Self Assessment :

1. Let $A : \mathbb{R}^{6\times1} \to \mathbb{R}^{5\times1}$ and $A : \mathbb{R}^{5\times1} \to \mathbb{R}^{7\times1}$ be two linear transformations. Then which of the following can be true.
(a)A and B are one-one
(b)A is one-one and B is not one-one.
(c) A is onto and B is one-one
(d) A and B both are onto.

Ans: A is onto and B is one-one

2. If $T : U \to V$ is any linear transformation from U to V then
(a) the kernel of T is a subspace of U
(b) the kernel of T is a subspace of V
(c) the range of T is a subspace of U
(d) V is always the range of T

Ans-(a)

3. Which of the following is not a linear transformation ?
(a) T(x, y, z) = (x, 2y, 3x - y)
(b) T(x, y, z) = (x - y, 0, y - z)
(c) T(x, y, z) = (0, 0, 0)
(d) T(x, y, z) = (1, x, z)

Ans-(d)

4. Which of the following statements is not true?
(a) If A is any $n \times m$ matrix, then the transformation T defined by T(x) = Ax is always a linear transformation.
(b)If $T : U \to V$ is any linear transformation from U to V then T(xy) = T(x)T(y) for all vectors x and y in U.
(c) If $T : U \to V$ is any linear transformation from U to V then T(-x) = -T(x) for all vectors x in U.
(d) If $T : U \to V$ is any linear transformation from U to V then T(0) = 0 in V for 0 in U.

Ans: (b)

5. Which of the following is a linear transformation ?
(a) T(x, y, z) = (x+1, 4y, 2x+y)
(b) T(x, y, z) = (x+y, x, y - z)
(c) T(x, y, z) = (1, 2, 3)
(d) T(x, y, z) = (1, x, z)

Ans-(b)

6. If $T : U \to V$ be a L.T, then which of the following is correct

(a)Rank T + Nullity T = dim V
(b) Rank T . Nullity T = dim V
(c) Rank T - Nullity T = dim V
(d)Rank T / Nullity T = dim V

Ans-(a)

7.If $T : U \to V$ be a L.T, then which of the following is correct
(a)Range T $\cap$ Ker T = $\{1\}$
(b) Range T $\cap$ Ker T = $\{2\}$
(c) Range T $\cap$ Ker T = $\{3\}$
(d)Range T $\cap$ Ker T = $\{0\}$

Ans:(d)