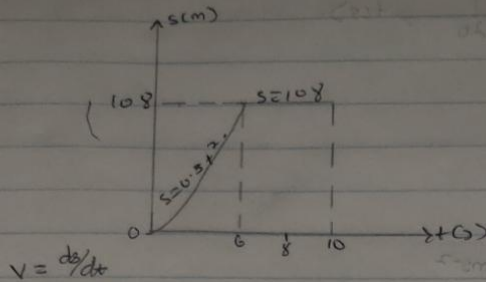


NAME: TUNDE- ADEJOLA SIMSOLUNIA
 MATRIC NO: 181ENG1081022
 DEPARTMENT: BIOMEDICAL ENGINEERING
 COURSE: ENGINEERING MECHANICS (ENG234)
 DATE: MAY 2020

D.



$$v = 1.5t^2$$

$$\text{at } t = 6\text{s,}$$

$$v = 1.5(6)^2$$

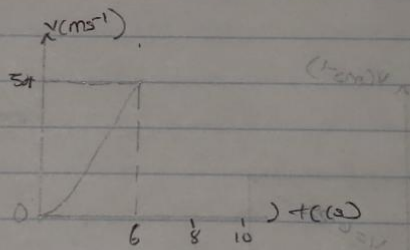
$$= 1.5 \times 36$$

$$= 54 \text{ m s}^{-1}$$

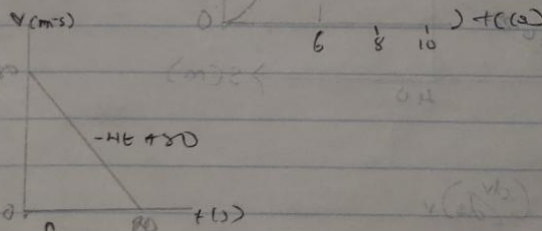
From $t = 6\text{s} - 10\text{s}$, $s = 10.8\text{m}$.

therefore, $v = 0$.

V-t graph.



2.



1.

$$s = \int v dt$$

$$s = \int (-4t + 80)$$

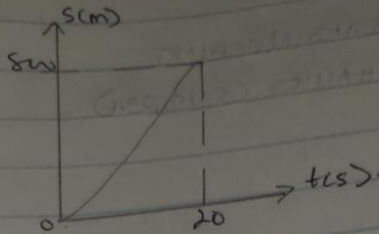
$$s = -2t^2 + 80t$$

$$\text{at } t = 20\text{s.}$$

$$s = -2(20)^2 + 80(20)$$

$$S = 1600 - 800 \approx 800 \text{ m}$$

S-t graph.



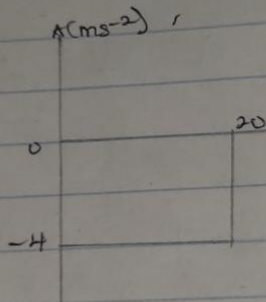
(b) Acceleration.

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

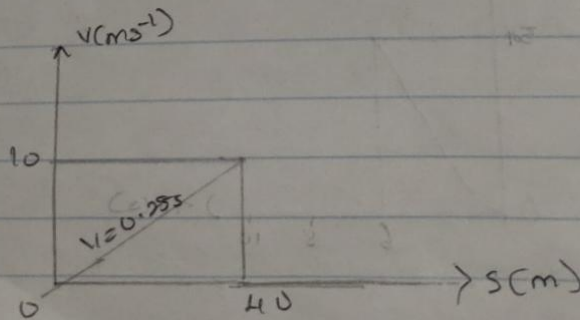
$$\therefore a = -4 \text{ ms}^{-2}$$

$$\text{at } t = 20 \text{ s, } a = -4 \text{ ms}^{-2}$$

A-t Graph. $a(\text{ms}^{-2})$



(3)



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

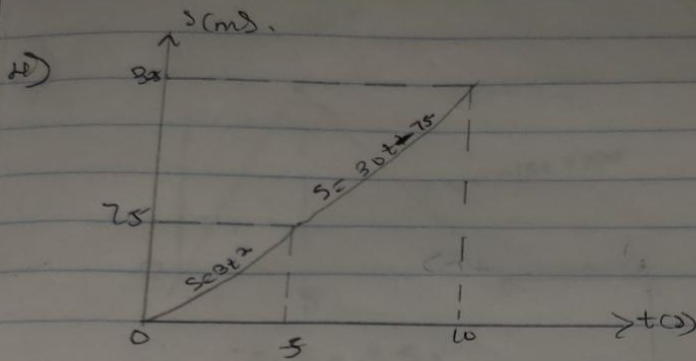
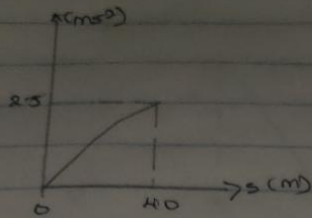
$$v = 0.25s$$

$$a = 10 \times d(0.25s) / ds$$

$$a = 10 \times 0.25$$

$$a = 2.5 \text{ ms}^{-2}$$

A-S Graph.



