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Matric No - 19/Eng02/016

Mat 102

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

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

$$2B = 2(3i - 2j + k) = 6i - 4j + 2k$$

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

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

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

$$\begin{vmatrix} i & j & k \\ -2 & 3 & -4 \\ 1 & 0 & -2 \end{vmatrix}$$

$$i \begin{vmatrix} 3 & -4 \\ 0 & 2 \end{vmatrix} - j \begin{vmatrix} -2 & -4 \\ 1 & -2 \end{vmatrix} + k \begin{vmatrix} -2 & 3 \\ 1 & 0 \end{vmatrix}$$

$$i(6 - 0) - j(4 - 4) + k(0 - 3)$$

$$6i - 0j + (-3k)$$

$$(A - 2B) \times C = 6i - 3k$$

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

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

$$3B = 9i - 6j + 3k$$

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

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

$$+ (0-24) - j(6+36) + 15(-12-0)$$

$$-24i = 42j = -12k = 20 \times 3B$$

$$(20 \times 3B)$$

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

$$+ (96) - j(6) - k(144)$$

$$-96i + 144k$$

2)  $A = pi - 6j - 3k$ ,  $B = 4i + 3j - k$ ,  $C = i - 3j + 2k$   
for coplanar

$$A \cdot (B \times C) = 0$$

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

$$p(6-3) + 6(8-1) - 3(-12-3)$$

$$3p + 42 + 45 = 0$$

$$3p + 87 = 0$$

$$3p = -87$$

$$p = -29$$