Programme Name & Branch	**: M.Tech. (Integrated)**
Course Code and Course Name	**: IAMAT101 - Multivariable Calculus and Differential Equations**
	: Common Question Paper
Faculty Name(s)	**: Common for all**
Class Number(s)	**: 22/08/2025**
Date of Examination	**: 90 minutes**
Exam Duration	**Maximum Marks: 50**

General instruction(s):

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

1. Evaluate partial derivatives and solve optimization problems involving several variables with or without constraints.
2. Solve multiple integrals in Cartesian, polar, cylindrical and spherical coordinates.

Q. No	Question	M	CO	BL
1.	Test the continuity of the function $f(x,y) = \frac{5x^4y^2}{x^8+y^4}$ at $(0,0)$.	10	1	2
2.	Find the Taylor series expansion of $f(x,y) = e^{5x+3y}cosx$ around $(0,0)$ up to third order.	10	1	2
3.	Find the Jacobian $J\left(\frac{x,y}{r,\theta}\right)$ and $J\left(\frac{r,\theta}{x,y}\right)$, where $x = rcos\theta$ and $y = rsin\theta$.	10	1	3
4.	Find the area of the region bounded by the curves $y = x^2$ and $y = -x + 2$ and draw the curves.	10	2	3
5.	Change the order of the integration and hence evaluate $\int_0^{\sqrt{2}} \int_y^{\sqrt{4-y^2}} 5dxdy$.	10	2	3

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