Velocity

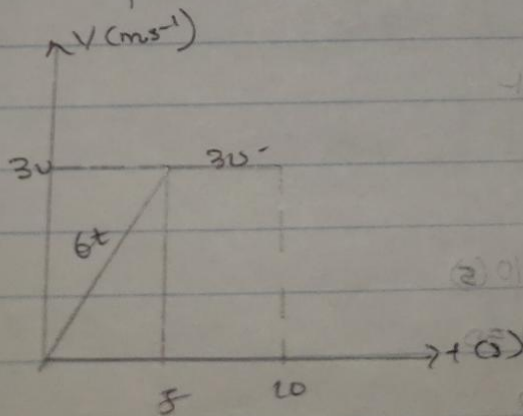
$$V = \frac{ds}{dt} = \frac{d(3t^2)}{dt} = 6t$$

at $t = 5s$

$$V = 6 \times 5$$

$$= 30 \text{ ms}^{-1}$$

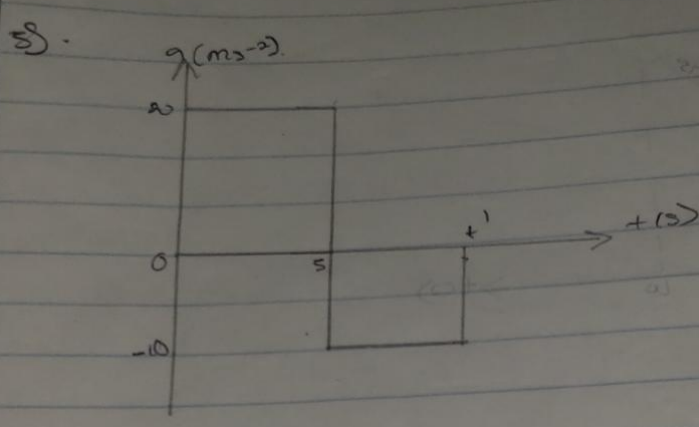
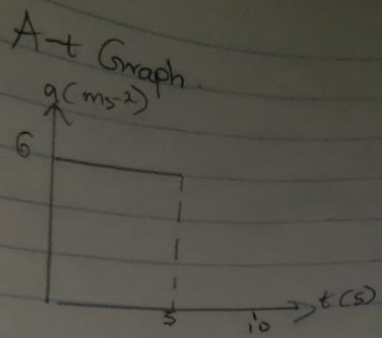
V-t Graph



Acceleration

$$a = \frac{dv}{dt} = 6 \text{ ms}^{-2}$$

at $t = 5s$, $a = 6 \text{ ms}^{-2}$, at



$$v = \int a dt$$

$$v = \int 20 dt$$

$$v = 20t$$

at 5s

$$v = 20 \times 5 = 100 \text{ ms}^{-1}$$

$$5s \leq t \leq t'$$

$$\int_{100}^v dv = \int_5^{t'} -10 dt$$

$$v - 100 = -10t \Big|_5^{t'}$$

$$v - 100 = -10t' + 10(5)$$

$$v - 100 = -10t' + 50$$

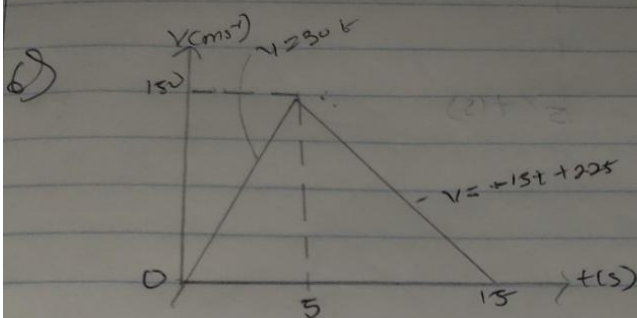
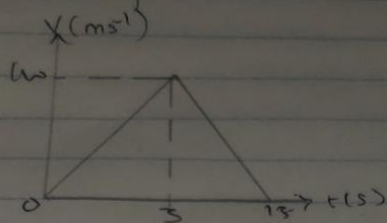
at t' , $v = 0$

$$0 - 100 = -10t' + 50$$

$$10t' = 150$$

$$t' = 15s$$

V-t Graph



$$0 \leq t \leq 5 \text{ s}$$

$$v = 30t$$

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

$$s = 15t^2 \Big|_0^5$$

$$s = 15(5)^2 - 15(0)^2$$

$$s = 15 \times 25$$

$$s = 375 \text{ m}$$

$$v = -15t + 225$$

$$\int_{375}^s ds = \int_5^{15} (-15t + 225) \, dt$$

$$s - 375 = \left. \frac{-15t^2}{2} + 225t \right|_5^{15}$$

$$s - 375 = \left[\frac{-15(15)^2}{2} + 225(15) \right] - \left[\frac{-15(5)^2}{2} + 225(5) \right]$$

$$s - 375 = \left[\frac{-15 \times 225}{2} + 3375 \right] - \left[\frac{-15 \times 25}{2} + 1125 \right]$$

