, t = time, bacterial growth follows 1st order kinetics.]

[JEE Main 2025 (Online) 7th April Morning Shift]

(1)


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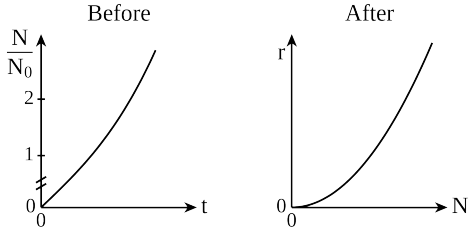

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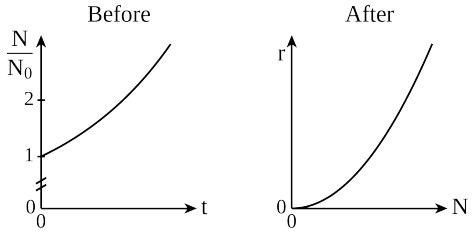

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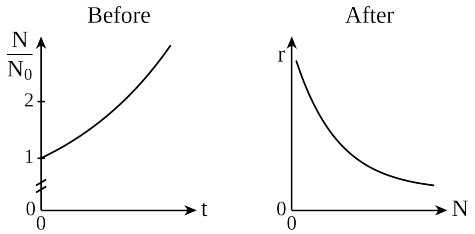

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Q.23 Total enthalpy change for freezing of 1 mol of water at 10°C to ice at −10°C is _____
(Given: $\Delta_{fus}H$ = x kJ/mol
$C_p[H_2O(l)]$ = y J mol^{-1} K^{-1}
$C_p[H_2O(s)]$ = z J mol^{-1} K^{-1})

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) −x–10y–10z (2) x–10y–10z
(3) −10(100x + y + z) (4) 10(100x + y + z)

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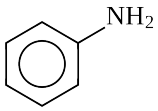
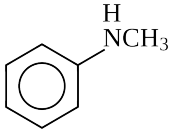
Q.24 Which of the following amine(s) show(s) positive carbylamine test?

A. 

B. $(CH_3)_2NH$

C. CH_3NH_2

D. $(CH_3)_3N$

E. 

Choose the correct answer from the options given below: [JEE Main 2025 (Online) 7th April Morning Shift]

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

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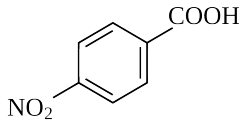
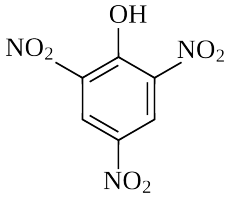
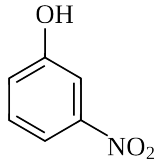
Q.25 Which of the following compounds is least likely to give effervescence of CO_2 in presence of aq. $NaHCO_3$?

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) $Ph–\overset{\oplus}{N}H_3\ \overset{\ominus}{Cl}$

(2) 

(3) 

(4) 

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Q.26 Match the **List I** with **List II**.

List - I Molecule/Ion		**List - II Bond pair : lone pair (on the central atom)**	
A.	ICl_2^-	I.	4:2
B.	H_2O	II.	4:1
C.	SO_2	III.	2:3
D.	XeF_4	IV.	2:2

Choose the correct answer from the options given below: [JEE Main 2025 (Online) 7th April Morning Shift]

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

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Q.27 The first transition series metal 'M' has the highest enthalpy of atomisation in its series. One of its aquated ions (M^{n+}) exists in green colour. The nature of the oxide formed by the above M^{n+} ion is:

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) basic (2) neutral
(3) amphoteric (4) acidic

Scan or tap for the full solution

Q.28 The number of valence electrons present in the metal among Cr, Co, Fe and Ni which has the lowest enthalpy of atomisation is :

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 10 (2) 6 (3) 9 (4) 8

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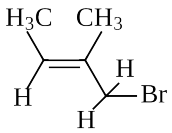
Q.29 Which of the following is the correct IUPAC name of given organic compound (X)?

[JEE Main 2025 (Online) 7th April Morning Shift]



(X)

(1) 4-Bromo-3-methylbut-2-ene

(2) 1-Bromo-2-methylbut-2-ene

(3) 3-Bromo-3-methylprop-2-ene

(4) 2-Bromo-2-methylbut-2-ene

Scan or tap for the full solution

Q.30 At the sea level, the dry air mass percentage composition is given as nitrogen gas: 70.0, oxygen gas: 27.0 and argon gas: 3.0. If total pressure is 1.15 atm, then calculate the ratio of following respectively:

(i) partial pressure of nitrogen gas to partial pressure of oxygen gas

(ii) partial pressure of oxygen gas to partial pressure of argon gas

(Given: Molar mass of N, O and Ar are 14, 16 and 40 g mol^{-1} respectively.)

