

# 1 - JEE Main Maths 24-Jan 2026 Shift -2

**Q1.** Let the length of the latus rectum of an ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ , ( $a > b$ ), be 30. If its eccentricity is the maximum value of the function  $f(t) = -\frac{3}{4} + 2t - t^2$ , then  $(a^2 + b^2)$  is equal to **[2026]**

- 1) 256
- 2) 516
- 3) 276
- 4) 496

**Q2.** The largest value of  $n$ , for which  $40^n$  divides  $60!$ , is **[2026]**

- 1) 13
- 2) 14
- 3) 12
- 4) 11

**Q3.** Let  $X = \{x \in \mathbb{N} : 1 \leq x \leq 19\}$  and for some  $a, b \in \mathbb{R}$ ,  $Y = \{ax + b : x \in X\}$ . If the mean and variance of the elements of  $Y$  are 30 and 750, respectively, then the sum of all possible values of  $b$  is **[2026]**

- 1) 100
- 2) 20
- 3) 80
- 4) 60

**Q4.** Let  $\vec{a} = 2\hat{i} - \hat{j} - \hat{k}$ ,  $\vec{b} = \hat{i} + 3\hat{j} - \hat{k}$  and  $\vec{c} = 2\hat{i} + \hat{j} + 3\hat{k}$ . Let  $\vec{v}$  be the vector in the plane of the vectors  $\vec{a}$  and  $\vec{b}$ , such that the length of its projection on the vector  $\vec{c}$  is  $\frac{1}{\sqrt{14}}$ . Then  $|\vec{v}|$  is equal to **[2026]**

- 1)  $\frac{\sqrt{21}}{2}$
- 2)  $\frac{\sqrt{35}}{2}$
- 3) 13
- 4) 7

**Q5.**  $\left(\frac{1}{3} + \frac{4}{7}\right) + \left(\frac{1}{3^2} + \frac{1}{3} \times \frac{4}{7} + \frac{4^2}{7^2}\right) + \left(\frac{1}{3^3} + \frac{1}{3^2} \times \frac{4}{7} + \frac{1}{3} \times \frac{4^2}{7^2} + \frac{4^3}{7^3}\right) + \dots$  upto infinite terms, is equal to **[2026]**

- 1)  $\frac{6}{5}$
- 2)  $\frac{4}{3}$
- 3)  $\frac{7}{4}$
- 4)  $\frac{5}{2}$

**Q6.** The letters of the word "UDAYPUR" are written in all possible ways with or without meaning and these words are arranged as in a dictionary. The rank of the word "UDAYPUR" is **[2026]**

- 1) 1579
- 2) 1581
- 3) 1580
- 4) 1578

**Q7.** If the domain of the function  $f(x) = \sin^{-1}\left(\frac{1}{x^2 - 2x - 2}\right)$ , is  $(-\infty, \alpha] \cup [\beta, \gamma] \cup [\delta, \infty)$ , then  $\alpha + \beta + \gamma + \delta$  is equal to **[2026]**

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

**Q8.** Consider the following three statements for the function  $f: (0, \infty) \rightarrow \mathbb{R}$  defined by  $f(x) = |\log_e x| - |x - 1|$ :

(I)  $f$  is differentiable at all  $x > 0$ .

(II)  $f$  is increasing in  $(0, 1)$ .

(III)  $f$  is decreasing in  $(1, \infty)$ .

Then.

[2026]

1) Only (I) and (III) are TRUE.

2) Only (II) and (III) are TRUE.

3) All (I), (II) and (III) are TRUE.

4) Only (I) is TRUE.

**Q9.** Let  $f$  be a function such that  $3f(x) + 2f\left(\frac{m}{19x}\right) = 5x$ ,  $x \neq 0$ , where  $m = \sum_{i=1}^9 (i)^2$ . Then  $f(5) - f(2)$  is equal to [2026]

1) 18

2) -9

3) 9

4) 36

**Q10.** Let  $P = [p_{ij}]$  and  $Q = [q_{ij}]$  be two square matrices of order 3 such that  $q_{ij} = 2^{(i+j-1)} p_{ij}$  and  $\det(Q) = 2^{10}$ . Then the value of  $\det(\text{adj}(\text{adj} P))$  is: [2026]

1) 124

2) 16

3) 81

4) 32

**Q11.** The smallest positive integral value of  $a$ , for which all the roots of  $x^4 - ax^2 + 9 = 0$  are real and distinct, is equal to [2026]

