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Seat No:

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G. H. Raisoni College of Engineering and Management, Pune.
(An Autonomous Institution)
F.Y B.Tech (All Branches)
Winter 2020
CAE-III(2020 Pattern)

Subject Name: Matrices and Differential Calculus (UBSL103)

[Time: 1 Hour]

[Max. Marks-15]

COURSE OUTCOME:

1. Understand and use the theory of Matrices to solve the system of linear equations and engineering problems in respective disciplines.
2. Determine the Eigenvalues and Eigenvectors of a matrix and apply to various engineering problems in respective disciplines.
3. Apply concepts of differentiation in solving engineering problems.
4. Use applications of partial differentiation to solve various problems in engineering.
5. Apply the Knowledge of vector differentiation to solve various problems in engineering.

Instructions to the candidates:.

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

CO3	a)	If $y = \cos(5x + 3)$ then n^{th} order derivative of y is	[1]	L1
	B)	If $Y = \cos(a \log x)$, then prove that $x^2 Y_{n+2} + (2n+1)xY_{n+1} + (n^2 + a^2)Y_n = 0$	[3]	L3
CO4	a)	If $v = \log(x^2 + y^2 + xy)$ then calculate $X^2(\partial^2 v / \partial x^2) + 2xy(\partial^2 v / \partial x \partial y) + y^2(\partial^2 v / \partial y^2)$	[3]	L4
	b)	Explain Euler's first and second theorem	[2]	L2
CO1	a)	Find rank of matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$ by reducing to normal form	[3]	L3
CO2	a)	Find all eigen values and eigen vector corresponding to largest eigen value for matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$	[3]	L4