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MATRIC NO: - 19/ENG02/005

DEPARTMENT: - COMPUTER ENGINEERING

1.)  $x = 8t^3, y = 4t^3 - 7t, z = t + 3$

i) Velocity =  $\frac{dr}{dt}$

$$r = x_i + y_j + z_k$$
$$r = 8t^3 i + (4t^3 - 7t)j + (t + 3)k$$

$$\frac{dr}{dt} = 24t^2 i + (12t^2 - 7)j + k //$$

ii) Acceleration  $\left(\frac{d^2r}{dt^2}\right) = 48t i + 24t j //$

2.)  $T = \frac{dr/dt}{\left|\frac{dr}{dt}\right|}$

$$r = 3t i + t^3 j + t^2 k$$

$$\frac{dr}{dt} = 3i + 3t^2 j + 2t k$$

at  $t = 1$

$$\frac{dr}{dt} = 3i + 3j + 2k$$

$$\left|\frac{dr}{dt}\right| = \sqrt{3^2 + 3^2 + 2^2}$$

$$= \sqrt{9 + 9 + 4}$$
$$\left| \frac{dr}{dt} \right| = \sqrt{22}$$

$$\underline{T = \frac{3i + 3j + 2k}{\sqrt{22}}}$$
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