Vector, Matrices,Determinants

Time:45 minutes   Class 12 scert   Max mark: 23

1. (a) The vertices of the triangle are $(0, 2), (0, 3), (4, 6)$, then the area of the triangle is   **(1)**

2. (a) Find matrices X and Y such that $X + Y = \begin{bmatrix} 7 & 0 \\ 2 & 5 \end{bmatrix}, X - Y = \begin{bmatrix} 3 & 0 \\ 0 & 3 \end{bmatrix}$ **(3)**

3. (a) Find the projection of the vector $\hat{i} + 3\hat{j} + 7\hat{k}$ on the vector $7\hat{i} + -\hat{j} + 8\hat{k}$ **(3)**

4. (a) If $A = \begin{bmatrix} -2 \\ 4 \\ 5 \end{bmatrix}, B = \begin{bmatrix} 1 & 3 & -6 \end{bmatrix}$ Verify $(AB)' = B'A'$ **(3)**

5. (a) Express the matrix $A = \begin{bmatrix} 3 & 3 & -1 \\ -2 & -2 & 1 \\ -4 & -5 & 2 \end{bmatrix}$ as the sum of a symmetric matrix and a skew symmetric matrix   **(3)**

6. (a) Consider $\vec{a} = \hat{i} + 2\hat{j} + 3\hat{k}, \vec{b} = 3\hat{i} + 2\hat{j} + \hat{k}$, find $\vec{a}.\vec{b}$ **(1)**

   (b) Find the angle between $\vec{a}$ and $\vec{b}$ **(2)**

7. (a) For the symmetric matrix $A = \begin{bmatrix} 2 & x & 4 \\ 5 & 3 & 8 \\ 4 & y & 9 \end{bmatrix}$. Find the values of x and y.   **(1)**

   (b) Verify AA' and $A + A'$ are symmetric Matrices   **(2)**

8. (a) If $\vec{a} = \hat{i} - 7\hat{j} + 7\hat{k}, \vec{b} = 3\hat{i} - 2\hat{j} + 2\hat{k}$ Find $\vec{a} \times \vec{b}$ **(2)**

   (b) Find the unit Vector perpendicular to both $\vec{a}$ and $\vec{b}$ **(1)**

   (c) Find the area of parellelogram whose adjacent sides are *veca* and $\vec{b}$ **(1)**