1) 7

2) 3

3) 4

4) 9

**Q12.** The sum of all values of  $\alpha$ , for which the shortest distance between the lines

$\frac{x+1}{\alpha} = \frac{y-2}{-1} = \frac{z-4}{-\alpha}$  and  $\frac{x}{\alpha} = \frac{y-1}{2} = \frac{z-1}{2\alpha}$  is  $\sqrt{2}$ , is [2026]

1) 8

2) -6

3) 6

4) -8

**Q13.** Let  $\vec{a} = 2\hat{i} - 5\hat{j} + 5\hat{k}$  and  $\vec{b} = \hat{i} - \hat{j} + 3\hat{k}$ . If  $\vec{c}$  is a vector such that  $2(\vec{a} \times \vec{c}) + 3(\vec{b} \times \vec{c}) = \vec{0}$  and  $(\vec{a} - \vec{b}) \cdot \vec{c} = -97$ , then  $|\vec{c} \times \hat{k}|^2$  is equal to [2026]

1) 218

2) 205

3) 193

4) 233

**Q14.** Let  $y = y(x)$  be a differentiable function in the interval  $(0, \infty)$  such that  $y(1) = 2$ , and  $\lim_{t \rightarrow x} \left( \frac{t^2 y(x) - x^2 y(t)}{x-t} \right) = 3$  for each  $x > 0$ . Then  $2y(2)$  is equal to [2026]

1) 23

2) 27

3) 18

4) 12

**Q15.** Let  $[t]$  denote the greatest integer less than or equal to  $t$ . If the function

$$f(x) = \begin{cases} b^2 \sin\left(\frac{\pi}{2}\left[\frac{\pi}{2}(\cos x + \sin x)\cos x\right]\right), & x < 0 \\ \frac{\sin x - \frac{1}{2}\sin 2x}{x^3}, & x > 0 \\ a, & x = 0 \end{cases}$$

is continuous at  $x = 0$ , then  $a^2 + b^2$  is equal to [2026]

- |                   |                  |
|-------------------|------------------|
| 1) $\frac{9}{16}$ | 2) $\frac{1}{2}$ |
| 3) $\frac{5}{8}$  | 4) $\frac{3}{4}$ |

**Q16.** Let the angles made with the positive  $x$ -axis by two straight lines drawn from the point  $P(2, 3)$  and meeting the line  $x + y = 6$  at a distance  $\sqrt{\frac{2}{3}}$  from the point  $P$  be  $\theta_1$  and  $\theta_2$ . Then the value of  $(\theta_1 + \theta_2)$  is: [2026]

- |                    |                     |
|--------------------|---------------------|
| 1) $\frac{\pi}{2}$ | 2) $\frac{\pi}{3}$  |
| 3) $\frac{\pi}{6}$ | 4) $\frac{\pi}{12}$ |

**Q17.** Let  $f(\alpha)$  denote the area of the region in the first quadrant bounded by  $x = 0$ ,  $x = 1$ ,  $y^2 = x$  and  $y = |ax - 5| - |1 - ax| + \alpha x^2$ . Then  $(f(0) + f(1))$  is equal to [2026]

- |      |       |
|------|-------|
| 1) 9 | 2) 12 |
| 3) 7 | 4) 14 |

**Q18.** Let the image of parabola  $x^2 = 4y$ , in the line  $x - y = 1$  be  $(y + a)^2 = b(x - c)$ ,  $a, b, c \in \mathbb{N}$ . Then  $a + b + c$  is equal to [2026]

- |      |       |
|------|-------|
| 1) 4 | 2) 12 |
| 3) 8 | 4) 6  |

**Q19.** Let  $f(x) = \int \frac{7x^{10} + 9x^8}{(1 + x^2 + 2x^9)^2} dx$ ,  $x > 0$ ,  $\lim_{x \rightarrow 0} f(x) = 0$  and  $f(1) = \frac{1}{4}$ .

If  $A = \begin{bmatrix} 0 & 0 & 1 \\ \frac{1}{4} & f'(1) & 1 \\ \alpha^2 & 4 & 1 \end{bmatrix}$  and  $B = \text{adj}(\text{adj} A)$  be such that  $|B| = 81$ , then  $\alpha^2$  is equal to [2026]

- |      |      |
|------|------|
| 1) 1 | 2) 4 |
| 3) 2 | 4) 3 |

**Q20.** Let  $a_1, a_2, a_3, a_4$  be an A.P. of four terms such that each term of the A.P. and its common difference  $l$  are integers. If  $a_1 + a_2 + a_3 + a_4 = 48$  and  $a_1 a_2 a_3 a_4 + l^4 = 361$ , then the largest term of the A.P. is equal to [2026]

