

# PYQSide

## JEE MAIN 2026 (ONLINE) 24TH JANUARY EVENING SHIFT — QUESTION PAPER

Max. Marks: 300

Questions: 75

### Section A (MCQ)

- Q.1** The fifth harmonic of a closed organ pipe is found to be in unison with the first harmonic of an open pipe. The ratio of lengths of closed pipe to that of the open pipe is  $5/x$ . The value of  $x$  is \_\_\_\_\_

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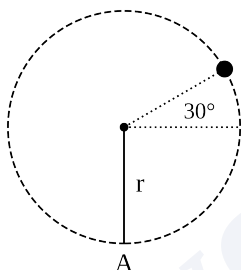
- (1) 3      (2) 2      (3) 4      (4) 1

Scan or tap for the  
full solution



- Q.2** 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)

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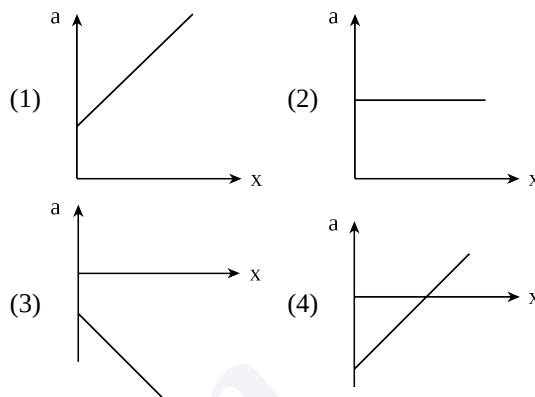
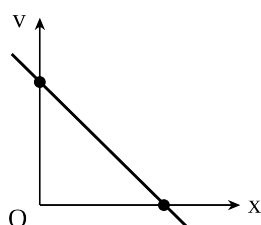
- (1)  $\sqrt{\frac{7}{2}gr}$     (2)  $\sqrt{4gr}$     (3)  $\sqrt{\frac{5}{2}gr}$     (4)  $\sqrt{5gr}$

Scan or tap for the  
full solution



- Q.3** The velocity ( $v$ ) – distance ( $x$ ) graph is shown in figure. Which graph represents acceleration ( $a$ ) versus distance ( $x$ ) variation of this system?

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full solution



- Q.4** 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 \_\_\_\_\_

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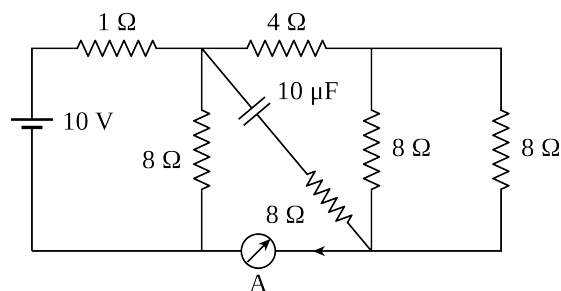
- (1)  $\frac{I_0}{2}$       (2)  $I_0$       (3)  $2I_0$       (4)  $4I_0$

Scan or tap for the  
full solution



- Q.5** The reading of the ammeter (A) in steady state in the following circuit (assuming negligible internal resistance of the ammeter) is \_\_\_\_\_ A.

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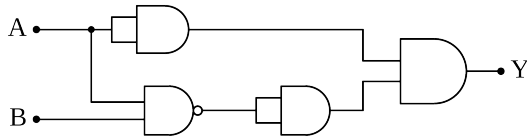
- (1)  $1/2$       (2) 1      (3) 2      (4) 0

Scan or tap for the  
full solution



- Q.6** Identify the correct truth table of the given logic circuit.