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 5.46, 17.8 (2) 2.96, 11.2

(3) 4.26, 19.3 (4) 2.59, 11.85

Scan or tap for the full solution

Q.31 Given below are two statements :

Statement-I: Dimethyl ether is completely soluble in water. However, diethyl ether is soluble in water to a very small extent.

Statement-II: Sodium metal can be used to dry diethyl ether and not ethyl alcohol.

In the light of given statements, choose the correct answer from the options given below

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) Statement-I is false but Statement-II is true

(2) Statement-I is true but Statement-II is false

(3) Both Statement-I and Statement-II are true

(4) Both Statement-I and Statement-II are false

Scan or tap for the full solution

Q.32 Given below are two statements :

Statement-I: Mohr's salt is composed of only three types of ions – ferrous, ammonium and sulfate.

Statement-II: If the molar conductances at infinite dilution for ferrous, ammonium and sulfate ions are x_1, x_2 and x_3 S cm^2 mol^{-1}, respectively then the molar conductance for Mohr's salt solution at infinite dilution would be given by $x_1 + x_2 + 2x_3$

In the light of the given statements, choose the correct answer from the options given below :

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) Both Statement-I and Statement-II are true

(2) Statement-I is true but Statement-II is false

(3) Both Statement-I and Statement-II are false

(4) Statement-I is false but Statement-II is true

Scan or tap for the full solution

Q.33 Given below are two statements:

Statement-I: D-(+)-glucose + D-(+)-fructose $\xrightarrow{-H_2O}$ Sucrose

sucrose $\xrightarrow{\text{hydrolysis}}$ D-(+)-glucose + D-(+)-fructose

Statement-II: Invert sugar is formed during sucrose hydrolysis

In the light of the above statements, choose the correct answer from the options given below

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) Both Statement-I and Statement-II are false

(2) Statement-I is false but Statement-II is true

(3) Both Statement-I and Statement-II are true

(4) Statement-I is true but Statement-II is false

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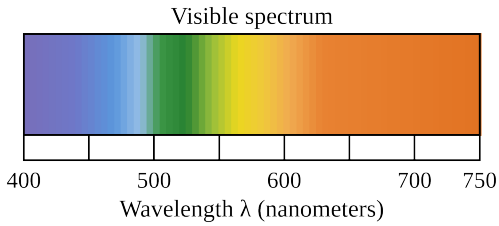
Q.34



Which of the following statements are correct, if the threshold frequency of caesium is 5.16×10^{14} Hz?

A. When Cs is placed inside a vacuum chamber with an ammeter connected to it and yellow light is focused on Cs, the ammeter shows the presence of current.

B. When the brightness of the yellow light is dimmed, the value of the current in the ammeter is reduced.

C. When a red light is used instead of the yellow light, the current produced is higher with respect to the yellow light.

D. When a blue light is used, the ammeter shows the formation of current.

E. When a white light is used, the ammeter shows formation of current.

Choose the correct answer from the options given below: [JEE Main 2025 (Online) 7th April Morning Shift]

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

(3) A, B, D and E Only (4) A, D and E Only

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Q.35 The group 14 elements A and B have the first ionisation enthalpy values of 708 and 715 kJ mol^{-1} respectively. The above values are lowest among their group members. The nature of their ions A^{2+} and B^{4+} respectively is

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) both reducing (2) oxidising and reducing

(3) both oxidising (4) reducing and oxidising

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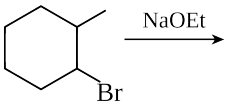
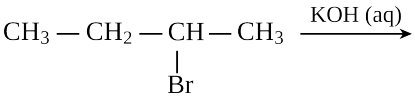
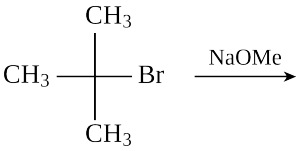
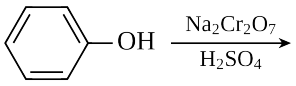
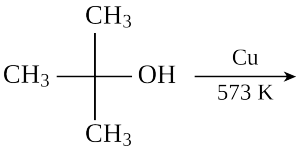
Q.36 The reactions which cannot be applied to prepare an alkene by elimination, are

A. 

B. 

