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School of Engineering and Technology

II MID TERM EXAMINATIONS: JANUARY 2022

B.Tech. Semester-I

ENGINEERING MATHEMATICS-I

BTEBE103

Time: 2 Hour **M.M.: 20**

Q.1 Attempt any 8 questions: **(1*8=8)**

a) Find the second order Taylor's polynomial approximation of $f(x,y) = xe^y + 1$ about (1,0).

b) Find the second order Taylor's polynomial approximation of $f(x,y) = \sqrt{xy}$ about (1,3).

c) If f(x,y)(function of two independent variables), then what is the condition of 'f' for maxima and minima?

d) Write the necessary condition of Lagrange's function for extreme points.

e) Write the Taylor's Series for two variables.

f) Write the formula of double integration in polar form.

g) What are the applications of double integral?

h) Evaluate $\int_0^3 \int_1^3 xy(1+x+y)dxdy$.

i) Write the relation between beta and gamma function.

j) Prove that: -$\Gamma(n+1) = n\Gamma n$.

k) Evaluate $\int_1^2 \int_0^3 (1+8xy)dxdy$

l) What is point of inflexion?

Q.2 Find the extreme point of x^3+2y^3+3x^2+12y^2+24=0. [6]

OR

Q.2 Find the dimensions of the rectangular box open at the top of maximum capacity whose surface is 108 sq.cm.

Q.3 Evaluate. [6]

$$\int_0^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} dydx.$$

OR

Q.3 Prove that: -$\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$.