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|     |   |   |   |     |   |   |   |
|-----|---|---|---|-----|---|---|---|
|     | A | B | Y |     | A | B | Y |
|     | 0 | 0 | 0 |     | 0 | 0 | 0 |
| (1) | 0 | 1 | 0 | (2) | 0 | 1 | 1 |
|     | 1 | 0 | 1 |     | 1 | 0 | 1 |
|     | 1 | 1 | 0 |     | 1 | 1 | 0 |

|     |   |   |   |     |   |   |   |
|-----|---|---|---|-----|---|---|---|
|     | A | B | Y |     | A | B | Y |
|     | 0 | 0 | 1 |     | 0 | 0 | 1 |
| (3) | 0 | 1 | 1 | (4) | 0 | 1 | 0 |
|     | 1 | 0 | 1 |     | 1 | 0 | 1 |
|     | 1 | 1 | 0 |     | 1 | 1 | 0 |

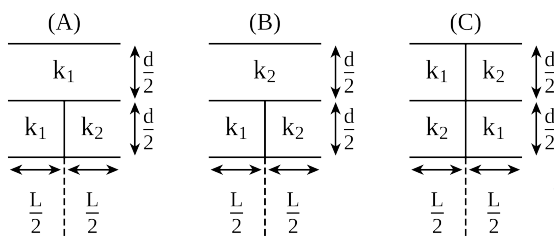
Scan or tap for the full solution



**Q.7** 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?

( $k_1 > k_2$ )

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- (1)  $C_C > C_B > C_A$  (2)  $C_B > C_C > C_A$   
 (3)  $C_A > C_C > C_B$  (4)  $C_C > C_A > C_B$

Scan or tap for the full solution



**Q.8** A moving coil galvanometer of resistance  $100 \Omega$  shows a full scale deflection for a current of  $1 \text{ mA}$ . The value of resistance required to convert this galvanometer into an ammeter, showing full scale deflection for a current of  $5 \text{ mA}$ , is \_\_\_\_\_  $\Omega$

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- (1) 25 (2) 2.5 (3) 0.5 (4) 10

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**Q.9** Distance between an object and three times magnified real image is  $40 \text{ cm}$ . The focal length of the mirror used is \_\_\_\_\_  $\text{cm}$ .

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- (1) -20 (2) -15/2 (3) -10 (4) -15

Scan or tap for the full solution



**Q.10** A cubical block of density  $\rho_b = 600 \text{ kg/m}^3$  floats in a liquid of density  $\rho_l = 900 \text{ kg/m}^3$ . If the height of block is  $H = 8.0 \text{ cm}$ , then height of the submerged part is \_\_\_\_\_  $\text{cm}$ .

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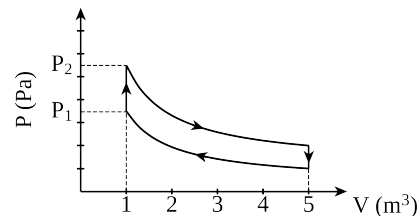
- (1) 6.3 (2) 4.3 (3) 7.3 (4) 5.3

Scan or tap for the full solution



**Q.11** 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  $\alpha \text{ Joule}$  ( $P_1 = 21.7 \text{ Pa}$  and  $P_2 = 30 \text{ Pa}$ ,  $C_v = 21 \text{ J/K mol}$ ,  $R = 8.3 \text{ J/mol K}$ ). The value of  $\alpha$  is \_\_\_\_\_.

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- (1) 21 (2) 28 (3) 24 (4) 15

Scan or tap for the full solution



**Q.12** In a vernier callipers, 50 vernier scale divisions are equal to 48 main scale divisions. If one main scale division =  $0.05 \text{ mm}$ , then the least count of the vernier callipers is \_\_\_\_\_  $\text{mm}$ .

