



VIT

Vellore Institute of Technology
(Chartered by the University under section 3 of UGC Act, 1956)

Vellore - 632014, Tamil Nadu, India
FALL SEMESTER 2022-2023

CONTINUOUS ASSESSMENT TEST - II

Programme Name & Branch : B. Tech.
 Course Code : BMAT101L
 Course Name : Calculus
 Slot : E2+TE2
 Duration : 90 minutes

Max. Marks : 50

General instruction(s): Answer All Questions ($5 \times 10 = 50$).

Q. No	Question	Marks
1.	Using Taylor's formula to find the quadratic approximation of the function $f(x, y) = xy^2 + y \cos(x - y)$ about the point $(1, 1)$. Estimate the maximum absolute error in the region $ x - 1 < 0.05$, $ y - 1 < 0.1$.	8+2= 10
2.	A space probe in the shape of the ellipsoid $4x^2 + y^2 + 4z^2 = 16$ enters Earth's atmosphere and its surface begins to heat. After one hour, the temperature at the point (x, y, z) on the probe's surface is $T(x, y, z) = 8x^2 + 4yz - 16z + 600$. Find the hottest point on the probe's surface.	10
3.	Change the order of integration in $\int_0^8 \int_{\sqrt{x}}^2 \frac{1}{(1+y^4)} dx dy$ and then evaluate it.	10
4.	Convert the following integral $\int_0^1 \int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} \int_{-(x^2+y^2)}^{(x^2+y^2)} 21xy^2 dz dy dx$ to cylindrical coordinates and then evaluate the new integral.	10
5.	Using Beta and Gamma functions, evaluate a) $\int_0^1 \left(\frac{x^3}{1-x^3}\right)^{\frac{1}{2}} dx$, b) $\int_0^1 x^3(1-x)^2 dx$.	5+5= 10

