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DEPT: COMPUTER ENGINEERING
MATRIC NO: 19/ENG02/067

1. $A = 4i + j - 2k \quad B = 3i - 2j + k \quad C = i - 2k$

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

$(A - 2B) = 4i + j - 2k - 2(3i - 2j + k)$

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

$= -2i + 5j - 4k$

$$(A-2B) \times C = \begin{vmatrix} i & j & k \\ -2 & 5 & -4 \\ 1 & 0 & -2 \end{vmatrix}$$

$$= i\begin{vmatrix} 5 & -4 \\ 0 & -2 \end{vmatrix} - j\begin{vmatrix} -2 & -4 \\ 1 & -2 \end{vmatrix} + k\begin{vmatrix} -2 & 5 \\ 1 & 0 \end{vmatrix}$$

$= i(-10+4) - j(4+4) + k(0-5)$

$= -6i - 8j - 5k$

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

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

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

$$(2C \times 3B) = \begin{vmatrix} i & j & k \\ 2 & 0 & -4 \\ 9 & -6 & 3 \end{vmatrix}$$

$$= i\begin{vmatrix} 0 & -4 \\ -6 & 3 \end{vmatrix} - j\begin{vmatrix} 2 & -4 \\ 9 & 3 \end{vmatrix} + k\begin{vmatrix} 2 & 0 \\ 9 & -6 \end{vmatrix}$$

$= i(0-24) - j(6+36) + k(-12-0)$

$= -24i - 42j - 12k$

$$A \times (2C \times 3B) = \begin{vmatrix} i & j & k \\ 4 & 1 & -2 \\ -24 & -42 & -12 \end{vmatrix}$$

$$= i\begin{vmatrix} 1 & -2 \\ -42 & -12 \end{vmatrix} - j\begin{vmatrix} 4 & -2 \\ -24 & -12 \end{vmatrix} + k\begin{vmatrix} 4 & 1 \\ -24 & -42 \end{vmatrix}$$

$= i(-12-84) - j(-48-48) + k(-168+24)$

$A \times (2C \times 3B) = -96i - 96j - 144k$

2. $A = Pi - 6j - 3k \quad B = 4i + 3j - k \quad C = i - 3j + 2k$

$A \times B \times C = 0$

$$A \times B \times C = \begin{vmatrix} P & -6 & -3 \\ 4 & 3 & -1 \\ 1 & -3 & 2 \end{vmatrix} = 0$$

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

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

$$= 3P + 54 + 45$$

$$= 3P + 99$$

$A \times B \times C = 0$

$3P + 99 = 0$

$3P = -99$

$P = \frac{-99}{3}$

$P = -11$