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

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**Q.13** Five persons  $P_1, P_2, P_3, P_4$  and  $P_5$  recorded object distance ( $u$ ) and image distance ( $v$ ) using same convex lens having power  $+5 \text{ D}$  as  $(25, 96)$ ,  $(30, 62)$ ,  $(35, 37)$ ,  $(45, 35)$  and  $(50, 32)$  respectively. Identify correct statement

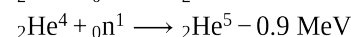
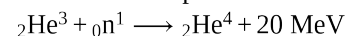
[JEE Main 2026 (Online) 24th January Evening Shift]

- (1) Readings recorded by  $P_3$  and  $P_2$  persons are incorrect  
 (2) Readings recorded by all persons are correct  
 (3) Readings recorded by  $P_3$  person are incorrect  
 (4) Readings recorded by  $P_4$  and  $P_5$  persons are incorrect

Scan or tap for the full solution



**Q.14** The binding energies for the following nuclear reactions are expressed in  $\text{MeV}$ .



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 :

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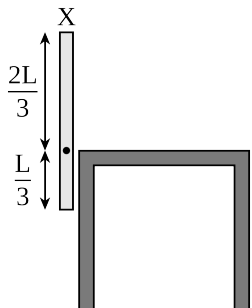
- (1)  $X_4 > X_5 > X_3$  (2)  $X_4 < X_5 < X_3$   
 (3)  $X_4 > X_5 < X_3$  (4)  $X_4 = X_5 = X_3$

Scan or tap for the full solution



- Q.15** 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)

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

Scan or tap for the full solution



- Q.16** A point source is kept at the center of a spherically enclosed detector. If the volume of the detector is increased by 8 times, the intensity will

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- (1) increase by 64 times (2) decrease by 4 times  
(3) decrease by 8 times (4) increase by 8 times

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- Q.17** 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

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

Scan or tap for the full solution



- Q.18** A flexible chain of mass  $m$  hangs between two fixed points at the same level. The inclination of the chain with the horizontal at the two points of support is  $30^\circ$ . Considering the equilibrium of each half of the chain, the tension of the chain at the lowest point is \_\_\_\_\_.

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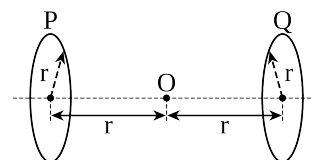
- (1)  $mg$  (2)  $\frac{\sqrt{3}}{2}mg$   
(3)  $\frac{1}{2}mg$  (4)  $\sqrt{3}mg$

Scan or tap for the full solution



- Q.19** Two identical circular loops P and Q each of radius  $r$  are lying in parallel planes such that they have common axis. The currents through P and Q are  $I$  and  $4I$  respectively in clockwise direction as seen from O. The net magnetic field at O is :

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- (1)  $\frac{\mu_0 I}{4\sqrt{2}r}$  towards Q (2)  $\frac{3\mu_0 I}{4\sqrt{2}r}$  towards Q  
(3)  $\frac{3\mu_0 I}{4\sqrt{2}r}$  towards P (4)  $\frac{\mu_0 I}{4\sqrt{2}r}$  towards P

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- Q.20** When a light of a given wavelength falls on a metallic surface the stopping potential for photoelectrons is 3.2 V. If a second light having wavelength twice of first light is used, the stopping potential drops to 0.7 V. The wavelength of first light is \_\_\_\_\_ m.

( $h = 6.63 \times 10^{-34} \text{ J s}$ ,  $e = 1.6 \times 10^{-19} \text{ C}$ ,  $c = 3 \times 10^8 \text{ m/s}$ )

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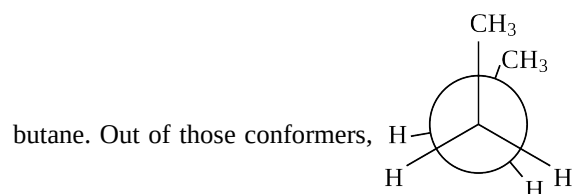
- (1)  $2.9 \times 10^{-8}$  (2)  $2.5 \times 10^{-7}$   
(3)  $3.1 \times 10^{-7}$  (4)  $2.2 \times 10^{-8}$

Scan or tap for the full solution



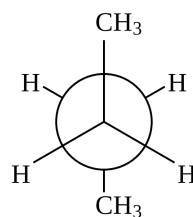
- Q.21** Given below are two statements :

