Congratulations
ON YOUR CONVOCATION CEREMONY

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LELEKUMO TAM MAT102 ASSIGNMENT

ATMOSPHERIC MECHANICAL ENGINEERING

QUESTION 1, If $A = 2i - j$ $B = 3i + j + 11k$ $C = 4i + 4j - 5k$

a, $-3A + 7B - 8C$

$-3(2i - j) + 7(3i + j + 11k) - 8(4i + 4j - 5k)$

$-6i + 3j + 21i + 7j + 77k - 32i + 32j + 40k$

$\Rightarrow -17i - 22j + 117k$ //

b, If $K = 2A + 4B - C$, find direction cosine of K

$2(2i - j) + 4(3i + j + 11k) - (4i + 4j - 5k)$

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

$\Rightarrow 12i - 2j + 49k$

$\bar{K} = 12i - 2j + 49k$

$a = 12 \quad b = -2 \quad c = 49$

$|r| = \sqrt{12^2 + (-2)^2 + (49)^2}$

$= \sqrt{144 + 4 + 2401}$

$= \sqrt{2549} \approx 50.49$

$\cos\alpha$ $\cos\beta$ $\cos\gamma$

$L = \frac{a}{|r|}$, $M = \frac{b}{|r|}$, $N = \frac{c}{|r|}$

$L = \frac{12}{50.49}$, $M = \frac{-2}{50.49}$, $N = \frac{49}{50.49}$

Hence direction cosines of K are $\left(\frac{12}{50.49}, \frac{-2}{50.49}, \frac{49}{50.49}\right)$ //

e, $A - 2B - C$

$2i - j - 2(3i + j + 11k) - (4i + 4j - 5k)$

$2i - j - 6i - 2j - 22k - 4i - 4j + 5k$

$\Rightarrow -8i - 7j - 17k$ //

QUESTION 2, Define perpendicular and co-planar vectors

a, Perpendicular vectors are vectors that multiply together to give 0 i.e $\bar{A} \cdot \bar{B} = 0$

b, Co-planar vectors is a case whereby three vectors A, B and C are parallel, and also they align on the same plane i.e $\bar{A} \cdot (\bar{B} \times \bar{C}) = 0$