JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

T2 EXAMINATIONS, OCTOBER-2019

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

Course Code: 10B11MA111

Course Name: 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.

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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]

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