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MECHANICAL ENGINEERING

Question 1a

Dynamic equation refers to difference equation in discrete time, differential equation in continuous time, time scale calculus in combined discrete time and continuous time.

Question 1b

To develop an O.D.E for the system

$$y = Ate^t \quad - (1)$$

Since there is only one constant

$$\therefore \frac{dy}{dt} = Ae^t \quad - (2)$$

$$\text{from } A = \frac{dy}{dt} \cdot \frac{1}{e^t} \quad - (3)$$

Substituting (3) in eqn (1)

$$y = Ate^t$$

$$\therefore y = \frac{dy}{dt} \cdot \frac{1}{e^t} \times t e^t$$

$$\therefore y = \frac{dy}{dt} t$$