

⇒ Analytical Solution:-

$$\frac{dx}{dt} = xt^2 + 1 \cdot y = y(t^2 + 1)$$

$$\int \frac{dy}{y} = \int (t^2 + 1) dt$$

$$\ln y = \frac{t^3}{3} + 1 \cdot t + \ln C$$

$$y(0) = 1 \Rightarrow \text{Given}$$
$$\frac{t^3}{3} + 1 \cdot t$$

$$y = Ce$$

$$1 = Ce \Rightarrow C = 1$$

$$y = e^{\frac{t^3}{3} + 1 \cdot t}$$