

Jaypee University of Information Technology, Waknaghat

Test - 1, September 2018

B.Tech (ECE/CSE/IT/CE)

Course Code: 18B11MA111

Max. Marks: 15

Course Title: Engineering Mathematics - I

Course Credits: 4

Max. Time: 60 min

Instructions: ALL questions are compulsory and carry equal marks.

1. Consider $f(x, y) = \frac{x \sin x}{x^2 + y^4}$.
 - (a) Does the limit exist at $(0, 0)$?
 - (b) Is $f(x, y)$ continuous at $(0, 0)$? Justify your answer.
2. Use chain rule to find $\frac{\partial \omega}{\partial \alpha}$, where $\omega = xe^{zy}$ with $x = \alpha^2\beta$, $y = \beta^2\gamma$ and $z = \gamma^2\alpha$.
3. Consider $f(x, y) = x^3 + y^2 - 2xy + 7x - 8y + 4$.
 - (a) Find the critical point of $f(x, y)$.
 - (b) Determine the nature of the critical points.
4. Use Lagrange's multiplier method to find extrema of $f(x, y) = xy^2$ subject to $9x^2 + y^2 = 9$.
5. Find the second order Taylor expansion of $f(x, y) = e^{2x} \sin(3y)$ about $(0, 0)$.

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