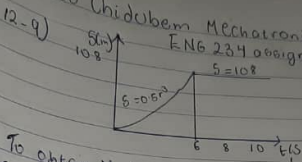


Nwosu Chidubem Mechanical 191ENG061037 22-05-2024  
 ENG 234 assignment



To obtain  $V-t$  graph  
 Consider the two intervals  
 and two equations  
 eqn(i) -  $s = 0.5t^2$  at a  
 time interval of  $0 < t < 6s$

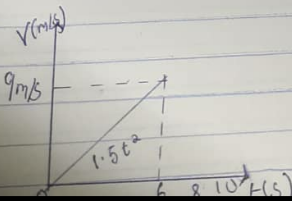
eqn(ii) -  $s = 108$  at time  
 interval  $6 < t < 10s$

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

22<sup>6</sup>) i)  $\frac{ds}{dt} = 3 \times 0.5t^2 = 1.5t^2$

ii)  $\frac{ds}{dt} = 108 = 0$

3<sup>7</sup>  $V-t$  graph



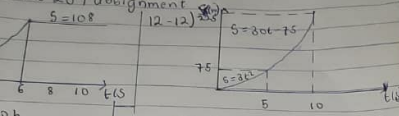


You

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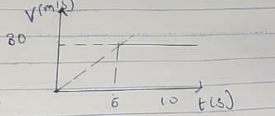


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To obtain a-t graph  
 eqn (i)  $s = 6t^2$   
 i)  $v = \frac{ds}{dt} = 6t$   
 ii)  $v = \frac{ds}{dt} = 30 \text{ m/s}$

eqn (ii) interval  $0 < t < 5$   
 eqn (ii) interval  $6 < t < 10$

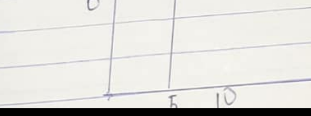


for the a-t graph  
 further differentiate velocity  
 $a = \frac{dv}{dt}$

i)  $a = 6 \text{ m/s}^2$  for eqn (i)

ii)  $a = 0 \text{ m/s}^2$  for eqn (ii)

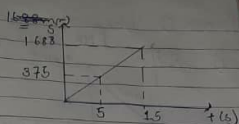
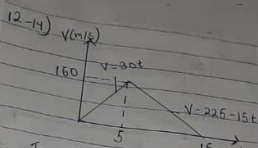
because velocity is changing.





You

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To construct  $s-t$  graph  
integrate both equations.

eqn i at interval  
 $0 \leq t \leq 5$

$$v = 30t$$

$$s = \int v$$

$$s = \int 30t$$

$$s = 30ft$$

$$s = \frac{30t^2}{2}$$

$$s = [15t^2]_0^5$$

eqn ii at interval

$$5 \leq t \leq 15$$

$$v = 225 - 15t$$

$$s = \left[ \frac{225t - 15t^2}{2} \right]_5^{15}$$

for eqn(i) at  $t=5$

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

$$= 375m$$

for eqn(ii) at  $t=15$

$$s = \frac{225(15) - 15(15)^2}{2}$$



You

Today, 14:17



$s-t$  graph equations  
 interval

$v = -4t + 80$

To get  $a-t$  graph  
 differentiate  $v$   
 $a = \frac{dv}{dt} = \underline{\underline{-4 \text{ m/s}^2}}$

$a(\text{m/s}^2)$   
 $-4$   
 $-a(\text{m/s}^2)$

To get  $s-t$  graph  
 integrate  $v$   
 $s = \int v = -2t^2 + 80t$   
 a)  $t=0$   $s=0$ , so b)  $t=20$   
 $s = -2(20)^2 + 80(20) = \underline{\underline{800 \text{ m}}}$

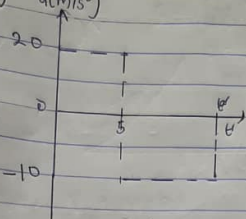
$s(\text{m})$   
 $800$   
 $20$   
 $t(\text{s})$

$375 \text{ m}$   
 $t = 15$   
 $s = \frac{-15(15)^2}{2}$   
 $-1687.5$   
 $687.5 \approx 400$



