



End Term Examination(December 2018)

School: School of Engineering

Program : B.Tech.

Course:Linear Algebra and Differential Calculus

Course Code: ENG-101

Semester: I

Max. Marks: 40

Duration(mins): 120

N.B.-

1. All questions are compulsory.
 2. Figures to the right indicate full marks.
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1. Attempt EACH of the following: (10)

- (a) Evaluate : $\lim_{x \rightarrow 4} \frac{x^2 - 16}{x^2 + x - 20}$.
- (b) Find the first order partial derivatives u_x and u_y of $u = e^x \sin y$.
- (c) Determine the degree of homogeneous function $\sqrt{x^2 - xy}$.
- (d) Find $\frac{\partial(u,v)}{\partial(x,y)}$ if $u = x + y$ and $v = x - y$.
- (e) Define Relative and Percentage error.

2. Attempt any THREE of the following: (15)

- (a) Solve:
$$-x_1 + x_2 + 2x_3 = 2,$$
$$3x_1 - x_2 + x_3 = 6,$$
$$-x_1 + 3x_2 + 4x_3 = 4.$$
- (b) Find the first seven terms of the Maclaurin's series of $f(x) = \ln \sec x$.
- (c) Verify Euler's theorem for the function $(ax + by)^{\frac{1}{3}}$.
- (d) If the radius of a sphere is measured 5 inches with a possible error of 0.02 inches, find relative percentage error in the computed value of the volume.

3. Attempt any THREE of the following: (15)

- (a) Find the combined product of the five values of the expression $(1 + i)^{\frac{1}{5}}$.
- (b) Find $\frac{d^2y}{dx^2}$ from the implicit function $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$.
- (c) If $V = f(2x - 3y, 3y - 4z, 4z - 2x)$ then prove that $6V_x + 4V_y + 3V_z = 0$.
- (d) Find maximum and minimum values of $f(x, y) = x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$.