SET-A

Student Name: Avichal Pandey **University Roll No.:**	**Printed Pages:**
School of Engineering **First Theory Sessional Examination** **Odd Semester (AS: 2024-25)** **B. Tech: CSE** **[Year: I]** **[Semester : I]**	
Course Title: Matrices and Calculus **Course Code: NBS4101**	**Max Marks: 30** **Time:** 1 *hr*

Instructions: 1-Read the question Carefully.
2-Notations have usual meaning.

	SECTION 'A' **Q.N.1. Attempt all parts of the following:**	**Course Objective**	**Marks**
a)	Define Symmetric and skew symmetric matrix.	**CO1**	1
b)	Define rank of a matrix.	**CO1**	1
c)	Write the statement of Cayley – Hamilton Theorem.	**CO1**	1
d)	Define Eigen values of a square matrix.	**CO1**	1
e)	Discuss the Echelon Form of a matrix.	**CO1**	1

	SECTION 'B' **Q.N.2. Attempt any two parts of the following:**	**Course Objective**	**Marks**
a)	For what value of λ the equation $x+y+z=1$ $x+2y+4z=\lambda$ $x+4y+10z=\lambda^2$ has a solution.	**CO1**	7.5
b)	Examine the vectors $X_1=(2,2,1), X_2=(1,3,1) X_3=(1,2,2)$ for linear dependence.	**CO1**	7.5
c)	Find the A^{-1} of a matrix $A=\begin{bmatrix}4 & 3 & 1\\ 2 & 1 & -2\\ 1 & 2 & 1\end{bmatrix}$ by Cayley-Hamilton Theorem.	**CO1**	7.5

	SECTION 'C' **Q.N.3. Attempt any one part of the following:**	**Course Objective**	**Marks**
a)	Find the rank of the matrix by reducing it to normal form $A=\begin{bmatrix}1 & 2 & -1 & 3\\ 4 & 1 & 2 & 1\\ 3 & -1 & 1 & 2\\ 1 & 2 & 0 & 1\end{bmatrix}$	**CO1**	**10**
b)	Verify Cayley- Hamilton Theorem of the matrix $A=\begin{bmatrix}2 & 1 & 1\\ 0 & 1 & 0\\ 1 & 1 & 2\end{bmatrix}$	**CO1**	**10**
c)	Find the eigen value & eigen vector of matrix $A=\begin{bmatrix}-5 & 2\\ 2 & -2\end{bmatrix}$.	**CO1**	**10**

Table 1: Mapping between COs and questions

COs	Questions Numbers	Total Marks
CO1	1(a), 1(b), 1(c), 1(d), 1(e), 2(a), 2(b), 2(c), 3(a), 3(b), 3(c)	57.5