- |       |       |
|-------|-------|
| 1) 23 | 2) 21 |
| 3) 24 | 4) 27 |

**Q21.** Let  $S$  be a set of 5 elements and  $P(S)$  denote the power set of  $S$ . Let  $E$  be an event of choosing an ordered pair  $(A, B)$  from the set  $P(S) \times P(S)$  such that  $A \cap B = \emptyset$ . If the probability of the event  $E$  is  $\frac{3^p}{2^q}$ , where  $p, q \in \mathbb{N}$ , then  $p + q$  is equal to \_\_\_\_\_ . [2026]

Q22. Let  $z = (1 + i)(1 + 2i)(1 + 3i) \dots (1 + ni)$ , where  $i = \sqrt{-1}$ . If  $|z|^2 = 44200$ , then  $n$  is equal to \_\_\_\_\_ . [2026]

Q23. The number of elements in the set  $\{x \in [0, 180^\circ]: \tan(x + 100^\circ) = \tan(x + 50^\circ) \tan x \tan(x - 50^\circ)\}$  is \_\_\_\_\_ . [2026]

Q24. Let  $(h, k)$  lie on the circle  $C: x^2 + y^2 = 4$  and the point  $(2h + 1, 3k + 2)$  lie on an ellipse with eccentricity  $e$ . Then the value of  $\frac{5}{e^2}$  is equal to \_\_\_\_\_ [2026]

Q25. If  $f(x)$  satisfies the relation  $f(x) = e^x + \int_0^1 (y + xe^y) f(y) dy$ , then  $e + f(0)$  is equal to \_\_\_\_\_ . [2026]

## 2 - JEE Main Physics 24-Jan 2026 Shift -2

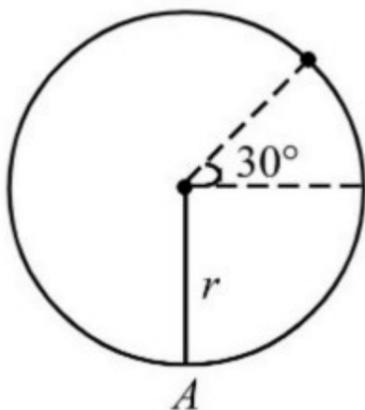
Q26. In a vernier callipers, 50 vernier scale divisions are equal to 48 main scale divisions. If one main scale division = 0.05 mm, then the least count of the vernier callipers is \_\_\_\_\_ mm. [2026]

- |          |          |
|----------|----------|
| 1) 0.05  | 2) 0.02  |
| 3) 0.002 | 4) 0.005 |

Q27. In case of vertical circular motion of a particle by a thread of length  $r$ , if the tension in the thread is zero at an angle  $30^\circ$  shown in figure, the velocity at the bottom point (A) of the circular path is

( $g =$  gravitational acceleration)

[2026]



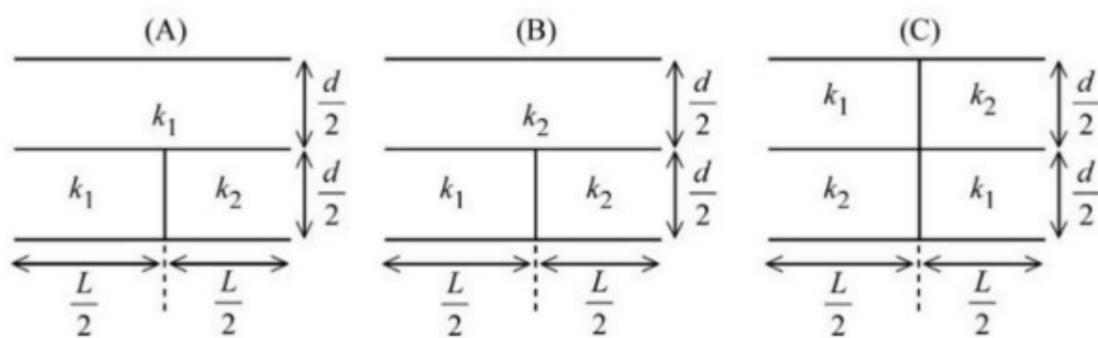
- |                           |                           |
|---------------------------|---------------------------|
| 1) $\sqrt{4gr}$           | 2) $\sqrt{5gr}$           |
| 3) $\sqrt{\frac{7}{2}gr}$ | 4) $\sqrt{\frac{5}{2}gr}$ |

Q28. A cubical block of density  $\rho_b = 600 \text{ kg/m}^3$  floats in a liquid of density  $\rho_e = 900 \text{ kg/m}^3$ . If the height of the block is  $H = 8.0 \text{ cm}$ , then the height of the submerged part is \_\_\_\_\_ cm.

