Roll No	

Tatyasaheb Kore Institute of Engineering & Technology, Warananagar
(An Autonomous Institute)
F.Y. B. Tech (Sem-I), In Semester Examination –I, September 2023

ENGINEERING MATHEMATICS-I

Day and Date: Tuesday, 03 September 2023 **Marks: 30**

Time : 9:15 am to 10:15 am

Instructions: i) Use of non programmable calculator is allowed.
ii) Figures to the right indicate full marks.

		Unit No	CO	
Q.1	**Attempt any Three from the following questions.**			
a)	Reduce the following matrix to normal form and hence find its rank $\begin{bmatrix} 2 & -5 & 3 & 4 \\ 1 & 3 & 5 & 2 \\ 4 & -10 & 6 & 8 \\ 3 & 9 & 15 & 6 \end{bmatrix}$	1	1	**5**
b)	Solve the equations by matrix method $x + y + z = 3\ , x + 2y + 3z = 4,\quad x + 4y + 9z = 6$	1	1	**5**
c)	Solve $2x - y + 3z = 0\ , 3x + 2y + z = 0\ , x - 4y + 5z = 0$	1	1	**5**
d)	Investigate for what value of $a\ and\ b$ the equations $x + y + z = 6, x + 2y + 3z = 10, x + 2y + az = b$ Have i) No solution ii) A unique solution	1	1	**5**
Q.2	**Attempt any Three from the following questions.**			
a)	Find the Eigen values and Eigen vector corresponding to largest eigen value of $\begin{bmatrix} 7 & -2 & 0 \\ -2 & 6 & -2 \\ 0 & -2 & 5 \end{bmatrix}$	2	2	**5**
b)	Find the Eigen values of A , $A^2, 5A$ for the matrix $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$	2	2	**5**
c)	Find the Eigen values of A ,A^{-1} , A^T for the matrix $\begin{bmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{bmatrix}$	2	2	**5**
d)	Verify Cayley-Hamilton Theorem for matrix A $\begin{bmatrix} 1 & 2 & 3 \\ 2 & -1 & 4 \\ 3 & 1 & -1 \end{bmatrix}$	2	2	**5**

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