



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. Find the value of the integral $\int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x} + \sqrt{\cos x}} dx$.

- (A) π
- (B) $\pi/2$
- (C) $\pi/4$
- (D) 0

2. If A is a 3×3 matrix and $|A| = 5$, find the value of $|adj(A)|$.

- (A) 5
- (B) 25
- (C) 125
- (D) 15

3. Calculate the de Broglie wavelength of an electron accelerated through a potential difference of 100 V .

- (A) $1.227\text{ \AA}$
- (B) $12.27\text{ \AA}$
- (C) $0.1227\text{ \AA}$
- (D) $122.7\text{ \AA}$

4. Calculate the work done in moving a charge of $2\mu\text{C}$ between two points with a potential difference of 5 V .

- (A) 10 J
- (B) 10^{-5} J
- (C) 2.5 J
- (D) 0.4 J

5. Calculate the half-life of a first-order reaction if the rate constant is 0.693 min^{-1} .

- (A) 10 min
- (B) 1 min

- (C) 0.5 min
 - (D) 6.93 min
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6. What is the major product formed when Propene reacts with HBr in the presence of peroxide?

- (A) 2-Bromopropane
 - (B) 1-Bromopropane
 - (C) 1,2-Dibromopropane
 - (D) Propane
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7. Complete the series: 3, 7, 15, 31, 63, ...

- (A) 95
 - (B) 111
 - (C) 127
 - (D) 128
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