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MATRIC NO. 17/ENG04/003

DEPT. ELECTRICAL AND ELECTRONICS

COURSE CODE: MAT 102

QUESTION 2

If A=i+2j-4k , B=2i-3j+k , C=4j-3k, find A x (B x C)

Solution

Note:

* I x j=k
* J x k=i
* K x i=j

Also

* I x j= - ( j x I )
* J x k= - ( k x j )
* K x i= - ( I x k )

( B x C ) = ( 2i – 3j + k )(4j – 3k)

=2(4) I x j + 2(-3) I x k – 3(4) j x j – 3(-3) j x k + 1(4) k x j + 1(3) k x k

=8k – (-6j) + 9i – 4i

Re – arranging

(B x C) = 5i + 6j + 8k

A x (B x C) = I + 2j – 4k (5i + 6j + 8k)

= 1 (5) I x I + 1 (6) I x j + 1 (8) I x k + 2 (5) j x I + 2 (6) j x j + 2 (8) j x k – 4(5) k x I – 4(6) j x k – 4(8) k x k

= 6k + (-8j) + (-10k) + 16i – 20j –(-24)

Re- arranging

A x (B x C) = 40i – 28j – 4k

QUESTION 4

If A = 7i + 2j – k , B = 2i + j + 4k , Find ( A + B ) . ( B – A )

SOLUTION

Firstly (A + B ) = 7i +2j – k + 2i + j + 4k

Re- arranging

= 7i + 2i + 2j + j – k + 4k

= 9i + 3j + 3k

Next ( B – A ) = 2i + j + 4k – (7i + 2j – k)

Re- arranging

= 2i – 7i + j – 2j + 4k + k

= -5i – j + 5k

(A + B) . (B – A) = (9i + 3j + 3k) . (-5i – j + 5k)

= 9(-5) i.i + 9(-1) i.j 9(5) i.k + 3(-5) j.i + 3(-1) j.j + 3(5) j.k + 3(-5) k.i + 3(-1) k.j +3(5) k.k

(A + B) . (B – A) = 9(-5) + 3(-1) + 3(5)

= -45 – 3 + 15

= -33