**Statement-I:** There are several conformers for n-



(X)

is the least stable and most stable conformer is



(Y)

**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

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- (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

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**Q.22** In the Group analysis of cations,  $\text{Ba}^{2+}$  &  $\text{Ca}^{2+}$  are precipitated respectively as

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

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**Q.23** "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

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

Scan or tap for the full solution



**Q.24** At 298 K, the mole percentage of  $\text{N}_2(\text{g})$  in air is 80%. Water is in equilibrium with air at a pressure of 10 atm. What is the mole fraction of  $\text{N}_2(\text{g})$  in water at 298 K? ( $K_H$  for  $\text{N}_2$  is  $6.5 \times 10^7$  mmHg)

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

Scan or tap for the full solution



**Q.25** The heats of atomisation of methane and ethane are 'x'  $\text{kJ mol}^{-1}$  and 'y'  $\text{kJ mol}^{-1}$  respectively. The longest wavelength ( $\lambda$ ) of light capable of breaking the C–C bond can be expressed in SI unit as :

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

Scan or tap for the full solution



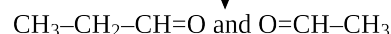
**Q.26** Pair of species among the following having same bond order as well as paramagnetic character will be- [JEE Main 2026 (Online) 24th January Evening Shift]

- (1)  $\text{O}_2^-$ ,  $\text{N}_2^+$  (2)  $\text{O}_2^+$ ,  $\text{N}_2^{2-}$   
 (3)  $\text{O}_2^-$ ,  $\text{N}_2^-$  (4)  $\text{O}_2^+$ ,  $\text{N}_2^-$

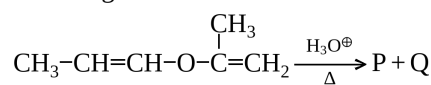
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**Q.27** The unsaturated ether on acidic hydrolysis produces carbonyl compounds as shown below :-



Based on this, predict the solution/reagent that will help to distinguish "P" and "Q" obtained in the following reaction :-



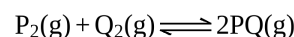
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- (1) Saturated  $\text{NaHSO}_3$  solution  
 (2) Fehling solution  
 (3) Lucas reagent  
 (4) 2,4-DNP reagent

Scan or tap for the full solution



**Q.28** 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

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

Scan or tap for the full solution



**Q.29** The correct order of C, N, O and F in terms of second ionisation potential is

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- (1)  $\text{C} < \text{N} < \text{F} < \text{O}$  (2)  $\text{C} < \text{F} < \text{N} < \text{O}$   
 (3)  $\text{F} < \text{N} < \text{C} < \text{O}$  (4)  $\text{C} < \text{O} < \text{N} < \text{F}$

Scan or tap for the full solution



**Q.30** Given below are two statements :

**Statement-I:** Cross aldol condensation between two different aldehydes will always produce four different products.

**Statement-II:** When semicarbazide reacts with a mixture of benzaldehyde and acetophenone under optimum pH, it forms a condensation product with

acetophenone only.

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

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

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**Q.31** Choose the **INCORRECT** statement

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

Scan or tap for the full solution



**Q.32** 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

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

Scan or tap for the full solution



**Q.33** Two liquids A and B form an ideal solution at temperature T K. At T K, the vapour pressures of pure A and B are 55 and 15  $\text{kN m}^{-2}$  respectively. What is the mole fraction of A in solution of A and B in equilibrium with a vapour in which the mole fraction of A is 0.8?

