



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 5:** 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. Evaluate $\int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x} + \sqrt{\cos x}} dx$.

- (A) $\frac{\pi}{2}$
- (B) $\frac{\pi}{6}$
- (C) $\frac{\pi}{4}$
- (D) $\frac{\pi}{3}$

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

- (A) 5
 - (B) 10
 - (C) 25
 - (D) 125
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3. Find the area of the region bounded by the curve $y^2 = 4x$ and the line $x = 3$.

- (A) $\frac{4\sqrt{3}}{3}$
 - (B) $\frac{6\sqrt{3}}{3}$
 - (C) $\frac{8\sqrt{3}}{3}$
 - (D) $\frac{12\sqrt{3}}{3}$
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4. If the current in a coil changes from 2A to 4A in 0.1s, inducing an EMF of 20V, find the self-inductance.

- (A) 0.5 H
 - (B) 1 H
 - (C) 2 H
 - (D) 4 H
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5. In a common emitter transistor, $\beta = 100$, $R_c = 2k\Omega$, and the output voltage is 2V. If $R_b = 1k\Omega$, find the input voltage.

- (A) 0.02 V
 - (B) 0.01 V
 - (C) 0.1 V
 - (D) 0.2 V
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6. Two point charges q_1 and q_2 are r cm apart in a vacuum with force F . What is the force if they are placed in a medium with dielectric constant $K = 5$ at distance $r/5$?

- (A) F
 - (B) $2F$
 - (C) $5F$
 - (D) $25F$
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7. A compound is formed by elements X and Y. Y atoms make CCP and X atoms occupy all octahedral voids. What is the formula?

- (A) X_2Y
 - (B) XY
 - (C) XY_2
 - (D) X_2Y_3
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8. Which linkage joins the monosaccharide units in sucrose?

- (A) $C_1 - C_4$ glycosidic linkage
 - (B) $C_1 - C_2$ glycosidic linkage
 - (C) $C_1 - C_6$ glycosidic linkage
 - (D) $C_2 - C_4$ glycosidic linkage
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9. Which electrolyte is most effective in the coagulation of a negative sol like As_2S_3 ?

- (A) $NaCl$
 - (B) $MgCl_2$
 - (C) $AlCl_3$
 - (D) KCl
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10. Complete the series: 285, 253, 221, 189, ?

- (A) 165
 - (B) 157
 - (C) 149
 - (D) 161
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11. If 'PLAYER' is written as '543976' and 'DARE' is '8367', what is the code for 'YELP'?

- (A) 9745
 - (B) 9457
 - (C) 9743
 - (D) 9547
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