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COLLEGE: SCIENCES

DEPARTMENT: BIOTECHNOLOGY

COURSE: MAT 102

**QUESTIONS**

1. If A=5i-7j-6k, B=j+4k, C=9i-4j+k, find -8(A+B).(C-A)
2. Find a unit vector tangent to the space curve x = -3t, y= t2, z=4t3at the point where t=1.
3. A particle moves along a curve, x=-8t2, y= t2 -4t, z=t+1, where t is time. Find its acceleration
4. If A=i+2j-4k, B=2i-3j+k, C=4j-3k, Find (AXB)XC)
5. Given R=4sin3ti+4e3tj+7t3k, find the integral of R with respect to t from 0 to 1

SOLUTION

1. -8(A+B)= -8(5i-7j+j-6k+4k)=-8(5i-6j-2k)= -40i+48j+16k

(C-A)= (9i-5i-4j+7j+k+6k)= 4i-3j+7k

Therefore -8(A+B).(C-A)= (-40i+48j+16k)(4i-3j+7k)= -160i-144j+112k

1. r= -3ti+t^2j+4t^3k

dr/dt= -3t+2t+12t^2

at t=1

dr/dt= -3i+2j+12k

|dr/dt|= root (-3)^2+(2)^2+(12)^2= root 9+4+144= root 157= 12.53

Hence t= -3i+2j+12k/12.53

1. r= -8t^2i+(t^2-4t)j+(t+1)k

dr/dt= 16ti+(2t-4)j+tk

1. (AXB)= |I j k|

 |1 2 -4|

 |2 -3 1|

I|2 -4| j|1 -4| k|1 2|

 |-3 1| |2 1| |2 -3|

I(2-12) –j(1+8)+k(-3-4)

= -10i-9j-7k

(AXB)XC)= |I j k|

 |-10 -9 -7|

 | 0 4 -3|

= i|-9 -7| j|-10 -7| k|-10 -9|

 |4 -3| |0 -3| | 0 4|

=i(27+28) –j(30) +k(-40+9)

= 55i -30j -31k