C. 

D. 

E. 

Choose the correct answer from the options given below: [JEE Main 2025 (Online) 7th April Morning Shift]

(1) B & E Only (2) B, C & D Only

(3) A, C & D Only (4) B & D Only

Scan or tap for the full solution

Q.37 When a salt is treated with sodium hydroxide solution it gives gas X. On passing gas X through reagent Y a brown coloured precipitate is formed. X and Y respectively, are

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) X = NH_3 and Y = HgO

(2) X = NH_4Cl and Y = KOH

(3) X = NH_3 and Y = K_2HgI_4 + KOH

(4) X = HCl and Y = NH_4Cl

Scan or tap for the full solution

Q.38 Reaction $A(g) \longrightarrow 2B(g) + C(g)$ is a first order reaction. It was started with pure A.

t/min	Pressure of system at time t/mm Hg
10	160
∞	240

Which of the following option is incorrect?

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) Initial pressure of A is 80 mm Hg

(2) The reaction never goes to completion

(3) Partial pressure of A after 10 minutes is 40 mm Hg

(4) Rate constant of the reaction is 1.693 min^{-1}

Scan or tap for the full solution

Q.39 An octahedral complex having molecular composition $Co{\cdot}5NH_3{\cdot}Cl{\cdot}SO_4$ has two isomers A and B. The solution of A gives a white precipitate with $AgNO_3$ solution and the solution of B gives white precipitate with $BaCl_2$ solution. The type of isomerism exhibited by the complex is,

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) Co-ordinate isomerism

(2) Ionisation isomerism

(3) Geometrical isomerism

(4) Linkage isomerism

Scan or tap for the full solution

Q.40 Given below are two statements:

Statement-I: Ozonolysis followed by treatment with Zn, H_2O of cis-2-butene gives ethanal.

Statement-II: The product obtained by ozonolysis followed by treatment with Zn, H_2O of 3,6-dimethyloct-4-ene has no chiral carbon atom.

In the light of the above statements, choose the correct answer from the options given below

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) Statement-I is false but Statement-II is true

(2) Both Statement-I and Statement-II are false

(3) Statement-I is true but Statement-II is false

(4) Both Statement-I and Statement-II are true

Scan or tap for the full solution

Q.41 From a group of 7 batsmen and 6 bowlers, 10 players are to be chosen for a team, which should include at least 4 batsmen and at least 4 bowlers. One batsman and one bowler who are captain and vice-captain respectively of the team should be included. Then the total number of ways such a selection can be made, is

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 145 (2) 165 (3) 155 (4) 135

Scan or tap for the full solution

Q.42 Let C_1 be the circle in the third quadrant of radius 3, that touches both coordinate axes. Let C_2 be the circle with centre (1, 3) that touches C_1 externally at the point (α, β). If $(\beta-\alpha)^2=\frac{m}{n}$, $\gcd(m,n)=1$, then m + n is equal to

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 22 (2) 13 (3) 9 (4) 31

Scan or tap for the full solution

Q.43 Let P be the parabola, whose focus is (−2, 1) and directrix is 2x + y + 2 = 0. Then the sum of the ordinates of the points on P, whose abscissa is −2, is

[JEE Main 2025 (Online) 7th April Morning Shift]

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

Scan or tap for the full solution

Q.44 The mean and standard deviation of 100 observations are 40 and 5.1, respectively. By mistake one observation is taken as 50 instead of 40. If the correct mean and the correct standard deviation are μ and σ respectively, then 10(μ + σ) is equal to [JEE Main 2025 (Online) 7th April Morning Shift]

(1) 447 (2) 445 (3) 449 (4) 451

Scan or tap for the full solution

Q.45 Let ABC be the triangle such that the equations of lines AB and AC be 3y − x = 2 and x + y = 2, respectively, and the points B and C lie on x-axis. If P is the orthocentre of the triangle ABC, then the area of the triangle PBC is equal to

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 8 (2) 4 (3) 10 (4) 6

Scan or tap for the full solution

Q.46 $\lim_{x\to 0^+}\frac{\tan\left(5(x)^{\frac{1}{3}}\right)\log_e(1+3x^2)}{\left(\tan^{-1}3\sqrt{x}\right)^2\left(e^{5(x)^{\frac{4}{3}}}-1\right)}$ is equal to

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) $\frac{5}{3}$ (2) 1 (3) $\frac{1}{3}$ (4) $\frac{1}{15}$

Scan or tap for the full solution

Q.47 Let y = y(x) be the solution curve of the differential equation

$x(x^2+e^x)dy+(e^x(x-2)y-x^3)dx=0$, x > 0, passing through the point (1, 0). Then y(2) is equal to :

[JEE Main 2025 (Online) 7th April Morning Shift]

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

Scan or tap for the full solution

Q.48 Let A be a 3 × 3 matrix such that |adj(adj(adj A))| = 81.

