

MECHANICS

NAME: OJIJI

AMOROBAN

CATHERINE

MATRIC NO.: 18/

ENG01/015

DEPT. :

CHEMICAL

ENGINEERING

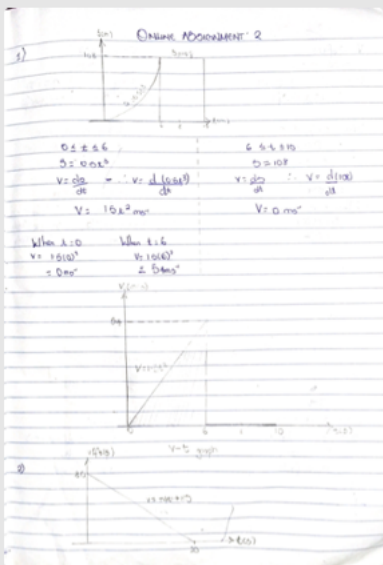
COURSE. :

ENGINEERING

MECHANICS

ENG234

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S-t

$$V = 80 \text{ ft/s}$$

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

$$S = \int v dt = \int 80 dt$$

$$S = (80t + c) \text{ ft}$$

$$\text{When } s=0, t=0$$

$$0 = 80(0) + c$$

$$c=0$$

$$\therefore S = 80t$$

$$\text{When } t=0$$

$$s = 80(0)$$

$$= 0 \text{ ft}$$

$$V = -4t + 80$$

$$t \geq 0$$

$$S = \int v dt = \int -4t + 80$$

$$S = (-2t^2 + 80t + c) \text{ ft}$$

$$\text{When } s=0, t=0$$

$$0 = -2(0)^2 + 80(0) + c$$

$$c=0$$

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

$$\text{When } t=0$$

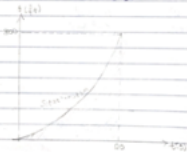
$$s = -2(0)^2 + 80(0)$$

$$= 0 \text{ ft}$$

$$\text{When } t=2$$

$$s = -2(2)^2 + 80(2)$$

$$= 152 \text{ ft}$$



a-t

$$v = 80 \text{ ft/s}$$

$$a = \frac{dv}{dt} = \frac{d(80)}{dt}$$

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

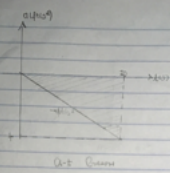
S-t

$$V = -4t + 80$$

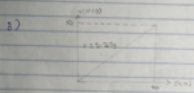
$$a = \frac{dv}{dt} = \frac{d(-4t + 80)}{dt}$$

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

RD
k/A
100



ant = 20
v = 20
100 ft



$$v = (0.20t) \text{ m/s}$$

$$\frac{dv}{dt} = 0.20$$

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

$$\therefore a = \frac{dv}{dt} = 0.20 \times \frac{dt}{dt} \Rightarrow a = 0.20 \frac{dt}{dt}$$

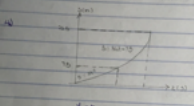
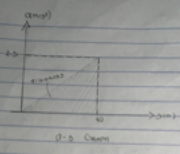
$$\text{but } \frac{dt}{dt} = v = 0.20t$$

$$\therefore a = 0.20 \times 0.20t$$

$$= (0.04t) \text{ m/s}^2$$

When $t=0$
 $a = (0.04 \times 0)$
 $= 0 \text{ m/s}^2$

When $t=10$
 $a = (0.04 \times 10)$
 $= 0.4 \text{ m/s}^2$



$0 \leq t \leq 5$
 $\phi = 3t^2$

$$v = \frac{d\phi}{dt} = \frac{d(3t^2)}{dt}$$

$$= (6t) \text{ m/s}$$

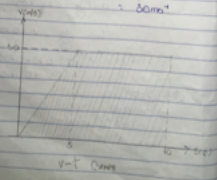
When $t=0$
 $v = 6(0)$
 $= 0 \text{ m/s}$

When $t=5$
 $v = 6(5)$
 $= 30 \text{ m/s}$

$5 \leq t \leq 10$
 $\phi = 30t - 75$

$$v = \frac{d\phi}{dt} = \frac{d(30t - 75)}{dt}$$

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



5.

a-t

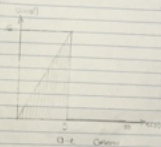
$0 \leq t \leq 5$

$s = 6t^2$

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

$= \frac{d(6t^2)}{dt} = \frac{d(6t^2)}{dt}$

$= 12t$



$5 \leq t \leq 10$

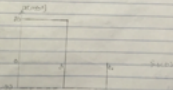
$s = 30t - 5$

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

$= \frac{d(30t - 5)}{dt} = \frac{d(30t - 5)}{dt}$

$= 30$

B.



$0 \leq t \leq 5$

$a = 20 \text{ ms}^{-2}$

$v = \int a dt$

$\int_0^5 v = \int_0^5 20$

$v = 20t$

$5 \leq t \leq 10$

$a = -10 \text{ ms}^{-2}$

$\int_5^{10} v = \int_5^{10} a dt = \int_5^{10} -10$

$\int_5^{10} v = \int_5^{10} -10$

When $t=0$, then $t=0$

$v = 20(0)$

$= 100 \text{ ms}^{-2}$

$v = 20(5)$

$= 100 \text{ ms}^{-2}$

$V=100 = [(-10)t^2] - (-100)$

$\cdot v=100 = -10t^2 + 100$

$\text{when } v=100 \text{ then } v = (-10t^2 + 100) \text{ ms}^{-2}$

When $v=0$ then $t=?$

$0 = -10t^2 + 100$

$10t^2 = 100$

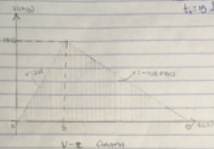
$t = 10 \text{ sec}$

When $t=0$

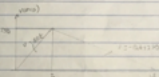
$s = 15(0)^2$

$= 0$

< 0



6)



$0 \leq t \leq 5$

$v = 30t$

$\int_0^5 ds = \int_0^5 v dt$

$\int_0^5 ds = \int_0^5 30t dt$

$s = \frac{30t^2}{2} = 15t^2 \text{ m}$

$5 \leq t \leq 10$

$v = 10t + 20$

$\int_5^{10} ds = \int_5^{10} v dt$

$\int_5^{10} ds = \int_5^{10} (-10t + 20) dt$

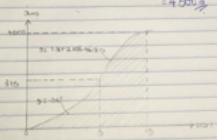
$s = 30 = \left[\frac{-10t^2}{2} + 20t \right]_5^{10}$

When $t=0$
 $S = 15(0)^2$
 $= 0m$

When $t=5$
 $S = 15(5)^2$
 $= 375m$

$S = 375 \left[\frac{(15(5))^2 + 225(5)}{2} - \frac{(15(5))^2 + 225(5)}{2} \right]$
 $S = 375 = \left[\frac{1125^2 + 225(5)}{2} - \frac{1125^2}{2} \right]$
 $S = (75t^2 + 225t - 0.625t^3)m$

When $t=15$ $S = ?$
 $S = 75(15)^2 + 225(15) - 0.625$
 $= 4500g$



S. & Graph