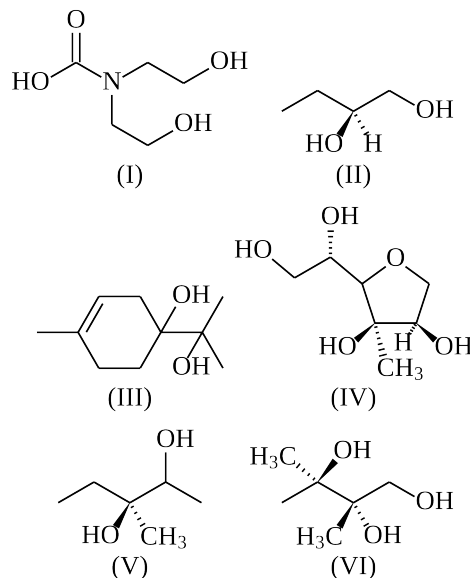
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- (1) 0.5217
- (2) 0.480
- (3) 0.340
- (4) 0.663

Scan or tap for the full solution



**Q.34** From the following, how many compounds contain at least one secondary alcohol?



Choose the correct answer from the options given below :

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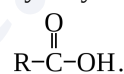
- (1) Three
- (2) Two
- (3) Four
- (4) Five

Scan or tap for the full solution



**Q.35** Given below are two statements :

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



**Statement-II:**  $\text{R-CN}$  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  $\text{NaOCl/NaOH}$  gives a product, that on treatment with  $\text{CHCl}_3/\text{KOH}/\Delta$  produces  $\text{R-NC}$ .

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

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

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**Q.36** 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:

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

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**Q.37** One mole of  $\text{Cl}_2(\text{g})$  was passed into 2 L of cold 2 M KOH solution. After the reaction, the concentrations of  $\text{Cl}^-$ ,  $\text{ClO}^-$  and  $\text{OH}^-$  are respectively (assume volume remains constant)

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

Scan or tap for the full solution 

**Q.38** A student has planned to prepare acetanilide from aniline using acetic anhydride.

The student has started from 9.3 g of aniline. However, the student has managed to obtain 11 g of dry acetanilide.

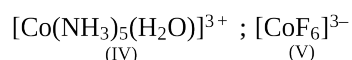
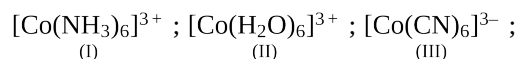
The % yield of this reaction is :-

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- (1) 59.5%    (2) 72.5%    (3) 97.5%    (4) 81.5%

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**Q.39** The wavelengths of light absorbed for the following complexes are in the order



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

Scan or tap for the full solution 

**Q.40** Find out the statements which are not true.

- Resonating structures with more number of covalent bonds and lesser charge separation are more stable.
- In electromeric effect, an unsaturated system shows +E effect with nucleophile and -E effect with electrophile.
- Inductive effect is responsible for high melting point, boiling point and dipole moment of polar compounds.
- The greater the number of alkyl groups attached to the doubly bonded carbon atoms, higher is the heat of hydrogenation.
- 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 :

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

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**Q.41** 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

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- (1) 7    (2) 3    (3) 4    (4) 9

Scan or tap for the full solution 

**Q.42** 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

[JEE Main 2026 (Online) 24th January Evening Shift]

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

Scan or tap for the full solution 

**Q.43** 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

[JEE Main 2026 (Online) 24th January Evening Shift]

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

Scan or tap for the full solution 

**Q.44** 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 [JEE Main 2026 (Online) 24th January Evening Shift]

- (1) Only (I) is TRUE.  
(2) Only (I) and (III) are TRUE.  
(3) Only (II) and (III) are TRUE.  
(4) All (I), (II) and (III) are TRUE.

Scan or tap for the full solution 

**Q.45** 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:

[JEE Main 2026 (Online) 24th January Evening Shift]

- (1) 81    (2) 16    (3) 124    (4) 32

Scan or tap for the full solution 

- Q.46** 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 :

[JEE Main 2026 (Online) 24th January Evening Shift]

- (1) 27 (2) 18 (3) 23 (4) 12

Scan or tap for the full solution 

- Q.47** 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

[JEE Main 2026 (Online) 24th January Evening Shift]

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

Scan or tap for the full solution 

- Q.48** Let  $[t]$  denote the greatest integer less than or equal to  $t$ . If the function

