



# VIT

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

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

REG.NO.:

GDN  
120

SLOT: G2+TG2

30

Programme Name & Branch : B.Tech  
Course Code and Course Name : BMAT101L & Calculus  
Class Number(s) : Common to G2+TG2  
Date of Examination : 19.10.2024  
Exam Duration : 90 minutes

Maximum Marks: 50

**General instruction(s):**

- Answer All Questions
- Students are permitted to bring any number of text books, printouts of e-books(complete/chapters) and hand written note books (class notes)

Q. No	Question	Mark	CO	BL
1.	Using Taylor series, find the cubic approximation to $f(x,y) = \cos y \sin x$ near to $(0, \frac{\pi}{4})$ . Hence compute the function value at $(0, 3\pi)$ .	10	2	2
2.	A closed rectangular box is to have volume $72\text{cm}^3$ . The height of the box is 2 times of the breadth of the box. If Rs.10 is used for making $1\text{cm}^2$ of the material used in the box, then what are the dimensions of the box to minimize the total cost of materials? Also find the minimum cost to make the box.	10	2	3
3.	Sketch the region $D$ of integration and write an equivalent double integral by changing order of integration $\int_{-1}^{\frac{1}{2}} \int_{x-2}^{3x} dydx + \int_{\frac{1}{2}}^2 \int_{x-2}^{2-x} dydx$ . Hence find the area of the region $D$ .	10	3	3
4.	Using spherical polar co-ordinates, find the volume of the solid cut from the thick-walled cylinder $1 \leq x^2 + y^2 \leq 2$ by the cone $z = \sqrt{x^2 + y^2}$ and above to the plane $z = 0$ .	10	3	3
5.	a) Evaluate the integral using gamma function $\int_0^{\infty} \sqrt{t} e^{-3\sqrt{t}} dt$ . b) Using beta function, evaluate $\int_0^1 \frac{y}{\sqrt{1-y^5}} dy$ .	5 5	4	2

\*\*\*\*\*