	Parul University **Faculty of Engineering and Technology** **Parul Institute of Engineering and Technology** **CSE/IT Department**			
Subject Name	**Linear Algebra**	**A.Y**	**2025-2026**	
Subject Code	**03019102BS01**	**Semester**	**II**	
Assignment-3				
Sr No	**Question**	**COs**	**B.T**	**Competence**
Q-1.	Find the rank and nullity of the matrix $A = \begin{bmatrix} 2 & 2 \\ 3 & 7 \end{bmatrix}$.	**1**	**3**	**Apply**
Q-2.	Check the vector B is in the Column Space or not by solving AX=B where $A = \begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$ $A = \begin{bmatrix} 3 \\ 7 \end{bmatrix}$.	**1**	**3**	**Apply**
Q-3	If the Rank of a 4×6 matrix is 3 , where $A = \begin{bmatrix} 1 & 2 & 0 & 3 & 4 & 5 \\ 3 & 6 & 0 & 9 & 12 & 15 \\ 2 & 4 & 0 & 6 & 8 & 10 \\ 1 & 2 & 0 & 3 & 4 & 5 \end{bmatrix}$. What is the dimension of the column space?	**1**	**2**	**Understand**
Q-4	Given a linear tranformation $T: R^2 \to R^2$ and vectors $u, v \in R^2$. If $T(u) = a$ & $T(v) = b$	**3**	**4**	**Analyze**

	Then prove that $T(u+v) = a+b$.			
Q-5	Find domain and co-domain of $(T_2 \circ T_1)$ and find $(T_2 \circ T_1)(x,y)$ $T_1(x,y) = (2x, 3y); T_2(x,y) = (x-y, x+y)$.	**3**	**2**	**Understand**
Q-6	Find a basis for the Column Space of $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$.	**3**	**3**	**Apply**
Q-7	Let $T: R^3 \to R^3$ bethe linear Transformation defined by $T(x,y,z) = (x+2y-z, y+z, x+y-2z)$ (a) Find a basis and the dimension for the range of T. (b) Find a basis and dimension for the kernel of T. (c) Verify the dimension theorem.	**3**	**3**	**Apply**