You

Today, 14:29

12-13)  $a(\text{m/s}^2)$ To obtain  $v-t$  graph

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

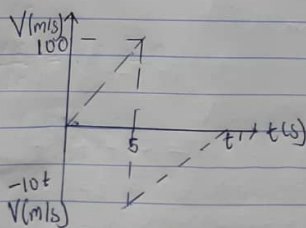
$$v_1 = \int a = 20t \text{ (m/s)} \quad 20t \text{ (m/s)}$$

$$v_2 = \int a = -10t \text{ (m/s)}$$

$$\left[ \begin{array}{l} \text{① } t=5 \text{ for eqn 1} \\ 20(5) = 100 \text{ m/s} \end{array} \right]$$

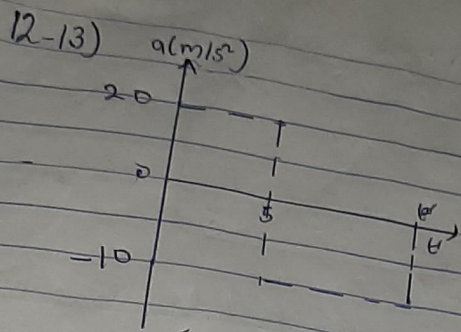
$$\text{② } t=t' \text{ for eqn 1)}$$

$$-10(t') = -10t' \text{ (m/s)}$$





$$v = v dv = a ds$$



To obtain  $v-t$  graph

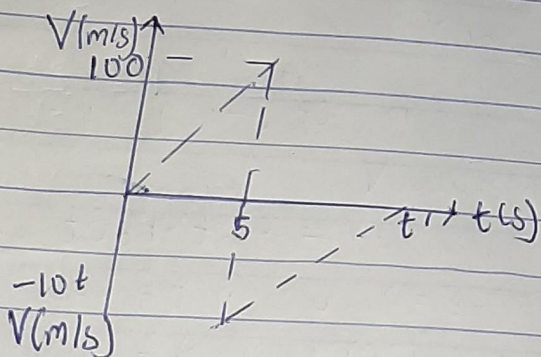
$$a = 20 \text{ m/s}^2$$

$$v_1 = \int a = 20t \text{ (m/s)} \quad 20t \text{ (m/s)}$$

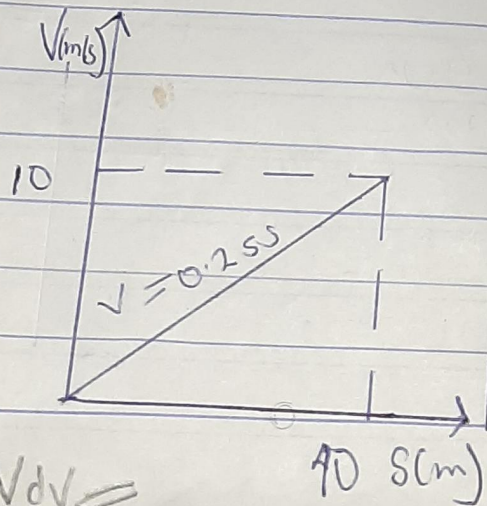
$$v_2 = \int a = -10t \text{ (m/s)}$$

①  $t = 5$  for eqn 1  
 $20(5) = 100 \text{ m/s}$

②  $t = t'$  for eqn 1  
 $-10(t') = -10t' \text{ (m/s)}$



12-11)



$$a = \frac{v}{t} \quad v dv =$$

40 s(m)

20-2

3rd part

$$v dv = a ds$$

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

$$v = 0.25s$$

$$\frac{dv}{ds} = 0.25$$

$$a = 0.25s \times 0.25$$

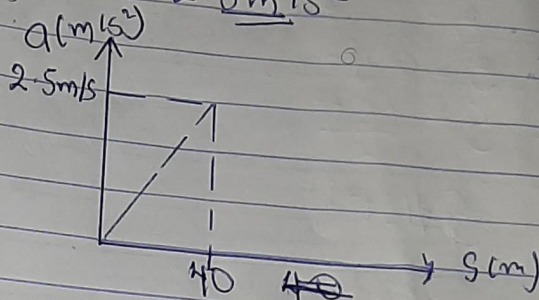
$$a = 0.0625 s \text{ (m/s}^2\text{)}$$

$$0 \leq s \leq 40$$

①  $s = 40 \text{ m}$

$$a = 0.0625 \times 40$$

$$= 2.5 \text{ m/s}^2$$



rating the equations of