VIT

Vellore Institute of Technology

SCHOOL OF ADVANCED SCIENCES

DEPARTMENT OF MATHEMATICS

SLOT D1

CONTINUOUS ASSESMENT TEST-II (December 2022)

FALL SEMESTER 2022-23

Programme Name & Branch: B.Tech

Course Code: BMAT101L

Course Name: Calculus

Exam Duration: 90 minutes **Maximum Marks:** 50

General instruction(s): Answer all questions 5×10=50

Sl.No.	Question	Marks
1.	Find the Taylor series expansion of the function $f(x,y)=x^2y+\sin y+e^x$ upto terms of third degree in $(x-1)$ and $(y-\pi)$.	10
2.	By using Lagrange's Method of Undetermined Multipliers find the points on the circle $x^2+y^2=80$ which are closest to and farthest from the point (1, 2).	10
3.	Change the order of integration and hence evaluate $\int_0^{\infty}\int_0^{x} xe^{\left(\frac{-x^2}{y}\right)}dydx$.	10
4.	Convert the integral $\int_{-4}^{4}\int_{-\sqrt{16-y^2}}^{\sqrt{16-y^2}}\int_{-\sqrt{16-x^2-y^2}}^{\sqrt{16-x^2-y^2}}\left(x^2+y^2+z^2\right)dzdxdy$ into spherical coordinates and hence evaluate it.	10
5.	(i)Evaluate $\int_0^{\infty}\frac{x^2dx}{\left(1+x^4\right)^3}$ using beta and gamma function. (ii)Evaluate $\int_0^{1}\frac{dx}{\sqrt{1-x^4}}$ using beta and gamma function.	(5+5)