ASSIGNMENT-LINEAR ALGEBRA

SECTION A

1) Find x, y, z and w if $3\begin{pmatrix} x & y \\ z & w \end{pmatrix} = \begin{pmatrix} x & 6 \\ -1 & 2w \end{pmatrix} + \begin{pmatrix} 4 & x+y \\ z+w & 3 \end{pmatrix}$.
2) Find a, b, c if $\begin{pmatrix} x-y \\ x+y \\ z-1 \end{pmatrix} = \begin{pmatrix} 4 \\ 2 \\ 8 \end{pmatrix}$.
3) Given $R = \begin{pmatrix} 1 & 2 \\ 3 & -4 \end{pmatrix}, S = \begin{pmatrix} 5 & 0 \\ -6 & 7 \end{pmatrix}$, show that $(RS)^T = S^T R^T$.
4) If $A = \begin{pmatrix} 2 & -5 & 1 \\ 3 & 0 & -4 \end{pmatrix}, B = \begin{pmatrix} 1 & -2 & -3 \\ 0 & -1 & 5 \end{pmatrix}, C = \begin{pmatrix} 0 & 1 & -2 \\ 1 & -1 & -1 \end{pmatrix}$, find $3A + 4B - 2C$.
5) Find the product ST when $S = \begin{pmatrix} 2 & 4 & 1 \\ 0 & 1 & -2 \end{pmatrix}$ and $T = \begin{pmatrix} 3 & 0 & 1 & -1 \\ -1 & 3 & 1 & 2 \\ 4 & 0 & 3 & -2 \end{pmatrix}$.
6) Find $5C - 2D$ when C=$\begin{pmatrix} 2 & 1 & 1 \\ -1 & -1 & 4 \end{pmatrix}$ and $D = \begin{pmatrix} 2 & -3 & 4 \\ -3 & 1 & -2 \end{pmatrix}$.
7) Find B^T and $(B^T)^T$, where $B = \begin{pmatrix} 1 & 3 & 5 \\ 6 & -7 & -8 \end{pmatrix}$.
8) Calculate $(CB)^T, if\ C = \begin{pmatrix} 1 & 2 \\ 3 & -4 \end{pmatrix}$ and $B = \begin{pmatrix} 5 & 0 \\ -6 & 7 \end{pmatrix}$.
9) Find $E + F$ if $E = \begin{pmatrix} 1 & 2 & -3 \\ 0 & -4 & 1 \end{pmatrix}$ and $F = \begin{pmatrix} 3 & 5 \\ 1 & -2 \end{pmatrix}$.
10) What is a square matrix?
11) Given $A = \begin{pmatrix} 3 & 7 & 2 \\ 1 & 6 & 4 \\ 9 & 0 & -5 \end{pmatrix}$, find the $tr(A)$.
12) When is square matrix said to singular?
13) Which of the matrices below is symmetric?

$$E = \begin{pmatrix} 9 & 1 & 5 \\ 1 & 6 & 2 \\ 5 & 2 & 7 \end{pmatrix}, \qquad F = \begin{pmatrix} 9 & 1 & 5 \\ 2 & 6 & 2 \\ 5 & 1 & 7 \end{pmatrix}$$

14) Every diagonal matrix is symmetric matrix. True or False.

SECTION B

a) Using the matrices

$E_1 = (1 \quad 2 \quad 4), E_2 = (5 \quad 4 \quad 2 \quad 3), C_1 = \begin{pmatrix} 3 \\ 2 \\ -1 \end{pmatrix}, C_2 = \begin{pmatrix} 1 \\ -1 \\ -1 \\ 1 \end{pmatrix}$

compute E_1C_1 and E_2C_2. Explain why the product E_1C_2 cannot be computed.

b) Using the matrices $M = \begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}, P = \begin{pmatrix} -1 & -2 \\ 3 & -4 \end{pmatrix}, and\ Q = \begin{pmatrix} 2 & 3 \\ 5 & -1 \end{pmatrix}$, compute the product $(M + P)Q$ and the sum $MQ + PQ$ to show that they are equal.