If $S=\left\{n\in Z:(|\text{adj}(\text{adj}\,A)|)^{\frac{(n-1)^2}{2}}=|A|^{(3n^2-5n-4)}\right\}$, then $\sum_{n\in S}|A^{(n^2+n)}|$ is equal to :

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 820 (2) 866 (3) 750 (4) 732

Scan or tap for the full solution

Q.49 The remainder when $((64)^{(64)})^{(64)}$ is divided by 7 is equal to [JEE Main 2025 (Online) 7th April Morning Shift]

(1) 4 (2) 6 (3) 3 (4) 1

Scan or tap for the full solution

Q.50 If for $\theta\in\left[-\frac{\pi}{3},0\right]$, the points

$(x,y)=\left(3\tan\left(\theta+\frac{\pi}{3}\right),2\tan\left(\theta+\frac{\pi}{6}\right)\right)$ lie on

xy + αx + βy + γ = 0, then $\alpha^2+\beta^2+\gamma^2$ is equal to :

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 75 (2) 96 (3) 80 (4) 72

Scan or tap for the full solution

Q.51 Let the system of equations :

2x + 3y + 5z = 9

7x + 3y − 2z = 8

12x + 3y − (4 + λ)z = 16 − μ

have infinitely many solutions. Then the radius of the circle centred at (λ, μ) and touching the line 4x = 3y is :

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) $\frac{7}{5}$ (2) $\frac{21}{5}$ (3) 7 (4) $\frac{17}{5}$

Scan or tap for the full solution

Q.52 Let the set of all values of $p \in R$, for which both the roots of the equation $x^2 - (p + 2)x + (2p + 9) = 0$ are negative real numbers, be the interval $(\alpha, \beta]$. Then $\beta - 2\alpha$ is equal to

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 5 (2) 0 (3) 20 (4) 9

Scan or tap for the full solution

Q.53 Among the statements

(S1) : The set

$$\left\{z \in C - \{-i\} : |z| = 1 \text{ and } \frac{z-i}{z+i} \text{ is purely real}\right\}$$

contains exactly two elements, and

(S2) : The set

$$\left\{z \in C - \{-1\} : |z| = 1 \text{ and } \frac{z-1}{z+1} \text{ is purely imaginary}\right\}$$

contains infinitely many elements.

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) both are incorrect (2) both are correct

(3) only (S2) is correct (4) only (S1) is correct

Scan or tap for the full solution

Q.54 The integral $\int_0^{\pi} \frac{(x+3)\sin x}{1+3\cos^2 x} dx$ is equal to

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) $\frac{\pi}{\sqrt{3}}(\pi+1)$ (2) $\frac{\pi}{3\sqrt{3}}(\pi+6)$

(3) $\frac{\pi}{\sqrt{3}}(\pi+2)$ (4) $\frac{\pi}{2\sqrt{3}}(\pi+4)$

Scan or tap for the full solution

Q.55 Let the line L pass through (1, 1, 1) and intersect the lines $\frac{x-1}{2} = \frac{y+1}{3} = \frac{z-1}{4}$ and $\frac{x-3}{1} = \frac{y-4}{2} = \frac{z}{1}$. Then, which of the following points lies on the line L?

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) (7, 15, 13) (2) (4, 22, 7)

(3) (10, − 29, − 50) (4) (5, 4, 3)

Scan or tap for the full solution

Q.56 If the area of the region bounded by the curves $y = 4 - \frac{x^2}{4}$ and $y = \frac{x-4}{2}$ is equal to α, then 6α equals

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 210 (2) 250 (3) 240 (4) 220

Scan or tap for the full solution

Q.57 If the shortest distance between the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x}{1} = \frac{y}{\alpha} = \frac{z-5}{1}$ is $\frac{5}{\sqrt{6}}$, then the sum of all possible values of α is

[JEE Main 2025 (Online) 7th April Morning Shift]

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

Scan or tap for the full solution

Q.58 Let x = −1 and x = 2 be the critical points of the function $f(x) = x^3 + ax^2 + b\log_e|x| + 1$, $x \neq 0$. Let m and M respectively be the absolute minimum and the absolute maximum values of f in the interval $\left[-2, -\frac{1}{2}\right]$. Then |M + m| is equal to (Take $\log_e 2 = 0.7$):

