



General Instructions

- (i) The examination will be conducted in Computer-Based Test (CBT) mode.
- (ii) Each question carries +4 marks for correct answer and 1 mark for wrong answer.
- (iii) The Question Paper is divided into 3 sections- **Engineering Mathematics, Engineering Mechanics, and Basic Electrical/Electronics Engineering**, each having 40 questions.
- (iv) Duration of the exam is 2 hours (120 minutes).

1. For a scalar function $\vec{F}(x, y, z) = x^2 + 3y^2 + 2z^2$, the directional derivative at the point P(1, 2, -1) is the direction of a vector $(\hat{i} + \hat{j} + 2\hat{k})$ is

- (A) -18
 - (B) $-3\sqrt{6}$
 - (C) $3\sqrt{6}$
 - (D) 18
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2. There are 3 candidate for a Mathematics, 5 for chemistry and 4 for a Physics scholarship. In how many ways can the scholarship be awarded.

- (A) 12
 - (B) 60
 - (C) 20
 - (D) none of these
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3. Consider an infinite series with first term a and common ratio r . If its sum is 4 and the second term is $\frac{3}{4}$, then

- (A) $a = \frac{7}{4}, r = \frac{3}{7}$
 - (B) $a = 2, r = \frac{3}{8}$
 - (C) $a = \frac{3}{2}, r = \frac{1}{2}$
 - (D) $a = 3, r = \frac{1}{4}$
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4. If a, b, c are positive numbers then value of $(a + b + c)\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)$, is

- (A) ≥ 10
 - (B) ≥ 9
 - (C) ≥ 12
 - (D) None of these
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5. In a mechanical refrigeration system, the highest temperature of refrigerant occurs

- (A) Between condenser and evaporator
 - (B) In evaporator
 - (C) Before expansion valve
 - (D) Between compressor and condenser
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6. A self-locking screw is one which

- (A) Has locking arrangement
 - (B) Has a hole drilled through for inserting locking pin
 - (C) Has coefficient of friction equal to or greater than the tangent of the load angle
 - (D) Has fine pitch screw threads
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7. At 'break-even point'

- (A) Constant expenses = Profits
 - (B) Total sales = variable expenses
 - (C) Variable expenses - Profits = Total sales
 - (D) None of the above
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