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MATRIC NO: 18/ENG05/003

DEPARTMENT: MECHATRONICS

COURSE TITLE: ENGINEERING MECHANICS

COURSE CODE: ENG 234

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#8 / ENG05/003

MECHATRONICS

ENG 234

ASSIGNMENT

F12-9 For $s = (0.5t^3)m$

For $s = (108m)$

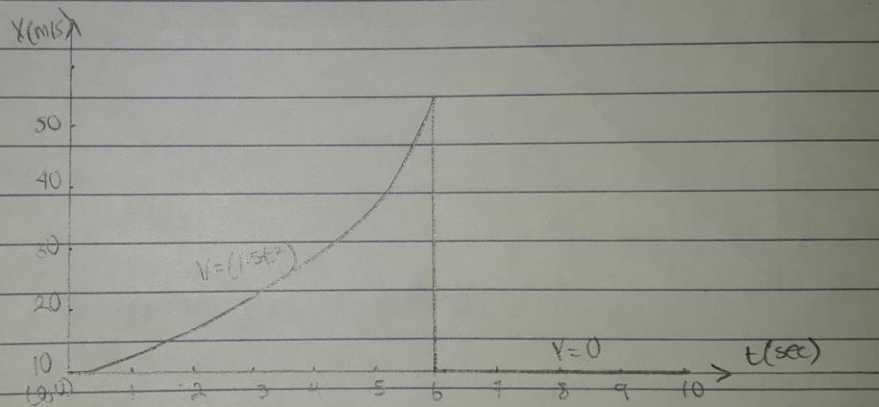
$$v = \frac{ds}{dt} = (1.5t^2)m/s$$

$$v = 0m/s$$

at $t=6$, $v_e = 54m/s$

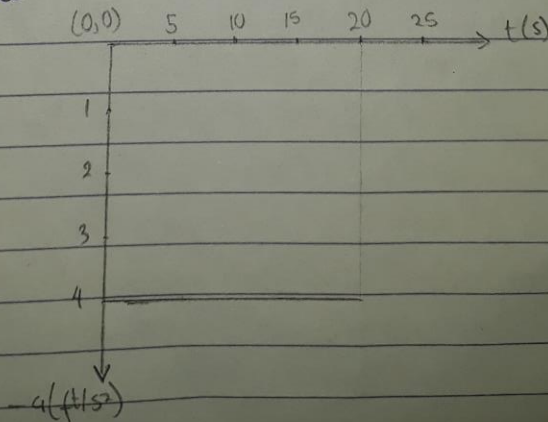
$$v_5 = 37.5m/s, v_0 = 0m/s$$

$$v_1 = 1.5m/s$$



F12-10 For $v = (-4t + 80)ft/s$

$$a = \frac{dv}{dt} = -4ft/s^2$$



FR-12

For $s = 3t^2 \text{ m}$

$v = 6t \text{ m/s}$

At $t = 5 \text{ s}$

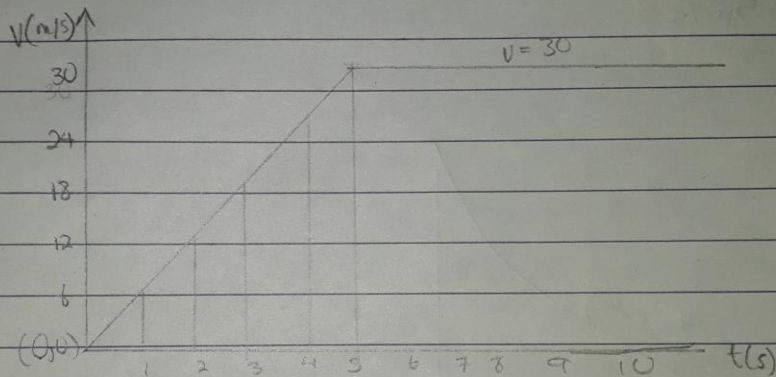
$v = 30 \text{ m/s}$

At $t = 4 \text{ s}$, $v = 24 \text{ m/s}$

At $t = 3 \text{ s}$, $v = 18 \text{ m/s}$

$s = (30t - 75) \text{ m}$

$v = 30 \text{ m/s}$

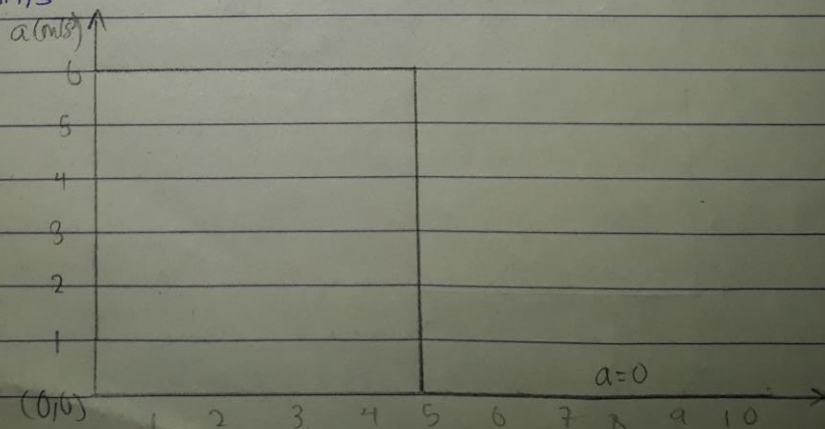


For $v = 6t \text{ m/s}$

$a = 6 \text{ m/s}^2$

For $v = 30 \text{ m/s}$

$a = 0 \text{ m/s}^2$



