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Chemical Engineering

MAT 102 Assignment

$$1 \quad x = 8t^3, \quad y = 4t^3 - 7t \quad \& \quad z = t + 3$$

$$\Rightarrow xi + yj + zk$$

$$\Rightarrow (8t^3)i + (4t^3 - 7t)j + (t + 3)k$$

$$\Rightarrow \text{Velocity} = (24t^2)i + (12t^2 - 7)j + k$$

$$\Rightarrow \text{Acceleration} = \frac{d(\text{Velocity})}{dt}$$

$$= (48t)i + (24t)j + 0k$$

$$\Rightarrow (48t)i + (24t)j$$

$$2 \quad x = 3t, \quad y = t^3 \quad \& \quad z = t^2$$

\neq

$$\Rightarrow (3t)i + (t^3)j + (t^2)k = r$$

$$\text{Unit tangent vector} = \frac{r(t)}{|r(t)|}$$

$$\Rightarrow |r(t)| = \sqrt{(3t)^2 + (t^3)^2 + (t^2)^2}$$

Where, $t = 1$

$$= \sqrt{(3)^2 + (1)^2 + (1)^2} = \sqrt{11}$$

$$\text{Unit tangent vector} = \frac{3ti + t^3j + t^2k}{\sqrt{11}}$$

$$\text{@ } t = 1$$

$$= \frac{3}{\sqrt{11}}i + \frac{1}{\sqrt{11}}j + \frac{1}{\sqrt{11}}k$$