[Total No. of Ques. 04] Seat No: [Total No. of Pages: 01]

G H Raisoni College of Engineering and Management, Pune
(An Autonomous Institution affiliated to Savitribai Phule, Pune University)

Department of First Year B. Tech.
Term II (2024-25)
CAE-I
Integral Calculus and Differential Equations (23UBSL1203)

[Time: 01 Hour] **[Max. Marks-20]**

Instructions to the candidates:

1) *All questions compulsory.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Assume suitable data, if necessary.*

Q. No.	*Sub Question*		*CO*	*Marks*	*BL*
1	*a)*	Trace the Curve: $y^2(2a - x) = x^3$.	CO1	[05]	L3
		OR			
	b)	Find $\frac{dI(a)}{da}$ for $I(a) = \int_{\pi/6a}^{\pi/2a} \frac{\sin ax}{x}\, dx$ using DUIS Rule – 2.	CO1	[05]	L3
	c)	Write any four properties of Gamma function and evaluate $\int_0^\infty x\, e^{-\sqrt{x}}\, dx$	CO1	[05]	L2
		OR			
	d)	Write any four Properties of Beta Function and evaluate $\int_0^1 x^3 (1 - \sqrt{x})^5\, dx$	CO1	[05]	L2
2	*a)*	Evaluate $\iint y\, dx\, dy$ over the area bounded by the curve $y = x^2$ & $y = x$.	CO1	[05]	L3
		OR			
	b)	Evaluate $\iint x^2y^2\, dx\, dy$ over positive quadrant of a circle $x^2 + y^2 = 1$	CO1	[05]	L3
	c)	Prove that : i) $\int_0^1 \int_0^1 \frac{dx\, dy}{\sqrt{(1-x^2)(1-y^2)}} = \frac{\pi^2}{4}$ and ii) $\int_0^1 \int_{-\sqrt{y}}^{-y^2} xy\, dx\, dy = \frac{-1}{12}$	CO1	[05]	L3
		OR			
	d)	Evaluate $\int_{-1}^{1} \int_{0}^{z} \int_{x-z}^{x+z} (x + y + z)\, dy\, dx\, dz$	CO1	[05]	L3

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