F12-13

For $a = 20 \text{ m/s}^2$

$$\int_0^v du = \int_0^t a \cdot dt$$

$$v = 20t$$

At $t = 5\text{s}$

$$v_5 = 100 \text{ m/s}$$

At $t = 4\text{s}$, $v_4 = 80 \text{ m/s}$

At $t = 3\text{s}$, $v_3 = 60 \text{ m/s}$

For $a = -10 \text{ m/s}^2$

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

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

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

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

When the car comes to rest ; $v = 0 \text{ m/s}$

$$0 = -10t + 150$$

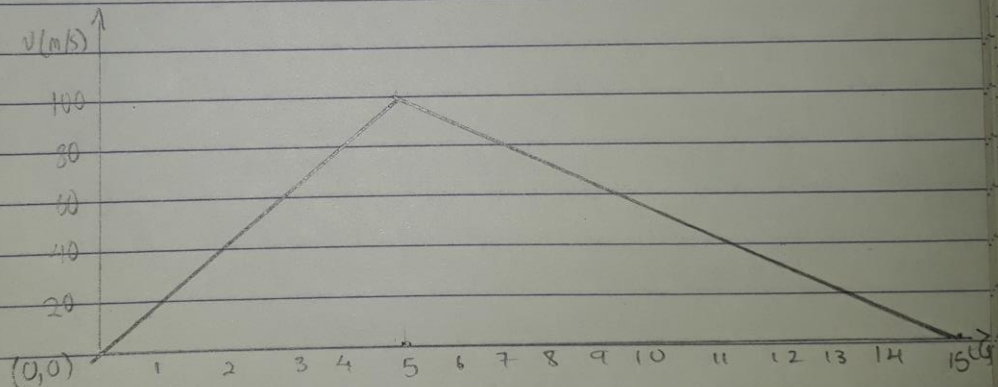
$$-150 = -10t$$

$$t = 15 \text{ sec}$$

At $t = 10\text{s}$, $v = 50 \text{ m/s}$

At $t = 8\text{s}$, $v = 70 \text{ m/s}$

At $t = 12\text{s}$, $v = 30 \text{ m/s}$



F12-14 For $\omega = (30t) \text{ m/s}$

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

$$s = (15t^2) \text{ m}$$

At $t = 5\text{s}$, $s = 375 \text{ m}$

At $t = 4\text{s}$, $s = 240 \text{ m}$

At $t = 2\text{s}$, $s = 60 \text{ m}$