

Hyalpatubda diolama Manasseh
 19/EN601/016
 Chemical Engineering

1. Given that

$$s = 0.5t^3 \text{ m}$$

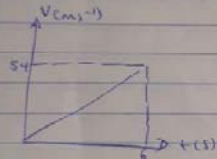
$$v = \frac{ds}{dt} = 1.5t^2$$

at $t = 6$

$$v = 1.5(6)^2 = 54$$

$$s_2 = 108 \text{ m}$$

$$v = \frac{ds}{dt} = 0 \text{ ms}^{-1}$$



$$3. v = (0.25s) \text{ ms}^{-1}$$

$$a = v \left(\frac{dv}{ds} \right)$$

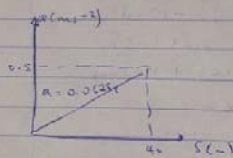
$$a = 0.25s(0.25)$$

$$a = 0.0625s \text{ ms}^{-2}$$

$$\text{at } s = 40 \text{ m}$$

$$a = 0.0625(40)$$

$$a = 2.5 \text{ ms}^{-2}$$



2. Given that

$$v = -4t + 80$$

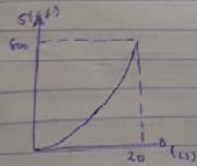
$$s = \int v dt$$

$$s = \int_0^{20} (-4t + 80) dt$$

$$s = -2t^2 + 80t$$

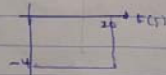
at $t = 20$

$$s = 800 \text{ ft}$$



$$a = \frac{dv}{dt}$$

$$a = -4 \text{ ft/s}^2$$



[a-t graph]
 $a(t \text{ in } s)$

$$4. s = 3t^2$$

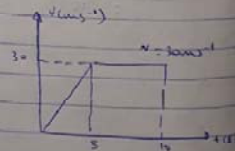
$$v = 6t$$

At $t = 5$

$$v = 6 \times 5 = 30 \text{ ms}^{-1}$$

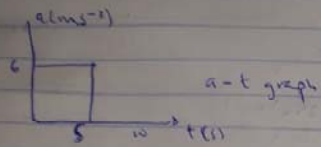
$$s = 30t - 7.5$$

$$= 30 \text{ ms}^{-1}$$



$$v = 6t \text{ ms}^{-1} \quad v = 30 \text{ ms}^{-1}$$

$$a = 6 \text{ ms}^{-2} \quad a = 0 \text{ ms}^{-2}$$



$$5. \quad a = 20 \text{ ms}^{-2} \quad a = -10 \text{ ms}^{-2}$$

$$\int du = \int a \cdot dt$$

$$= 20t$$

$$\text{At } t = 5$$

$$v = 100 \text{ ms}^{-1}$$

$$\int_{100}^v du = \int_5^t -10 \cdot dt$$

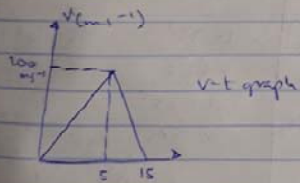
$$v - 100 = -10(t - 5)$$

$$v = (-10t + 150) \text{ ms}^{-1}$$

$$\text{At } v = 0$$

$$-150 = -10t$$

$$t = 15$$



$$6. \quad v = 30t$$

$$\int ds = \int v \cdot dt$$

$$\int_0^s ds = \int_0^t (30t) dt$$

$$s = 15t^2$$

$$\text{At } t = 5s$$

$$s = 15(5)^2$$

$$s = 375 \text{ m}$$