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18/ENG08/024

BIOMEDICAL ENGINEERING

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Biomedical Eng
Mechanics

1) $s = 0.5t^2$
 $v = \frac{ds}{dt} = 1.5t^2 \text{ m/s}$
at $t = 6$
 $v = 1.5(6)^2 = 54 \text{ m/s}$
 $s = 108$
 $v = \frac{ds}{dt} \quad v = \text{m/s}$
 $v-t \text{ graph}$

2.) $v = -4t + 80$
 $a = \frac{dv}{dt} = -4 \text{ m/s}^2$
at $t = 20$
 $a = 4 \text{ m/s}^2$
 $s = s_0 + v_0 t + \frac{1}{2} a t^2$
 $s = (-2(20)^2 + 80(20)) - (-2(0)^2 + 80(0))$
 $s = 800 \text{ m}$
 $a \text{ (m/s}^2)$

$s-t \text{ graph}$
 $a-t \text{ graph}$

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$v = 0.25$
 $a = v \left(\frac{dv}{ds} \right)$
 $a = 0.25 \times (0.25)$
 $a = (0.0625 \text{ s}) \text{ m/s}$
at $s = 40 \text{ m}$
 $a = (0.0625 (40))$
 $a = 2.5 \text{ m/s}^2$

$s = 3t^2$ $s = 30t - 75$
 $v = ds/dt = 6t$
at $t = 5$
 $v = 6(5) = 30 \text{ m/s}$
 $a = \frac{dv}{dt} = 6 \text{ m/s}^2$
 $a = 6 \text{ m/s}^2$

3) $a = 20 \text{ m/s}^2$
 $a = -10 \text{ m/s}^2$
 $s \, dv = 59 - 3t$
 $Sv = 5t^2 - 20.8t$
 $v = 20t$
at $t = 5$
 $v = 100 \text{ m/s}$

$$S_{\text{needed}} = st - 10.8t$$

$$1 - 100 = -10(t - 5)$$

$$V - 100 = -10t + 50$$

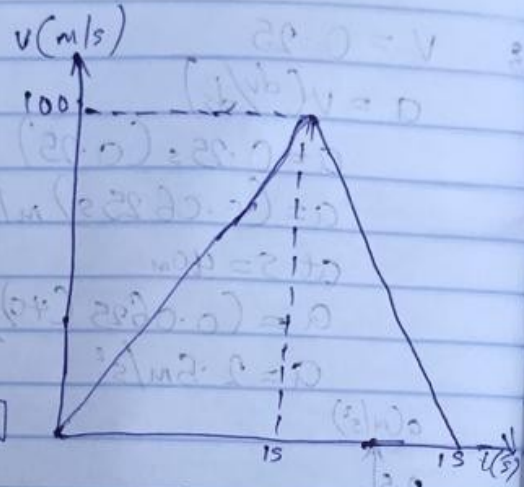
$$V = (-10t + 150) \text{ m/s}$$

$$\text{at } V = 0$$

$$0 = 10t + 150$$

$$-156 = -10t$$

$t = (s)$ [for car do come to rest]



$$V = 30t$$

$$S = Svdt = (15 + 2)$$

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

$$= 15(3)^2$$

$$= 375 \text{ m}$$

$$V = 15t + 225$$

$$S = Svdt = -7.5t^2 + 225t$$

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

$$= 15(3)^2$$

$$= 375 \text{ m}$$

$$V = 15t + 225$$

$$S = Svdt = -7.5t^2 + 225t$$

$$\text{at } t = t_2 - t_1 = 15 - 5 = 10$$

$$\text{at } t = 10$$

$$7.5(10)^2 + (225)(10)$$

$$= 1500 \text{ m}$$

$$\text{total distances traveled}$$

$$= 375 + 1500$$

$$= 1875 \text{ m}$$