$f(x) = \begin{cases} \sin\left(\frac{\pi}{2} \cos x + \sin x\right) & \text{if } x \in [0, \pi] \\ \frac{1}{2} \sin 2x & \text{if } x \in (\pi, 2\pi] \end{cases}$  is continuous at  $x = 0$ , then  $a^2 + b^2$  is equal to :

[JEE Main 2026 (Online) 24th January Evening Shift]

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

Scan or tap for the full solution 

- Q.49** 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

[JEE Main 2026 (Online) 24th January Evening Shift]

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

Scan or tap for the full solution 

- Q.50** The largest value of  $n$ , for which  $40^n$  divides  $60!$ , is

[JEE Main 2026 (Online) 24th January Evening Shift]

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

Scan or tap for the full solution 

- Q.51** Let  $f(\alpha)$  denote the area of the region in the first quadrant bounded by  $x = 0$ ,  $x = 1$ ,  $y^2 = x$  and  $y = |\alpha x - 5| - |1 - \alpha x| + \alpha x^2$ . Then  $(f(0) + f(1))$  is equal to

[JEE Main 2026 (Online) 24th January Evening Shift]

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

Scan or tap for the full solution 

- Q.52** 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

[JEE Main 2026 (Online) 24th January Evening Shift]

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

Scan or tap for the full solution 

- Q.53** 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:

[JEE Main 2026 (Online) 24th January Evening Shift]

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

Scan or tap for the full solution 

- Q.54** If the domain of the function

$$f(x) = \sin^{-1} \left( \frac{1}{x^2 - 2x - 2} \right) \text{ is}$$

$(-\infty, \alpha] \cup [\beta, \gamma] \cup [\delta, \infty)$ , then  $\alpha + \beta + \gamma + \delta$  is equal to

[JEE Main 2026 (Online) 24th January Evening Shift]

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

Scan or tap for the full solution 

- Q.55** 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  $f(1) = \frac{1}{4}$ .

$$\text{If } A = \begin{bmatrix} 0 & 0 & 1 \\ \frac{1}{4} & f'(1) & 1 \\ \alpha^2 & 4 & 1 \end{bmatrix} \text{ and } B = \text{adj}(\text{adj } A) \text{ be such}$$

that  $|B| = 81$ , then  $\alpha^2$  is equal to

[JEE Main 2026 (Online) 24th January Evening Shift]

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

Scan or tap for the full solution 

- Q.56** 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

[JEE Main 2026 (Online) 24th January Evening Shift]

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

Scan or tap for the full solution 

- Q.57** 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
- [JEE Main 2026 (Online) 24th January Evening Shift]
- (1) 36      (2) 9      (3) -9      (4) 18

Scan or tap for the full solution



- Q.58** 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  $\vec{v} = \vec{a} + \lambda\vec{b}$ ,  $\lambda \in \mathbb{R}$ , 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

- [JEE Main 2026 (Online) 24th January Evening Shift]
- (1)  $\frac{\sqrt{35}}{2}$       (2) 13      (3)  $\frac{\sqrt{21}}{2}$       (4) 7

Scan or tap for the full solution



- Q.59** 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

- [JEE Main 2026 (Online) 24th January Evening Shift]
- (1) 193      (2) 205      (3) 218      (4) 233

Scan or tap for the full solution



- Q.60**  $\left(\frac{1}{3} + \frac{4}{7}\right) + \left(\frac{1}{3^2} + \frac{1}{3} \times \frac{4}{7} + \frac{4^2}{7^2}\right) + \left(\frac{1}{3^3} + \frac{1}{3^2} \times \frac{4}{7} + \frac{1}{3} \times \frac{4^2}{7^2} + \frac{4^3}{7^3}\right) + \dots$  up to infinite terms, is equal to

- [JEE Main 2026 (Online) 24th January Evening Shift]
- (1)  $\frac{7}{4}$       (2)  $\frac{4}{3}$       (3)  $\frac{6}{5}$       (4)  $\frac{5}{2}$

Scan or tap for the full solution



## Section B (Numerical)

- Q.61** 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 1 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 \_\_\_\_\_  $\Omega$ .