[2026]

- |        |        |
|--------|--------|
| 1) 6.3 | 2) 5.3 |
| 3) 7.3 | 4) 4.3 |

Q29. Three parallel plate capacitors each with area  $A$  and separation  $d$  are filled with two dielectrics ( $k_1$  and  $k_2$ ) in the following fashion. Which of the following is true? ( $k_1 > k_2$ ) [2026]



1)  $C_A > C_C > C_B$

3)  $C_B > C_C > C_A$

2)  $C_C > C_A > C_B$

4)  $C_C > C_B > C_A$

**Q30.** A point source is kept at the center of a spherically enclosed detector. If the volume of the detector increases by 8 times, the intensity will **[2026]**

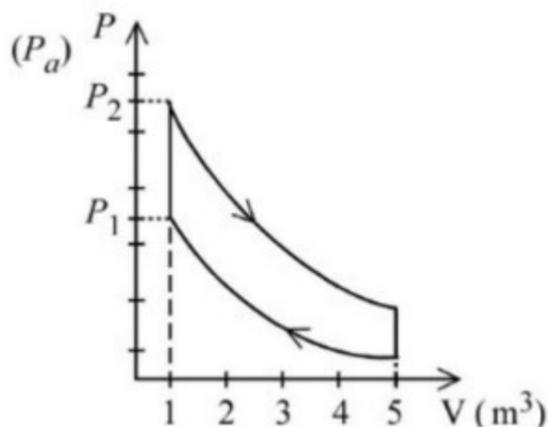
1) decrease by 8 times

2) increase by 8 times

3) decrease by 4 times

4) increase by 64 times

**Q31.** 10 mole of an ideal gas is undergoing the process shown in the figure. The heat involved in the process from  $P_1$  to  $P_2$  is  $\alpha$  Joule ( $P_1 = 21.7$  Pa and  $P_2 = 30$  Pa,  $C_v = 21$  J/K.mol,  $R = 8.3$  J/mol.K). The value of  $\alpha$  is **[2026]**



1) 28

2) 24

3) 15

4) 21

**Q32.** A moving coil galvanometer of resistance  $100 \Omega$  shows a full scale deflection for a current of 1 mA. The value of resistance required to convert this galvanometer into an ammeter, showing full scale deflection for a current of 5 mA, is **[2026]**

1) 0.5

2) 10

3) 2.5

4) 25

**Q33.** In the Young's double slit experiment the intensity produced by each one of the individual slits is  $I_0$ . The distance between two slits is 2 mm. The distance of screen from slits is 10 m. The wavelength of light is  $6000 \text{ \AA}$ . The intensity of light on the screen in front of one of the slits is **[2026]**

1)  $4I_0$

2)  $\frac{I_0}{2}$

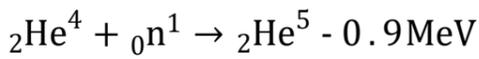
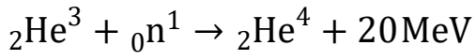
3)  $2I_0$

4)  $I_0$

**Q34.** A regular hexagon is formed by six wires each of resistance  $r \Omega$  and the corners are joined to the centre by wires of same resistance. If the current enters at one corner and leaves at the opposite corner, the equivalent resistance of the hexagon between the two opposite corners will be **[2026]**



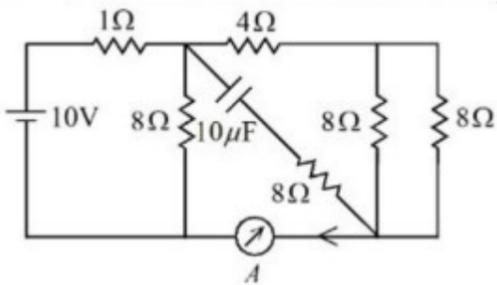
**Q41.** The binding energy for the following nuclear reactions are expressed in MeV.



