

Name: Key

ID:

Sec: 28

A car was moving from rest to rest. The v-t graph represents the straight line motion of the car, is given. What is the average speed traveled by the car from  $t = 0$  to  $t = 8$  hours?

1- Motion with uniform acceleration  $v(\text{Km/h})$

$$v_0 = 0, t = 2 \text{ h}, v = 20 \text{ Km/h}, x_1 = ?$$

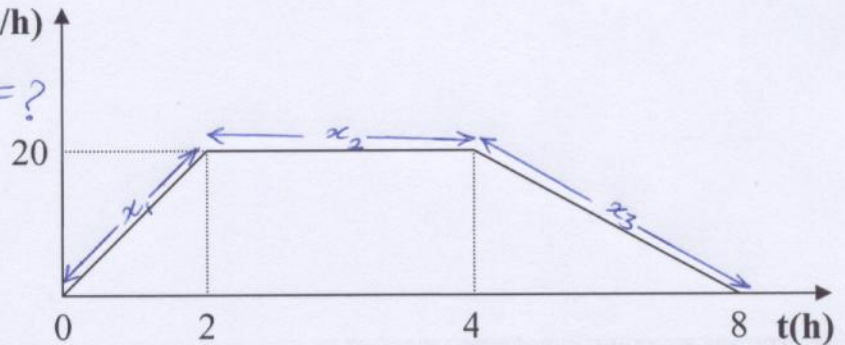
$$v = v_0 + at$$

$$20 = 0 + 2 \times a$$

$$a = 10 \text{ Km/h}^2$$

$$x = v_0 t + \frac{1}{2} at^2$$

$$x = 0 + \frac{1}{2} \times 10 \times (2)^2 = 20 \text{ m}$$



2- Motion with uniform velocity

$$v_0 = 20 \text{ Km/h}, t = 4 - 2 = 2 \text{ h}, x_2 = ?$$

$$v = \frac{x}{t} \Rightarrow x = vt$$

$$x_2 = 20 \times 2 = 40 \text{ m}$$

3- Motion with uniform deceleration

$$v_0 = 20 \text{ Km/h}, v = 0, t = 8 - 4 = 4 \text{ h}, x_3 = ?$$

$$v = v_0 + at$$

$$0 = 20 + 4a$$

$$a = -5 \text{ Km/h}^2$$

$$x = v_0 t + \frac{1}{2} at^2$$

$$x_3 = (20 \times 4) + \left(\frac{1}{2} \times -5 \times 4^2\right) = 40 \text{ m}$$

$$\text{Total distance } x = x_1 + x_2 + x_3 = 20 + 40 + 40 = 100 \text{ m}$$

$$\text{Average speed } s_{\text{avg}} = \frac{\text{total distance}}{\text{total time}} = \frac{100}{2+2+4} = \frac{100}{8}$$

$$s_{\text{avg}} = 12.5 \text{ Km/h}$$