VIT

Vellore Institute of Technology

Deemed to be University under section 3 of UGC Act 1956

REG. NO.:

SLOT: D2 + TD2

SCHOOL OF ADVANCED SCIENCES
DEPARTMENT OF MATHEMATICS
CONTINUOUS ASSESSMENT TEST - II
FALL SEMESTER – 2024 – 2025

Programme Name & Branch	:	B. Tech. – ECE, EE(VLSI)
Course Code & Course Name	:	BMAT101L & Calculus
Class Number(s)	:	Common to all – D2 + TD2 slot
Faculty Name(s)	:	Common to all – D2 + TD2 slot
Date of Examination	:	16-10-2024
Exam Duration	:	90 Minutes

Maximum Marks : 50

General Instruction(s): Answer All Questions

Q. No.	Questions	M	CO	BL
1.	Expand $f(x,y) = \sin(e^y + x^2 - 2)$ by Taylor's series in powers of $(x-1)$ and y, upto second order degree.	10	2	2
2.	By using Lagrange's multiplier method, find the ends of the major and minor axes of the ellipse $3x^2 - xy + 3y^2 = 4$, which points are farthest from and closest to the origin. Also, sketch that ellipse.	10	2	3
3.	Change the order of integration in each of the double integrals $\int_{-1}^{0}\int_{-x}^{1}(x^2+y^2)\,dy\,dx$ and $\int_{0}^{1}\int_{x}^{1}(x^2+y^2)\,dy\,dx$ and hence express their sum as one double integral and evaluate it.	10	3	3
4.	By changing to spherical polar coordinate system, evaluate $\iiint_V dx\,dy\,dz$, where V is defined as $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$	10	3	3
5.	(i) Evaluate $\int_0^\infty \frac{x^{10} - x^{18}}{(1+x)^{30}} dx$, by using beta function.	5	4	2
	(ii) Evaluate $\int_0^\infty e^{-4x} x^{\frac{5}{2}} dx$, by using gamma function.	5		

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