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LNCT- University

1st MID SEM EXAMINATION (Nov – 2023)

B.TECH I SEM Engg. Mathematics-I – [BT-102]

(COMMON FOR ALL BRANCH)

Time: 1:30 Hrs Max Marks :20

NOTE: All questions are compulsory & all questions carry equal marks.

Que1. Compute the approximate value of $\sqrt{11}$ to the four decimal places by taking the first five terms of an appropriate Taylor's expansion. [CO-1]

OR

Que1. If $u = f(r)$, where $r^2 = x^2 + y^2$ then show that $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = f''(r) + \frac{1}{r} f'(r)$. [CO-1]

Que2. If $u = (x^2 + y^2 + z^2)^{-1/2}$ then prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z} = -u$. [CO-1].

OR

Que2. Verify the Rolle's Theorem for the function $f(x) = x(x+3)e^{-x/2}$. [CO-1]

Que3. Discuss the maxima and minima of function $u = x^3 + y^3 - 3axy$. [CO-1]

OR

Que3. Find the expansion of $\sin^{-1} x$ by Maclaurin Theorem. [CO-1]

Que4. Evaluate $\lim_{n\to\infty} [(1+\frac{1}{n^2})(1+\frac{2^2}{n^2})(1+\frac{3^2}{n^2}).....(1+\frac{n^2}{n^2})]^{(1/n)}$. [CO-2]

OR

Que4. Evaluate from the definition as the limit of sum $\int_1^3 (x^2 + x)dx$. [CO-2]