



VIT

Vellore Institute of Technology

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

SLOT: G1+TG1

Programme Name & Branch : B.Tech - ~~Biotechnology~~ *Chemical Engineering*
Course Code and Course Name : BAMAT101 - Multivariable Calculus and Differential Equations
Faculty Name(s) : Common to G1
Class Number(s) : Common to G1
Date of Examination : 23-08-2025
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)
- Course Outcomes
 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.	Determine whether the following functions are functionally dependent or not. Find a functional relation between them in case they are functionally dependent. $u = xy + yz + zx, v = x^2 + y^2 + z^2$ and $w = x + y + z$	10	CO1	2
2.	Expand the function $f(x, y) = e^x \log(1 + y)$ in powers of x and y up to the terms of 3 rd degree using Taylor's theorem.	10	CO1	2
3.	A rectangular box open at the top is to have volume of 32 cubic ft. Find the dimensions of the box requiring least material for its construction.	10	CO1	3
4.	Evaluate $\iint_R xy(x+y) dx dy$ over the region R bounded by $y = x^2$ and $y = x$.	10	CO2	2
5.	Change the order of integration and evaluate $\int_0^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} dy dx$.	10	CO2	3