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19/ENGG06/042 Mechanical engineering

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

1) Find:

$$A \cdot C + B \cdot C$$

$$A \cdot C \Rightarrow (3i + 4j - 6k) \cdot (7i - 7j + k)$$

$$\Rightarrow 21 - 28 - 6 \Rightarrow -13$$

$$B \cdot C \Rightarrow (5i - 11j + 2k) \cdot (7i - 7j + k)$$

$$\Rightarrow 35 + 77 + 2 \Rightarrow 114$$

$$\therefore (A \cdot C) + (B \cdot C) \Rightarrow -13 + 114 \Rightarrow 101$$

$$2) (A - B) \cdot C$$

$$\Rightarrow (A - B) \Rightarrow (3i + 4j - 6k) - (5i - 11j + 2k)$$

$$\Rightarrow 8i + 15j - 8k$$

$$\therefore (A - B) \cdot C \Rightarrow (8i + 15j - 8k) \cdot (7i - 7j + k)$$

$$\Rightarrow 56 - 105 - 8$$

$$\Rightarrow -57$$

$$3) A \cdot (B \times C)$$

$$B \times C =$$

$$\begin{vmatrix} i & j & k \\ 5 & -11 & 2 \\ 7 & -7 & 1 \end{vmatrix}$$

$$\Rightarrow i(-11 + 14) - j(5 - 14) + k(-7 + 77)$$

$$\Rightarrow 3i + 9j + 70k$$

$$\therefore A \cdot (B \times C) \Rightarrow (3i + 4j - 6k) \cdot (3i + 9j + 70k)$$

$$\Rightarrow 9 + 36 - 420$$

$$\Rightarrow -375$$