

DARE BENEDICT OLUBUKOLA

MECHANICAL ENGINEERING

19/ENG06/016 SERIAL NO.; 111

MAT 102 ASSIGNMENT (Mrs. Funmilayo Saka)

If $A = 3i + 4j - 6k$, $B = 5i - 11j + 2k$, $C = 7i - 7j + k$.

Find,

- (i) $A \cdot C + B \cdot C$
- (ii) $(A - B) \cdot C$
- (iii) $A \cdot (B \times C)$

Solution

(i) $A \cdot C + B \cdot C$

$$\begin{aligned} &= (3i + 4j - 6k) \cdot (7i - 7j + k) + (5i - 11j + 2k) \cdot (7i - 7j + k) \\ &= (-13) + (114) \\ &= \underline{\underline{101}} \end{aligned}$$

(ii) $(A - B) \cdot C$

$$\begin{aligned} &= [(3i + 4j - 6k) - (5i - 11j + 2k)] \cdot (7i - 7j + k) \\ &= (-2i + 15j - 8k) \cdot (7i - 7j + k) \\ &= (-14) + (-105) + (-8) \\ &= \underline{\underline{-127}} \end{aligned}$$

$$(iii) A \cdot (B \times C)$$

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

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

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

$$= 3[3] - 4[-9] - 6[42]$$

$$= 9 + 36 - 252$$

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