(ii) $\langle 3A \times B \rangle \cdot \langle A \times 2B \rangle$

$A = 2i - j$

$3A = 2 \times \langle 2i - j \rangle$

$= 6i - 3j$

$B = 3i + j + 11k$

$\therefore 3A \times B$

$$\begin{vmatrix} i & j & k \\ 6 & -3 & 0 \\ 3 & 1 & 11 \end{vmatrix}$$

$+i(3 \times 11) - (1 \times 0) - j(6 \times 11 - (3 \times 0) + k(6 \times 1) - (3 \times -3)$

$33i - 66j + 9k$

(iii) $(A \times B \times C)$

$A = 2i - j$

$B = 3i + j + 11k$

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

$= 2i - j \times 3i + j - 11k \times 4i + 4j - 5k$

$$= \begin{bmatrix} i & j & k \\ 2 & -1 & 0 \\ 3 & +11 & +11 \\ 4 & +4 & -5 \end{bmatrix}$$

$$= 2i\begin{bmatrix} +1 & +11 \\ +4 & -5 \end{bmatrix} - 1j\begin{bmatrix} 3 & +11 \\ 4 & -5 \end{bmatrix} + k\begin{bmatrix} 3 & +1 \\ 4 & +0 \end{bmatrix}$$

(2) Perpendicular vector is a vector such that there are two vectors perpendicular to each other of form of a right angle one rotate counterclockwise and the other rotate clockwise. While coplanar vectors are vectors parallel to the same plane, or lie on the same plane.

Name : ISAAC BAG. G.

A = 2i - j
B = 3i + j - 11k
C = 4i + 4j - 5k

i. -3A + 7B - 8C.

$-3\langle 2i - j\rangle + 7\langle 3i + j - 11k\rangle - 8\langle 4i + 4j - 5k\rangle$

$-6i + 3j + 21i + 7j - 77k - 24i - 24j + 40k$

C.L.T.

$-6i + 21i - 24i + 3j + 7j - 24j - 77k + 40k$

$-9i - 14j - 37k$

ii. K = 2A + 4B - C

$K = 2\langle 2i - j\rangle + 4\langle 3i + j - 11k\rangle - \langle 4i + 4j - 5k\rangle$

$K = 4i - 2j + 12i + 4j - 44k - 4i - 4j + 5k$

$K = 4i + 12i - 4i - 2j + 4j - 4j - 44k + 5k$

$K = 12i - 2j - 39k$

Unit ~~direction~~ vector

$\hat{k} = \frac{k}{|k|}$

$k = 12i - 2j - 39k$

$|k| = \sqrt{(12)^2 + (-2)^2 + (-39)^2}$

$|k| = \sqrt{144 + 4 + 1521}$

$|k| = \sqrt{1669}$

$|k| = 40.85$

$\simeq 41$

∴ unit vector

$= \frac{12i - 2j - 39k}{40.85}$

∴ direction of cosines of K are $= \frac{12}{40.85}, \frac{-2}{40.85}$

OR $\frac{12}{41}, \frac{-2}{41}, \frac{-39}{41}$