



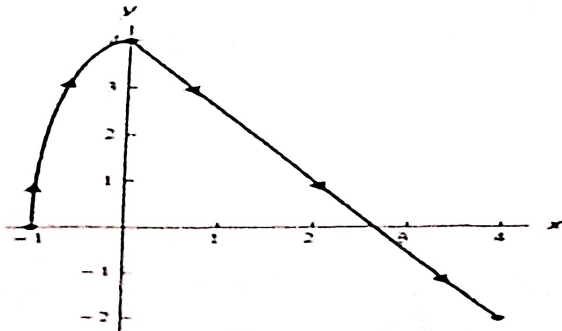
Continuous Assessment Test (CAT) – II - OCTOBER 2025

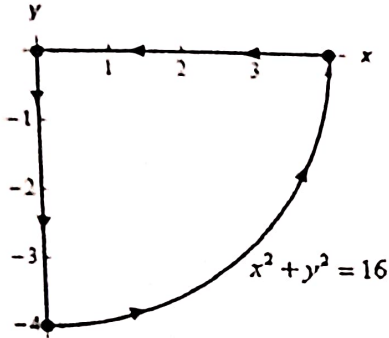
Programme	: B.Tech.	Semester	: FALL SEMESTER 2025-26
Course Code & Course Title	: BAMAT101 & Multivariable Calculus and Differential Equations	Slot	: B1+TB1
Faculty	: SRUTHA KEERTHI B, KALYANI DESIKAN, SHANTHA SHEELA J, SANDIP, KRITI ARYA, KARTHIK S, SANDIP KUMAR DAS, MOHIT KUMAR, N RAMESH BABU, SHOBA PANDIAN, PICHANI CHANDRIKA, GOMATHI D, DIVYA S RAJ, SARANYA M, UMA MAHESWARI S, THANGARAJ M, ASWINI K, MINI GHOSH, SAURABH CHANDRA MAURY, ANKIT KUMAR, BHARANI DHARAN K, ANNAL R, NAZEER ANSARI, RAVINDAR RAJ C	Class Number	: CH2025260103296, 3297, 3301, 3302, 3303, 3304, 3305, 3307, 3310, 3311, 3314, 3315, 3317, 3498, 3511, 3519, 3522, 3523, 3524, 3526, 3527, 3528, 3947, 4059
Duration	: 90 Minutes	Max. Mark	: 50

General Instructions:

- Write only your registration number on the question paper in the box provided and do not write other information.
- Only non-programmable calculator without storage is permitted.

Answer all questions

Q. No	Sub Sec.	Description	Marks	CO	BT Level
1.		Use spherical coordinates to evaluate the volume of the portion of the unit sphere (centered at the origin) that lies above the plane $z = \frac{1}{\sqrt{2}}$.	10	2	K3
2.	a.	Evaluate $\int \vec{F} \cdot d\vec{r}$ over C , where $\vec{F}(x, y) = xy\vec{i} - 3\vec{j}$ and C is the portion of the ellipse $x^2 + \frac{y^2}{16} = 1$ in the 2 nd quadrant with the clockwise rotation, followed by the line segment from (0,4) to (4,-2). See the sketch below. 	6	3	K2

	b.	If $\nabla f = (e^{yz} + y\cos(xy))\hat{i} + (xze^{yz} + x\cos(xy))\hat{j} + (xye^{yz} + 3z^2)\hat{k}$, find f given that $f(1,0,0) = 2$.	4		
3.	a.	Use Green's theorem to evaluate $\oint (y^3 - xy^2)dx + (2 - x^3)dy,$ where C is shown below 	6	3	K3
	b.	Find the angle between the surfaces $x \log(z) = y^2 - 1$ and $x^2y = 2 - z$ at the point $(1,1,1)$.	4		
4.	a.	Use divergence theorem to evaluate $\iint \vec{F} \cdot d\vec{S}$ where $\vec{F} = xy\hat{i} - \frac{1}{2}y^2\hat{j} + z\hat{k}$, and the surface consists of the three surfaces $z = 4 - 3x^2 - 3y^2$, $1 \leq z \leq 4$ (on the top) $x^2 + y^2 = 1$, $0 \leq z \leq 1$ (on the sides) $z = 0$ (on the bottom).	7	3	K3
	b.	Given $\vec{F}$ and $\vec{G}$ are irrotational. Is $\vec{F} \times \vec{G}$ solenoidal?	3		
5.		Solve $y'' + 4y = t \sin(2t) + 10e^{2t}$ by method of undetermined coefficients.	10	3	K3

***All the best ***

K2 – Understanding; K3 - Apply

Co-ordinator Signature

