

19/EMG04/024

PLATE 02

DIATA ANTHONY EMMANUEL

Electrical & Electronics Engineering

1) $A = 4i + j - 2k$, $B = 3i - 2j + k$ $C = i - 2k$

a) $(A - 2B) \times C = [4i + j - 2k - 2(3i - 2j + k)] \times C$
 $= [4i + j - 2k - 6i + 4j - 2k] \times C$
 $= (-2i + 5j - 4k) \times (i - 2k)$

$$= \begin{vmatrix} -2 & 5 & -4 \\ 1 & 0 & -2 \end{vmatrix}$$

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

$$= i(-10) - j(+8) + k(-5)$$

$$= -10i - 8j - 5k$$

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

$$= A \times \begin{vmatrix} 2 & 0 & -4 \\ 9 & -6 & 3 \end{vmatrix}$$

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

$$= A \times (24i - 42j - 12k)$$

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

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

$$= -96i - 192 + 4$$

$$2) \begin{vmatrix} P & -6 & -3 \\ 4 & 3 & -1 \\ 1 & -3 & 2 \end{vmatrix} = 0$$

$$P \begin{vmatrix} 3 & -1 \\ -3 & 2 \end{vmatrix} - (-6) \begin{vmatrix} 4 & -1 \\ 1 & 2 \end{vmatrix} - 3 \begin{vmatrix} 4 & 3 \\ 1 & -3 \end{vmatrix} = 0$$

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

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

$$3P + 99 = 0$$

$$3P = -99$$

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

$$= -33$$