



VIT

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

**SCHOOL OF ADVANCED SCIENCES
DEPARTMENT OF MATHEMATICS
CONTINUOUS ASSESSMENT TEST – II
FALL SEMESTER 2023-2024**

Programme Name : Int. M. Tech
Course Code : IMAT101L
Course Name : Calculus
Slot : G2+TG2 (Common Question Paper)
Exam Duration: 90 minutes **Maximum Marks: 50**
General instruction(s): Answer all the following questions. 5 x 10 = 50 Marks

Q.No.	Question
1.	Verify whether $u = x^3 - y^3 z^3$, $v = x^2 + y^2 z^2 + xyz$ and $w = x - yz$ are functionally dependent. If so, find the relation among them.
2.	Find the third degree Taylor's polynomial approximation of the function $-2 + 3y + x^2 y$ at $(1, -2)$.
3.	Find the shortest and the longest distances from the point $(1, 2, -1)$ to the sphere $x^2 + y^2 + z^2 = 24$, using Lagrange's multiplier method.
4.	Using double integral, find the area between $y = 4x - x^2$ and the line $y = x$.
5.	Evaluate $\int_0^{\infty} \int_0^y y e^{-\frac{y^2}{x}} dx dy$ by changing the order of integration.