19CS30048 SUHAS JAIN

1)

$$f : R^3 \to R^3$$

$$A \in R^{3\times 3}$$

$$f(x) = Ax$$

$$A = [\, f(e_1) \quad f(e_2) \quad f(e_3) \,]$$

$$f(e_1) = \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}$$

$$f(e_2) = \begin{bmatrix} 2 \\ 1 \\ 0 \end{bmatrix}$$

$$f(e_3) = \begin{bmatrix} -1 \\ 1 \\ 0 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 2 & -1 \\ 0 & 1 & 1 \\ -1 & 0 & 0 \end{bmatrix}$$

Trace = Sum of elements on diagonal

$= 1 + 1 + 0 = \boxed{2}$