



G H Raison College of Engineering and Management, Pune
(An Empowered Autonomous Institute affiliated to Savitribai Phule, Pune University, NAAC Accredited "A+" Grade)

**First Year
(TERM- II)**

CAE II - SUMMER 2025 (2023 Pattern)

Integral Calculus and Differential Equations (23UBSL1203)

(Max. Marks: 20)

(Time: - 01 Hour)

Instructions to the students:

- i) All questions are compulsory. ii) Neat diagrams must be drawn wherever necessary. iii) Figures to the right indicate full marks. iv) Use of scientific calculator is allowed v) Assume suitable data, if necessary.*

Q. No.	Question	CO	Marks	BL
1	a) Evaluate $\int_C \vec{F} \cdot d\vec{r}$ for $\vec{F} = 3x^2i + (2xz - y)j + zk$ along a straight line joining the points (0, 0, 0) and (2, 1, 3). OR	CO2	[04]	L3
	b) Find the work done in moving a particle once round the ellipse $\frac{x^2}{16} + \frac{y^2}{4} = 1, z = 0$ under the field of force \vec{F} given by $\vec{F} = (2x - y + z)i + (x + y - z^2)j + (3z - 2y + 4z)k$.	CO2	[04]	L3
	c) Verify Greens theorem for $\vec{F} = x^2i + xyj$ over the region R bounded by the curve $y = x^2$ and the line $y = x$. OR	CO2	[06]	L3
	d) Evaluate $\iint_S (\nabla \times \vec{F}) \cdot \hat{n} ds$ for $\vec{F} = xy^2i + yj + xz^2k$. Where S is the surface of rectangular lamina bounded by $x = 0, y = 0, x = 1, y = 2, z = 0$.	CO2	[06]	L3
2	a) Solve: $\frac{dy}{dx} = \frac{\tan y - 2xy - y}{x^2 - xy + y}$ $\tan^2 y + \sec^2 y$ OR	CO3	[05]	L3
	b) Solve: $\left(\frac{y^2}{(y-x)^2} - \frac{1}{x} \right) dx + \left(\frac{1}{y} - \frac{x^2}{(x-y)^2} \right) dy = 0$	CO3	[05]	L3
	c) Solve: $(1 + x^2) \frac{dy}{dx} + xy = 1$ OR	CO3	[05]	L3
	d) Solve: \cos $\cos y \frac{dy}{dx} - \frac{\sin y}{1+x} = (1 + x) e^x$	CO3	[05]	L3

- BL - Bloom's Taxonomy Levels (1- Remember, 2- Understand, 3 - Apply, 4 - Analyze, 5 - Evaluate 6 - Create)
- CO- Course Outcomes