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DESI: MATHS - M ENGINEERING

MARKAS: 17/11/2020/20

S/N: 61

TMT 102 assignment

(1) $A = 4i + j - 2k$

$$B = 3i - 2j + k$$

$$C = i - 2k$$

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

$$2B = 2(3i - 2j + k)$$

$$= 6i - 4j + 2k$$

$$(A - 2B) = (4i + j - 2k) - (6i - 4j + 2k)$$

$$= -2i + 5j$$

$$(A - 2B) \times C \Rightarrow (-2i + 5j) \times (i - 2k)$$

$$\Rightarrow \begin{array}{ccc|ccc|ccc} i & j & k & i & j & k & i & j & k \\ \hline -2 & 5 & 0 & 1 & 0 & 0 & 0 & 0 & -2 \\ \hline 1 & 0 & -2 & 0 & 2 & 0 & 1 & 2 & 0 \end{array}$$

k

$$\begin{array}{ccc|ccc} -2 & 5 & 0 & 0 & 0 & 0 \\ \hline 1 & 0 & 0 & 0 & 0 & 0 \\ \hline \end{array} \Rightarrow (0+0)i + (0+0)j + (-10+0)k$$
$$= 2j - 10k$$

(3) $A \times (2C \times 3B)$

$$2C = 2(i - 2k) \Rightarrow (2i - 4k)$$

$$3B = 3(3i - 2j + k) \Rightarrow (9i - 6j + 3k)$$

$$(2C \times 3B) = (2i - 4k) \times (9i - 6j + 3k)$$

$$\Rightarrow \begin{array}{ccc|ccc|ccc} i & j & k & i & j & k & i & j & k \\ \hline 2 & 0 & -4 & 0 & -4 & 0 & 2 & -4 & 0 \\ \hline 9 & -6 & 3 & -6 & 3 & 0 & 9 & 3 & 0 \end{array}$$

k

$$\begin{array}{ccc|ccc} 2 & 0 & 0 & 0 & 0 & 0 \\ \hline 9 & -6 & 0 & 0 & 0 & 0 \\ \hline \end{array} \Rightarrow (0+0+0)i + (-8+27)j + (0-54)k$$
$$= -8i + 19j - 54k$$

$$A \times (2C \times 3B) = (4i + j - 2k) \times (-19i + 17j - 34k)$$

$$\begin{array}{c|c|c} i & j & k \\ \hline 4 & 1 & -2 \\ \hline -19 & 17 & -34 \end{array} \times \begin{array}{c|c|c} i & j & k \\ \hline 1 & -2 & -11 \\ \hline 17 & -34 & -54 \end{array}$$

$$\begin{array}{c|c|c} k \\ \hline 4 & 1 & -2 \\ \hline -19 & 17 & -34 \end{array} \Rightarrow (-2 - 1026)i + (-8 + 772)j + (4 + 342)k$$

$$= 1028i + 964j + 346k$$

$$\textcircled{2} A = Pi - 6j - 3k$$

$$B = 4i + 3j - k$$

$$C = i - 3j + 2k$$

$$\vec{A} \cdot (\vec{B} \times \vec{C}) = \begin{array}{c|c|c} i & j & k \\ \hline P & -6 & -3 \\ \hline 4 & 3 & -1 \\ \hline 1 & -3 & 2 \end{array} = 0$$

$$\begin{array}{c|c|c} P & -6 & -3 \\ \hline -3 & 2 & 1 \end{array} + 6 \begin{array}{c|c|c} 4 & -1 & -3 \\ \hline 1 & 3 & 1 \end{array} - 3 \begin{array}{c|c|c} 4 & 3 & 1 \\ \hline -3 & 2 & -8 \end{array} = 0$$

$$\begin{array}{c|c|c} P & -6 & -3 \\ \hline -3 & 2 & 1 \end{array}$$

$$P(6-3) + 6(8+1) - 3(-12-3) = 0$$

$$P(3) + 6(9) - 3(-15) = 0$$

$$3P + 54 + 45 = 0$$

$$3P + 99 = 0$$

$$3P = -99$$

$$P = -33$$

3

$$= -33$$