If  $X_3, X_4, X_5$  denote the stability of  ${}_2\text{He}^3, {}_2\text{He}^4$  and  ${}_2\text{He}^5$  respectively, then the correct order is:  
**[2026]**

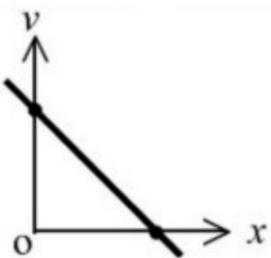
- |                      |                      |
|----------------------|----------------------|
| 1) $X_4 > X_5 > X_3$ | 2) $X_4 < X_5 < X_3$ |
| 3) $X_4 > X_5 < X_3$ | 4) $X_4 = X_5 = X_3$ |

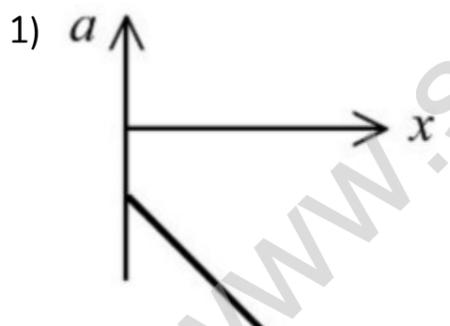
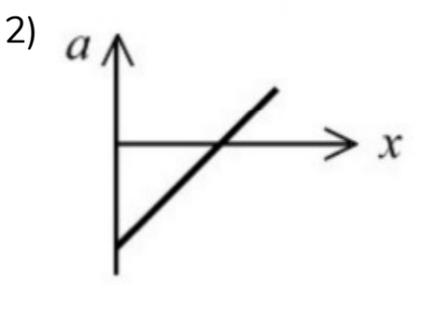
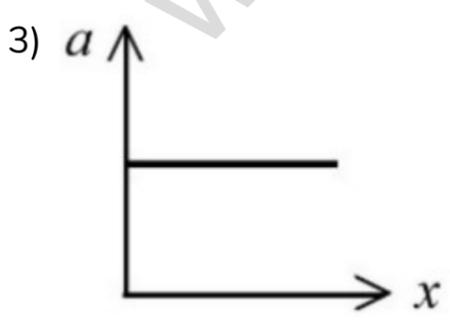
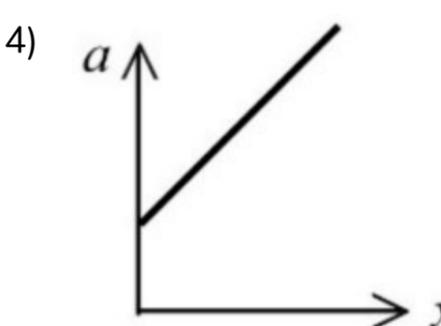
**Q42.** The reading of the ammeter (A) in steady state in the following circuit (assuming negligible internal resistance of the ammeter) is \_\_\_\_ A. **[2026]**



- |      |        |
|------|--------|
| 1) 1 | 2) 0   |
| 3) 2 | 4) 1/2 |

**Q43.** The velocity ( $v$ ) – Distance ( $x$ ) graph is shown in figure. Which graph represents acceleration ( $a$ ) versus distance ( $x$ ) variation of this system? **[2026]**



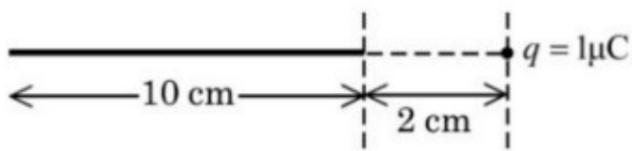
- |  |  |
|--|--|
| 1)  | 2)  |
| 3)  | 4)  |

**Q44.** A thin uniform rod ( $X$ ) of mass  $M$  and length  $L$  is pivoted at a height  $\left(\frac{L}{3}\right)$  as shown in the figure. The rod is allowed to fall from a vertical position and lie horizontally on the table. The angular velocity of this rod when it hits the table top is \_\_\_\_\_.

( $g$  = gravitational acceleration)

