

Congratulations

ON YOUR CONVOCAATION
CEREMONY

LELEKUMO TAM MAT 102

ASSIGNMENT

IA/MS/2012A

MECHANICAL

ENGINEERING

QUESTION,

$$A = 3i + 4j - 6k$$

$$B = 5i - 11j + 2k$$

$$C = 7i - 7j + k$$

1, $A \cdot C + B \cdot C$

$$A \cdot C = (3i + 4j - 6k) \cdot (7i - 7j + k)$$

$$\Rightarrow 21i^2 - 21ij + 3ik + 28ij - 28j^2 + 4jk - 42ik + 42jk - 6k^2$$

$$\Rightarrow 21i^2 + 7ij - 39ik - 28j^2 + 46jk - 6k^2$$

$$B \cdot C = (5i - 11j + 2k) \cdot (7i - 7j + k)$$

$$\Rightarrow 35i^2 - 35ij + 5ik - 77ij + 77j^2 - 11jk + 14ik - 14jk + 2k^2$$

$$\Rightarrow 35i^2 + 112ij + 19ik + 77j^2 - 25jk + 2k^2$$

$\therefore A \cdot C + B \cdot C$

$$= 56i^2 + 119ij - 20ik + 49j^2 + 21jk - 4k^2 //$$

$$2, (A-B) \cdot C$$

$$(3i + 4j - 6k) - (5i - 11j + 2k)$$

$$3i - 5i + 4j + 11j - 6k - 2k$$

$$= (-2i + 15j - 8k) \times C$$

$$= (-2i + 15j - 8k)(7i - 7j + k)$$

$$\Rightarrow -14i^2 + 14ij - 2ik + 105ij - 105j^2 + 15jk - 56ik + 56jk - 8k^2$$

$$\Rightarrow -14i^2 + 119ij - 58ik - 105j^2 + 71jk - 8k^2 //$$

$$3, A \cdot (B \times C)$$

From question 1, we got $(B \times C)$ to be

$$35i^2 + 112ij + 19ik + 77j^2 - 25jk + 2k^2$$

$$\therefore A \cdot (B \times C)$$

$$= 3i(35i^2 + 112ij + 19ik + 77j^2 - 25jk + 2k^2) + 4j$$

$$(35i^2 + 112ij + 19ik + 77j^2 - 25jk + 2k^2) - 6k$$

$$C(35i^2 + 112ij + 19ik + 77j^2 - 25jk + 2k^2)$$

$$\Rightarrow 105i^3 + 336i^2j + 57i^2k + 231ij^2 - 75ijk + 6ik^2 +$$

$$140i^2j + 448ij^2 + 76ijk + 308j^3 - 100jk + 8jk^2 +$$

$$210i^2k - 672ijk - 114ik^2 - 462j^2k + 180jk^2 - 12k^3$$

$$\Rightarrow 105i^3 + 476i^2j + 153i^2k + 679ij^2 - 67ijk - 108ik^2 + 308j^3 - 562j^2k + 158jk^2 - 12k^3 //$$