[JEE Main 2026 (Online) 24th January Evening Shift]

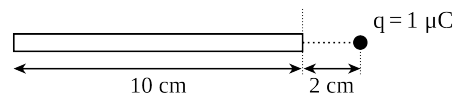
Scan or tap for the full solution



- Q.62** A point charge  $q = 1 \mu\text{C}$  is located at a distance 2 cm from one end of a thin insulating wire of length 10 cm having a charge  $Q = 24 \mu\text{C}$ , distributed uniformly along its length, as shown in figure. Force between  $q$  and wire is \_\_\_\_\_ N.

(Use :  $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ N m}^2/\text{C}^2$ )

[JEE Main 2026 (Online) 24th January Evening Shift]



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- Q.63** A soap bubble of surface tension  $0.04 \text{ N/m}$  is blown to a diameter of 7 cm. If  $(15000 - x) \mu\text{J}$  of work is done in blowing it further to make its diameter 14 cm, then the value of  $x$  is \_\_\_\_\_.

( $\pi = 22/7$ )

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- Q.64** When 300 J of heat is given to an ideal gas with  $C_p = \frac{7}{2}R$ , its temperature rises from  $20^\circ\text{C}$  to  $50^\circ\text{C}$  keeping its volume constant. The amount of the gas is (approximately) \_\_\_\_\_  $\times 10^{-3}$  mol.

( $R = 8.314 \text{ J/mol K}$ )

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- Q.65** A uniform solid cylinder of length  $L$  and radius  $R$  has moment of inertia about its axis equal to  $I_1$ . A small concentric cylinder of length  $L/2$  and radius  $R/3$  carved from this cylinder has moment of inertia about its axis equal to  $I_2$ . The ratio  $I_1/I_2$  is \_\_\_\_\_.

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- Q.66** 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)

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- Q.67** 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  $\log 2 = 0.3010$ )

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**Q.68** 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 of 0.02 M. If  $\lambda^\circ_{Q^-}$  happened to be equal to  $\lambda^\circ_{Z^-}$ , then the difference of the  $pK_a$  values of the two weak acids ( $pK_a(HQ) - pK_a(HZ)$ ) is \_\_\_\_ (Nearest integer).

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

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**Q.69** A chromium complex with a formula  $CrCl_3 \cdot 6H_2O$  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  $AgNO_3$ . The amount of  $AgCl$  formed in the above process is \_\_\_\_ g. (Nearest integer)

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

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**Q.70** 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  $CaCl_2$  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  $g\ mol^{-1}$  H : 1, C : 12, O : 16)

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**Q.71** 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 \_\_\_\_.

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**Q.72** Let  $z = (1 + i)(1 + 2i)(1 + 3i) \dots (1 + ni)$ , where  $i = \sqrt{-1}$ . If  $|z|^2 = 44200$ , then n is equal to \_\_\_\_.

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**Q.73** The number of elements in the set  $\{x \in [0, 180^\circ] : \tan(x + 100^\circ) = \tan(x + 50^\circ) \tan(x - 50^\circ)\}$  is \_\_\_\_.

[JEE Main 2026 (Online) 24th January Evening Shift]

Scan or tap for the full solution



**Q.74** 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 \_\_\_\_.

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**Q.75** 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 \_\_\_\_.

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Scan or tap for the full solution



## ANSWER KEY

### Section A (MCQ)

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

### Section B (Numerical)

| Ques. | 61 | 62 | 63    | 64  | 65  | 66 | 67  |
|-------|----|----|-------|-----|-----|----|-----|
| Ans.  | 6  | 90 | 11304 | 481 | 162 | 6  | 102 |
| Ques. | 68 | 69 | 70    | 71  | 72  | 73 | 74  |
| Ans.  | 2  | 3  | 73    | 15  | 5   | 4  | 9   |
| Ques. | 75 |    |       |     |     |    |     |
| Ans.  | 2  |    |       |     |     |    |     |