**[2026]**

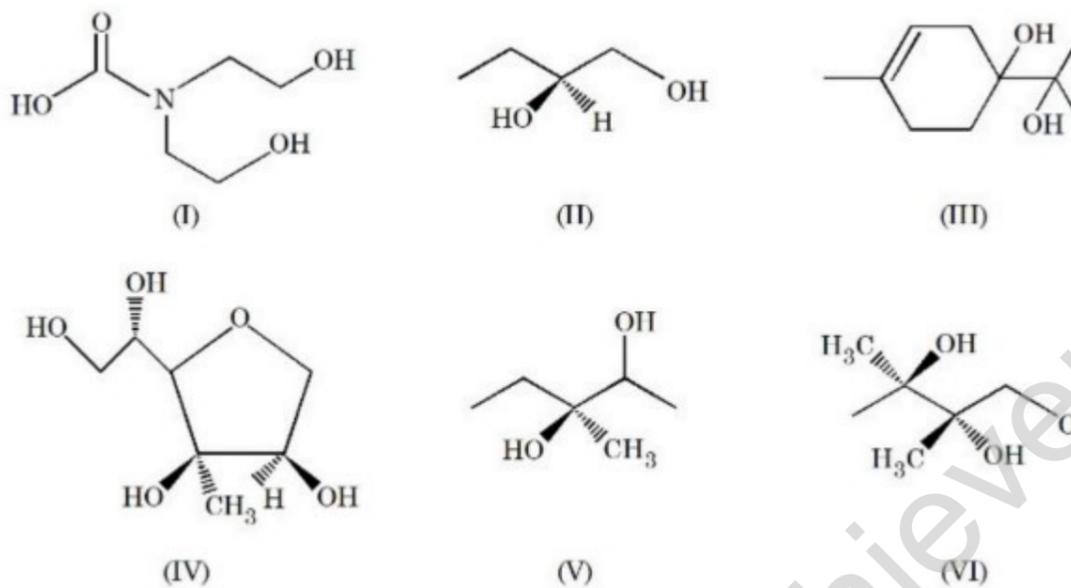




**Q50.** In a meter bridge experiment to determine the value of unknown resistance, first the resistances  $2\Omega$  and  $3\Omega$  are connected in the left and right gaps of the bridge and the null point is obtained at a distance  $l$  cm from the left. Now when an unknown resistance  $x\Omega$  is connected in parallel to  $3\Omega$  resistance, the null point is shifted by 10 cm to the right of wire. The value of unknown resistance  $x$  is \_\_\_\_\_  $\Omega$ . [2026]

### 3 - JEE Main Chemistry 24-Jan 2026 Shift -2

**Q51.** From the following, how many compounds contain at least one secondary alcohol?



Choose the correct answer from the options given below: [2026]

- |          |         |
|----------|---------|
| 1) Two   | 2) Five |
| 3) Three | 4) Four |

**Q52.** The heat of atomisation of methane and ethane are ' $x$ ' kJ mol<sup>-1</sup> and ' $y$ ' kJ mol<sup>-1</sup> respectively. The longest wavelength ( $\lambda$ ) of light capable of breaking the C-C bond can be expressed in SI unit as: [2026]

- |   |  |
|---|--|
| 1) $\frac{N_A hc}{250(4y - 6x)}$                        | 2) $N_A hc \left(y - \frac{6x}{4}\right)^{-1}$ |
| 3) $\frac{hc}{1000} \left(\frac{y - 6x}{4}\right)^{-1}$ | 4) $\frac{N_A hc}{250(y - 6x)}$                |

**Q53.** Pair of species among the following having same bond order as well as paramagnetic character will be- [2026]

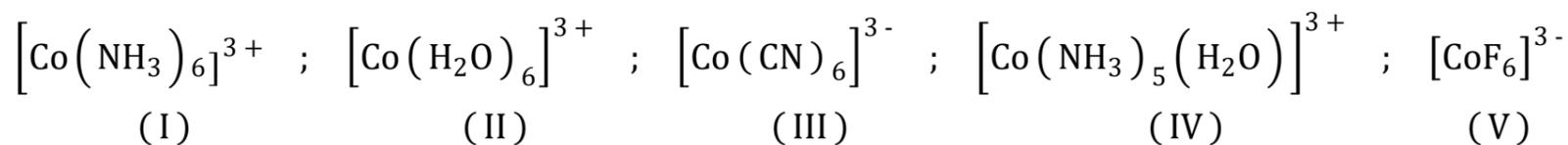
- |                      |                   |
|----------------------|-------------------|
| 1) $O_2^+, N_2^{2-}$ | 2) $O_2^-, N_2^-$ |
| 3) $O_2^+, N_2$      | 4) $O_2^-, N_2^+$ |

**Q54.** In the Group analysis of cations,  $Ba^{2+}$  &  $Ca^{2+}$  are precipitated respectively as [2026]

- |                          |                          |
|--------------------------|--------------------------|
| 1) hydroxide & carbonate | 2) carbonate & carbonate |
| 3) chromate & sulphide   | 4) sulphide & sulphide   |

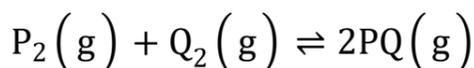
**Q55.**

The wavelength of light absorbed for the following complexes are in the order [2026]