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 21.1 (2) 19.8 (3) 22.1 (4) 20.9

Scan or tap for the full solution

Q.59 Let the angle θ, $0 < \theta < \frac{\pi}{2}$ between two unit vectors $\hat{a}$ and $\hat{b}$ be $\sin^{-1}\left(\frac{\sqrt{65}}{9}\right)$. If the vector $\vec{c} = 3\hat{a} + 6\hat{b} + 9(\hat{a} \times \hat{b})$, then the value of $9(\vec{c} \cdot \hat{a}) - 3(\vec{c} \cdot \hat{b})$ is

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 31 (2) 29 (3) 24 (4) 27

Scan or tap for the full solution

Q.60 Let x_1, x_2, x_3, x_4 be in a geometric progression. If 2, 7, 9, 5 are subtracted respectively from x_1, x_2, x_3, x_4, then the resulting numbers are in an arithmetic progression. Then the value of $\frac{1}{24}(x_1x_2x_3x_4)$ is:

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 18 (2) 216 (3) 36 (4) 72

Scan or tap for the full solution

Section B (Numerical) — 15 questions

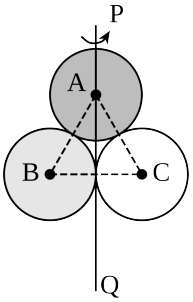
Q.61 A wire of length 10 cm and diameter 0.5 mm is used in a bulb. The temperature of the wire is 1727°C and power radiated by the wire is 94.2 W. Its emissivity is $\frac{x}{8}$ where x = _____.

(Given $\sigma = 6.0 \times 10^{-8}$ W m^{-2} K^{-4}, $\pi = 3.14$ and assume that the emissivity of wire material is same at all wavelengths.)

[JEE Main 2025 (Online) 7th April Morning Shift]

Scan or tap for the full solution

Q.62 A, B and C are disc, solid sphere and spherical shell respectively with same radii and masses. These masses are placed as shown in figure.



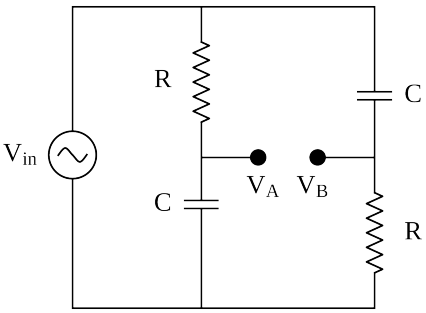
The moment of inertia of the given system about PQ axis is $\frac{x}{15}I$, where I is the moment of inertia of the disc about its diameter. The value of x is _____.

[JEE Main 2025 (Online) 7th April Morning Shift]

Scan or tap for the full solution

Q.63 For ac circuit shown in figure, R = 100 kΩ and C = 100 pF and the phase difference between V_{in} and $(V_B - V_A)$ is 90°. The input signal frequency is 10^x rad/sec, where 'x' is _____.

[JEE Main 2025 (Online) 7th April Morning Shift]



Scan or tap for the full solution

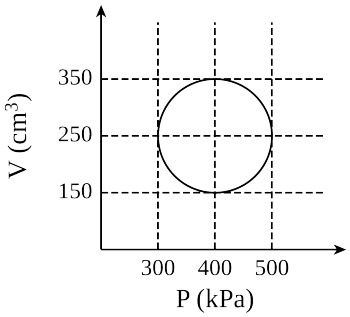
Q.64 A container contains a liquid with refractive index of 1.2 up to a height of 60 cm and another liquid having refractive index 1.6 is added to height H above first liquid. If viewed from above, the apparent shift in the position of bottom of container is 40 cm. The value of H is _____ cm. (Consider liquids are immiscible)

[JEE Main 2025 (Online) 7th April Morning Shift]

Scan or tap for the full solution

Q.65 An ideal gas has undergone through the cyclic process as shown in the figure. Work done by the gas in the entire cycle is _____ $\times 10^{-1}$ J. (Take $\pi = 3.14$)

[JEE Main 2025 (Online) 7th April Morning Shift]



Scan or tap for the full solution

Q.66 An organic compound weighing 500 mg, produced 220 mg of CO_2, on complete combustion. The percentage composition of carbon in the compound is _____ %. (nearest integer)
(Given molar mass in g mol^{-1} of C : 12, O : 16)

