[Total No. of Questions: 04] Roll No. | |

G. H. Raisoni College of Engineering and Management, Pune.

(An Autonomous Institution)

F.Y. B. Tech.

CAE-I (2020-21) Term-1

Matrices and Differential Calculus - (UBSL103)

[Time: 1 Hour] **[Max. Marks-15]**

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.***

Course Outcomes:

1. Understand and use the theory of Matrices to solve the system of linear equations and engineering problems in respective disciplines.
2. Determine the Eigen values and Eigen vectors 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.

Q.1 ***a)*** Define Dependent system of equations. **[01]**

b) State Homogeneous and Non- Homogeneous system of equations **[02]**

Q.2 ***a)*** Find A^{-1} by Adjoint method for A=$\begin{bmatrix}2 & 3 & 1\\1 & 2 & 3\\3 & 1 & 2\end{bmatrix}$ **[03]**

OR

b) Reduce the matrix to Row-Echelon Form and find rank of A=$\begin{bmatrix}1 & 2 & 3\\2 & 3 & 4\\3 & 5 & 7\end{bmatrix}$ **[03]**

Q.3 ***a)*** Find Eigen value of A=$\begin{bmatrix}1 & -1 & 0\\-1 & 2 & 1\\0 & 1 & 1\end{bmatrix}$ and Eigen vector of largest Eigen value. **[04]**

Q.4 ***a)*** Verify Cayley-Hamilton theorem and hence find value of A^{-1} & A^4 of A=$\begin{bmatrix}2 & -1 & 1\\-1 & 2 & -1\\1 & -1 & 2\end{bmatrix}$ **[05]**