- 1) III < IV < I < II < V  
2) III < I < IV < II < V  
3) III < I < IV < V < II  
4) III < I < II < IV < V

**Q56.** Consider the following gaseous equilibrium in a closed container of volume 'V' at T(K).



2 moles each of  $\text{P}_2(\text{g})$ ,  $\text{Q}_2(\text{g})$  and  $\text{PQ}(\text{g})$  are present at equilibrium. Now one mole each of ' $\text{P}_2$ ' and ' $\text{Q}_2$ ' are added to the equilibrium keeping the temperature at T(K). The number of moles of  $\text{P}_2$ ,  $\text{Q}_2$  and  $\text{PQ}$  at the new equilibrium, respectively, are [2026]

- 1) 2.67, 2.67, 2.67  
2) 1.21, 2.24, 1.56  
3) 1.66, 1.66, 1.66  
4) 2.56, 1.62, 2.24

**Q57.** The wavelength of spectral line obtained in the spectrum of  $\text{Li}^{2+}$  ion, when the transition takes place between two levels whose sum is 4 and difference is 2, is [2026]

- 1)  $2.28 \times 10^{-7} \text{ cm}$   
2)  $2.28 \times 10^{-6} \text{ cm}$   
3)  $1.14 \times 10^{-6} \text{ cm}$   
4)  $1.14 \times 10^{-7} \text{ cm}$

**Q58.** Given below are two statements: [2026]

**Statement I:** The dipole moment of R-CN is greater than R-NC and R-NC can undergo hydrolysis under acidic medium to produce  $\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH}$ .

**Statement II:** R-CN hydrolyses under acidic medium to produce a compound which on treatment with  $\text{SOCl}_2$ , followed by the addition of  $\text{NH}_3$  gives another compound (x). This compound (x) on treatment with  $\text{NaOCl}/\text{NaOH}$  gives a product, that on treatment with  $\text{CHCl}_3 / \text{KOH} / \Delta$  produces R-NC.

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

- 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

**Q59.** The number of possible tripeptides formed involving alanine (ala), glycine (gly) and valine (val), where no amino acid has been used more than once is: [2026]

- 1) 3  
2) 4  
3) 8  
4) 6

**Q60.** "X" is an oxoanion of the lightest element of group 7 (in the periodic table). The metal is in +6 oxidation state in "X". The color of the potassium salt of X is [2026]

- 1) orange  
2) purple  
3) yellow  
4) green

**Q61.** A student has planned to prepare acetanilide from aniline using acetic anhydride.



- A. Resonating structures with more number of covalent bonds and lesser charge separation are more stable.
- B. In electromeric effect, an unsaturated system shows +E effect with nucleophile and -E effect with electrophile.
- C. Inductive effect is responsible for high melting point, boiling point and dipole moment of polar compounds.
- D. The greater the number of alkyl groups attached to the doubly bonded carbon atoms, higher is the heat of hydrogenation.
- E. Stability of carbanion increases with the increase in s-character of the carbon carrying the negative charge.

Choose the correct answer from the options given below:

- |                  |                  |
|------------------|------------------|
| 1) B & D only    | 2) B, D & E only |
| 3) A, D & E only | 4) A, C & D only |

**Q67.** Choose the **INCORRECT** statement [2026]

- Among the isotopes of carbon,  $^{13}\text{C}$  is a radioactive isotope.
- Carbon cannot exceed its covalency more than four.
- $\text{CO}_2$  is the most acidic oxide among the dioxides of group 14 elements.
- Carbon exhibits negative oxidation states along with +4 and +2.

**Q68.** One mole of  $\text{Cl}_2$  (g) was passed into 2 L of cold 2M KOH solution. After the reaction, the concentrations of  $\text{Cl}^-$ ,  $\text{ClO}^-$  and  $\text{OH}^-$  are respectively (assume volume remains constant)

[2026]

- |                        |                      |
|------------------------|----------------------|
| 1) 0.5 M, 0.5 M, 0.5 M | 2) 0.5 M, 0.5 M, 1 M |
| 3) 0.75 M, 0.75 M, 1 M | 4) 1 M, 1 M, 1 M     |

**Q69.** At 298 K, the mole percentage of  $\text{N}_2$  (g) in air is 80%. Water is in equilibrium with air at a pressure of 10 atm. What is the mole fraction of  $\text{N}_2$  (g) in water at 298 K?

