REG.NO.: 24BCE2787

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

SLOT: E2+TE2

Programme Name & Branch : B. Tech
Course Code and Course Name : BMAT101L & Calculus
Class Number(s) : (Common to all E2+TE2 slot)
Date of Examination : 17/10/2024
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	M	CO	BL
1.	Use Taylor's formula to expand the function defined by $f(x,y) = cot^{-1}(xy)$ in powers of $(x + 0.5)$ and $(y - 2)$ up to second degree term.	10	2	2
2.	A right cylindrical can have a volume of 0.25 cubic feet. Find the height h and radius r that will minimize surface area of the right cylindrical can. What is the relationship between the resulting r and h?	10	2	3
3.	Evaluate $\int_0^1 \int_x^{\sqrt{2-x^2}} \frac{x}{\sqrt{x^2+y^2}} dydx$ by changing the order of integration.	10	3	3
4.	Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_{\sqrt{x^2+y^2}}^1 \frac{dz\,dy\,dx}{\sqrt{x^2+y^2+z^2}}$ by changing into spherical polar coordinates.	10	3	3
5.	a) Evaluate $\int_0^\infty x^{\left(\frac{1}{2}\right)} e^{-x^{\left(\frac{1}{3}\right)}} dx$ using gamma function. b) Evaluate $\int_0^{2a} x^2\sqrt{2ax - x^2}\, dx$ using beta function.	5 5	4	2