



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

SLOT: B2+TB2

REG.NO.:

SCHOOL OF ADVANCED SCIENCES
CONTINUOUS ASSESSMENT TEST (CAT) -I
FALL SEMESTER 2026-2027

Programme Name & Branch : B. Tech
Course Code : BAMAT101
Course Name : Multivariable calculus and Differential Equations
Faculty Name(s) : Common Question Paper
Class Number(s) : Common Question Paper
Date of Examination : 10-08-2026 (2.00 pm – 3.30 pm)
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 – Analyze, 5 – Evaluate, 6 – Create)
- Course Outcomes Statements:
CO. 1: Evaluate partial derivatives and solve optimization problems involving several variables with or without constraints
CO. 2: Solve multiple integrals in cartesian, polar, cylindrical and spherical coordinates

Q. No	Question	M	CO	BL
1.	(a) If $u = f(y - z, z - x, x - y)$ then find $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z}$	5	CO1	BL1
	(b) Verify the functional dependence of the functions $u = 3x + 2y - z, v = x - 2y + z, w = x(x + 2y - z)$. If they are functionally dependent find the relation between them.	5		
2.	Expand the function $x^2 + y^2 + e^x \sin y$ in powers of $(x - 1)$ and $(y - \frac{\pi}{2})$ up to terms of third degree	10	CO1	BL2
3.	The temperature T at any point (x, y, z) in space is $T(x, y, z) = xyz^2$. Find the highest temperature on the surface of the sphere $x^2 + y^2 + z^2 = 4$.	10	CO1	BL3
4.	Using double integral find the area between $y = 4x - x^2$ and the line $y = x$.	10	CO2	BL1
5.	Evaluate $\int_0^1 \int_x^{\sqrt{2-x^2}} \frac{x}{\sqrt{(x^2+y^2)}} dy dx$ by changing the order of integration.	10	CO2	BL2