( $K_H$  for  $\text{N}_2 = 6.5 \times 10^7$  mm Hg)

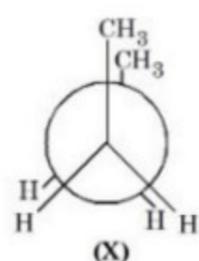
[2026]

- |                          |                          |
|--------------------------|--------------------------|
| 1) $1.17 \times 10^{-4}$ | 2) $9.35 \times 10^5$    |
| 3) $1.23 \times 10^{-7}$ | 4) $9.35 \times 10^{-5}$ |

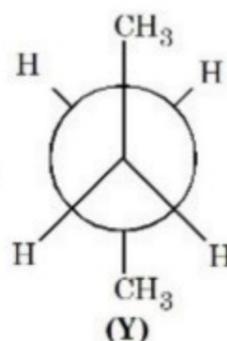
**Q70.** Given below are two statements:

[2026]

**Statement I:** There are several conformers for n-butane. Out of those conformers,



is the least stable and most stable conformer is



**Statement II:** As the dihedral angle increases, torsional strain decreases from (X) to (Y).

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

- 1) Both Statement I and Statement II are true      2) Statement I is false but Statement II is true  
 3) Both Statement I and Statement II are false      4) Statement I is true but Statement II is false

**Q71.** A chromium complex with a formula  $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$  has a spin only magnetic moment value of 3.87 BM and its solution conductivity corresponds to 1 : 2 electrolyte. 2.75 g of the complex solution was initially passed through a cation exchanger. The solution obtained after the process was reacted with excess of  $\text{AgNO}_3$ . The amount of  $\text{AgCl}$  formed in the above process is \_\_\_\_\_ g. (Nearest integer)

[Given: Molar mass in  $\text{g mol}^{-1}$  Cr : 52; Cl : 35.5; Ag : 108; O : 16; H : 1]      [2026]

**Q72.** Grignard reagent  $\text{RMgBr}$  (P) reacts with water and forms a gas (Q). One gram of Q occupies  $1.4 \text{ dm}^3$  at STP. (P) on reaction with dry ice in dry ether followed by  $\text{H}_3\text{O}^+$  forms a compound (Z). 0.1 mole of (Z) will weigh \_\_\_\_\_ g. (Nearest integer)      [2026]

**Q73.** 0.25 g of an organic compound "A" containing carbon, hydrogen and oxygen was analysed using the combustion method. There was an increase in mass of  $\text{CaCl}_2$  tube and potash tube at the end of the experiment. The amount was found to be 0.15 g and 0.1837 g, respectively. The percentage of oxygen in compound A is \_\_\_\_\_ %. (Nearest integer)

[Given: molar mass in  $\text{g mol}^{-1}$  H : 1, C : 12, O : 16]      [2026]

**Q74.** The half-life of  $^{65}\text{Zn}$  is 245 days. After x days, 75% of original activity remained. The value of x in days is \_\_\_\_\_. (Nearest integer)

[Given:  $\log 3 = 0.4771$  and  $\log 2 = 0.3010$ ]      [2026]

**Q75.** Molar conductivity of a weak acid HQ of concentration 0.18 M was found to be  $\frac{1}{30}$  of the molar conductivity of another weak acid HZ with concentration 0.02 M. If  $\lambda_{\text{Q}^-}^\circ$  happened to be equal to  $\lambda_{\text{Z}^-}^\circ$ , then the difference of the  $pK_a$  values of the two weak acids ( $pK_a(\text{HQ}) - pK_a(\text{HZ})$ ) is \_\_\_\_\_ (Nearest integer).

[Given: degree of dissociation ( $\alpha$ )  $\ll 1$  for both weak acids,  $\lambda^\circ$ : limiting molar conductivity of ions]      [2026]

### Answer Key

Q1 : 4    Q2 : 2    Q3 : 4    Q4 : 2    Q5 : 4    Q6 : 3    Q7 : 1    Q8 : 1    Q9 : 1  
 Q10 : 2    Q11 : 1    Q12 : 2    Q13 : 1    Q14 : 1    Q15 : 4    Q16 : 1    Q17 : 3  
 Q18 : 4    Q19 : 2    Q20 : 4    Q21 : 15    Q22 : 5    Q23 : 4    Q24 : 9    Q25 : 2  
 Q26 : 3    Q27 : 3    Q28 : 2    Q29 : 1    Q30 : 3    Q31 : 4    Q32 : 4    Q33 : 4  
 Q34 : 2    Q35 : 3    Q36 : 2    Q37 : 2    Q38 : 4    Q39 : 4    Q40 : 4    Q41 : 1