



General Instructions

- (i) **Duration:** The total duration of the examination is 2.5 hours (150 minutes).
- (ii) **Total Marks:** The complete paper carries a maximum of 500 marks.
- (iii) **Structure:** The paper has 4 Sections:
 - **Part 1:** 35 Multiple Choice Questions (Physics).
 - **Part 2:** 35 Multiple Choice Questions (Chemistry).
 - **Part 3:** 40 Multiple Choice Questions (Mathematics/Biology).
 - **Part 4:** 10 Multiple Choice Questions (Aptitude).
 - **Part 4:** 5 Multiple Choice Questions (English)
- (iv) **Compulsory Questions:** All 125 questions are compulsory.
- (v) Each question has four options. Only **one** option is correct.
- (vi) **Correct Answer:** +4 marks.
- (vii) **Incorrect Answer:** -1 (Negative marking).
- (viii) **Unanswered/Marked for Review:** 0 marks.

1. If $z = \frac{3i}{2}$, what is the value of $\arg(z)$?

- (A) 0
- (B) $\frac{\pi}{2}$
- (C) π
- (D) $\frac{3\pi}{2}$

2. Find the missing number in the series: 2, 6, 12, 20, 30, __.

- (A) 40
- (B) 42
- (C) 44
- (D) 46

3. Calculate the ratio of de Broglie wavelengths of an electron (λ_e) and a proton (λ_p) moving with the same velocity.

- (A) $\frac{m_e}{m_p}$
- (B) $\frac{m_p}{m_e}$
- (C) 1
- (D) $\frac{m_e^2}{m_p^2}$

4. What is the major product formed when phenol reacts with bromine water?

- (A) Bromobenzene
- (B) 2-bromophenol
- (C) 2,4-dibromophenol
- (D) 2,4,6-tribromophenol

5. A bag contains 5 red and 7 blue balls. Find the probability of drawing 2 red balls without replacement.

- (A) $\frac{5}{33}$
- (B) $\frac{10}{33}$

(C) $\frac{25}{144}$

(D) $\frac{7}{33}$

6. What happens to the magnetic field at the center of a circular coil if the number of turns is doubled while keeping the current constant?

(A) It becomes half ($\frac{B}{2}$)

(B) It remains the same

(C) It doubles ($2B$)

(D) It becomes four times ($4B$)

7. Identify the IUPAC name for the coordination compound $[Co(NH_3)_6]Cl_3$.

(A) Hexaamminecobalt(II) chloride

(B) Hexaamminecobalt(III) chloride

(C) Hexamminecobalt(III) chloride

(D) Hexaamminecobalt(II) trichloride

8. Find the value of k if the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-4}{k} = \frac{y-1}{2} = \frac{z}{1}$ are perpendicular.

(A) 5

(B) -5

(C) 2

(D) -2

9. Which of the following is an example of a condensation polymer?

(A) Polyethylene

(B) PVC

- (C) Nylon 6,6
 - (D) Polystyrene
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10. An object is placed 15 cm in front of a concave mirror of focal length 10 cm. Find the position and nature of the image.

- (A) 30 cm behind mirror, virtual and erect
 - (B) 30 cm in front of mirror, real and inverted
 - (C) 15 cm behind mirror, virtual
 - (D) 20 cm in front of mirror, real
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