

ADEWOLE ADEBAYO JUSTIN CIVIL ENGINEERING 19/EN0403/023

$$A = 3\hat{i} + 4\hat{j} - 6\hat{k} \quad B = 5\hat{i} - 11\hat{j} + 2\hat{k} \quad C = 7\hat{i} - 7\hat{j} + \hat{k}$$

$$\text{① } A \cdot C + B \cdot C$$

$$A \cdot C = (3 \times 7) + (4 \times -7) + (-6 \times 1)$$

$$= 21\hat{i} - 28\hat{j} - 6\hat{k}$$

$$B \cdot C = (5\hat{i} - 11\hat{j} + 2\hat{k}) \cdot (7\hat{i} - 7\hat{j} + \hat{k})$$

$$= 35\hat{i} + 77\hat{j} + 2\hat{k}$$

$$\therefore A \cdot C + B \cdot C = 56\hat{i} + 49\hat{j} - 4\hat{k}$$

$$\text{② } (A - B) \cdot C$$

$$(3\hat{i} + 4\hat{j} - 6\hat{k}) - (5\hat{i} - 11\hat{j} + 2\hat{k})$$

$$= 3\hat{i} + 4\hat{j} - 6\hat{k} - 5\hat{i} + 11\hat{j} - 2\hat{k}$$

$$= -2\hat{i} + 15\hat{j} - 8\hat{k}$$

$$(A - B) \cdot C = -14\hat{i} - 105\hat{j} - 8\hat{k}$$

$$\text{③ } A \cdot (B \times C)$$

$$\begin{vmatrix} + & - & + \\ 3 & 4 & -6 \\ 5 & -11 & 2 \\ 7 & -7 & 1 \end{vmatrix} = 3 \begin{vmatrix} -11 & 2 \\ -7 & 1 \end{vmatrix} - 4 \begin{vmatrix} 5 & 2 \\ 7 & 1 \end{vmatrix} - 6 \begin{vmatrix} 5 & -11 \\ 7 & -7 \end{vmatrix}$$

$$= 3(-11+14) - 4(5-14) - 6(-35+77)$$

$$= 9 + 36 - 252$$

$$= \underline{\underline{-207}}$$