



VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF ADVANCED SCIENCES
CONTINUOUS ASSESSMENT TEST - I
FALL SEMESTER 2025-2026

SLOT: F2+TF2

Programme Name & Branch : M.Tech. (Integrated)
Course Code and Course Name : IAMAT101 - Multivariable Calculus and Differential Equations
Faculty Name(s) : Common Question Paper
Class Number(s) : Common for all
Date of Examination : 22/08/2025
Exam Duration : 90 minutes 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 $f(x, y) = e^{5x+3y}\cos x$ 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 $x = r\cos\theta$ and $y = r\sin\theta$.	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 $\int_0^{\sqrt{2}} \int_y^{\sqrt{4-y^2}} 5dx dy$.	10	2	3
