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***Civil engineering***

***No 188***

 ***Mat 102***

**Question**

1. A particle moves along a curve x= 8t3, y=4t3-7t and z = t+3, where t is time. Find its

(i) velocity (ii) acceleration

2. Find the unit tangent vector to the space curve x=3t, y= t3 and z= t2 at t=1.

Solutions

1. Given that r = 8t3 + 4t3-7t + t+3

Velocity dr/dt = 24t2i + (12t2 -7)j + (1)k

 Acceleration d2r/dt2 = 48ti + 24tj

1. Tangent of the vector formula T = dr/dt / /dr/dt/

dr/dt = 3i + 3t2j + 2tk

t=1 = 3i + 3j + 2k

magnitude = 34

hence unit tangent vector = 3i + 3j + 2k/ 34