[JEE Main 2025 (Online) 7th April Morning Shift]

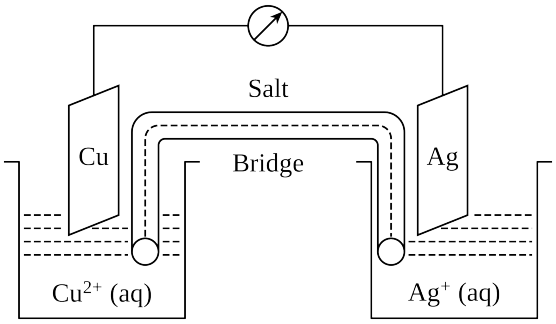
Scan or tap for the full solution

Q.67 The number of paramagnetic complexes among $[FeF_6]^{3-}$, $[Fe(CN)_6]^{3-}$, $[Mn(CN)_6]^{3-}$, $[Co(C_2O_4)_3]^{3-}$, $[MnCl_6]^{3-}$, and $[CoF_6]^{3-}$, which involve d^2sp^3 hybridization is _____.

[JEE Main 2025 (Online) 7th April Morning Shift]

Scan or tap for the full solution

Q.68 1 Faraday of electricity was passed through Cu^{2+}(1.5 M, 1 L)/Cu and 0.1 Faraday was passed through Ag^+(0.2 M, 1 L)/Ag electrolytic cells. After this the two cells were connected as shown below to make an electrochemical cell. The emf of the cell thus formed at 298 K is _____ mV (nearest integer)



Given : $E°_{Cu^{2+}/Cu} = 0.34$ V

$E°_{Ag^+/Ag} = 0.8$ V

$\frac{2.303RT}{F} = 0.06$ V

[JEE Main 2025 (Online) 7th April Morning Shift]

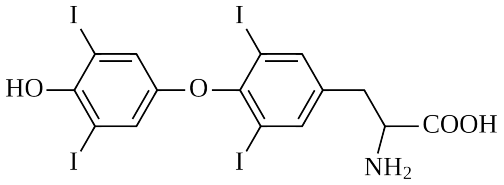
Scan or tap for the full solution

Q.69 The percentage dissociation of a salt (MX_3) solution at given temperature (van't Hoff factor i = 2) is _____ % (Nearest integer)

[JEE Main 2025 (Online) 7th April Morning Shift]

Scan or tap for the full solution

Q.70 Thyroxine, the hormone, has the structure given below



The percentage of iodine in thyroxine is _____ %. (nearest integer)

(Given molar mass in g mol^{-1} C : 12, H : 1, O : 16, N : 14, I : 127)

[JEE Main 2025 (Online) 7th April Morning Shift]

Scan or tap for the full solution

Q.71 The number of singular matrices of order 2, whose elements are from the set {2, 3, 6, 9}, is _____.

[JEE Main 2025 (Online) 7th April Morning Shift]

Scan or tap for the full solution

Q.72 The number of relations on the set A = {1, 2, 3}, containing at most 6 elements including (1, 2), which are reflexive and transitive but not symmetric, is _____.

[JEE Main 2025 (Online) 7th April Morning Shift]

Scan or tap for the full solution

Q.73 The number of points of discontinuity of the function $f(x)=\left[\frac{x^2}{2}\right]-[\sqrt{x}]$, $x\in[0,4]$, where $[\cdot]$ denotes the greatest integer function, is _____.

[JEE Main 2025 (Online) 7th April Morning Shift]

Scan or tap for the full solution

Q.74 For n ≥ 2, let S_n denote the set of all subsets of {1, 2, …, n} with no two consecutive numbers. For example $\{1,3,5\}\in S_6$, but $\{1,2,4\}\notin S_6$. Then $n(S_5)$ is equal to _____

[JEE Main 2025 (Online) 7th April Morning Shift]

Scan or tap for the full solution

Q.75 Consider the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ having one of its foci at P(−3, 0). If the latus rectum through its other focus subtends a right angle at P and $a^2b^2=\alpha\sqrt{2}-\beta$, $\alpha,\beta\in N$, then α + β is _____.

[JEE Main 2025 (Online) 7th April Morning Shift]

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

Section B (Numerical) — 15 questions

Ques.	61	62	63	64	65	66	67
Ans.	**5**	**199**	**5**	**80**	**314**	**12**	**2**
Ques.	68	69	70	71	72	73	74
Ans.	**400**	**33**	**65**	**36**	**6**	**8**	**13**
Ques.	75						
Ans.	**1944**						