Dr. Pradeep Kr. Pandey

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

T2 EXAMINATIONS, OCTOBER-2019

B.Tech I Semester (CS/IT/EC/CE)

Course Code: 18B11MA111

Course Name: Engineering Mathematics-I

Course Credits: 04

MAX. MARKS: 25

MAX. TIME: 1.5 Hours

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Marks are indicated in square brackets against each question.

1. Find the absolute maximum and absolute minimum values of $f(x, y) = x^3 + y^2 - xy - x$ on a closed and bounded region $x \geq 0, y \geq 0$ and $x + y \leq 2$. [4], [CO2]

2. By reversing the order of integration, evaluate $\int_{y=0}^{y=1} \int_{x=y}^{x=1} 3 \cos x^2 \, dx \, dy$. [4], [CO3]

3. Evaluate $\iint_S \frac{z}{2} \, dS$, where S is the upper half surface of sphere $x^2 + y^2 + z^2 = 4$. [4], [CO3]

4. Integrate $f(x, y) = x^2 - y$ over the curve $C: x^2 + y^2 = 4$ in the first quadrant from $(0, 2)$ to $(\sqrt{2}, \sqrt{2})$. [4], [CO4]

5. Find the equations of tangent plane and normal line at the point $(0, 1, 2)$ on the surface $\cos \pi x - x^2 y + e^{xz} + yz = 4$. [4], [CO4]

6. (a) Evaluate $L\{(t + e^{2t})^2\}$. [2.5], [CO5]

   (b) Using convolution, evaluate $L^{-1}\left\{\frac{1}{(s+1)(s+2)}\right\}$. [2.5], [CO5]

***