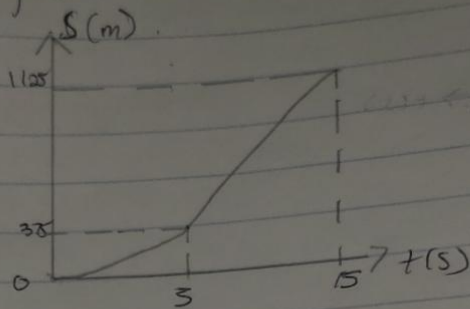
$$s - 375 = [-1687.5 + 3375] - [-937.5 + 1125]$$

$$s - 375 = +1687.5 - 937.5$$

$$s - 375 = 750$$

$$S = 1125 \text{ m}$$

S-t Graph



$$v = -12t + 302$$

$$v = 0$$

$$0 = -12t + 302$$

$$12t = 302$$

$$t = \frac{302}{12} = 25.1667$$

$$v = -12(25.1667) + 302 = -298 + 302 = 4$$

$$v = 4 \text{ m/s}$$

$$S = 1125$$

$$S = \frac{1}{2}at^2 + v_0t + S_0$$

$$1125 = \frac{1}{2}(-12)t^2 + 302t + 0$$

$$1125 = -6t^2 + 302t$$

$$6t^2 - 302t + 1125 = 0$$

$$t = \frac{302 \pm \sqrt{302^2 - 4 \cdot 6 \cdot 1125}}{2 \cdot 6}$$

$$t = \frac{302 \pm \sqrt{91204 - 27000}}{12}$$

$$t = \frac{302 \pm \sqrt{64204}}{12}$$

$$t = \frac{302 \pm 253.36}{12}$$

$$t_1 = \frac{302 + 253.36}{12} = \frac{555.36}{12} = 46.28$$

$$t_2 = \frac{302 - 253.36}{12} = \frac{48.64}{12} = 4.05$$

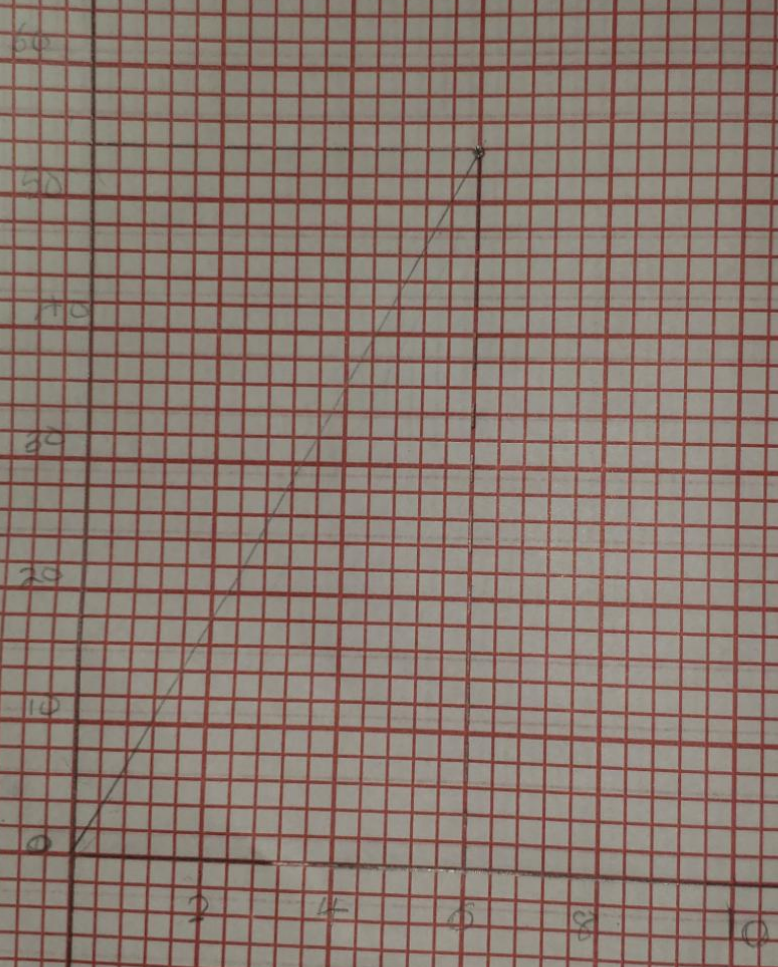
TDDC

2 cm represents 2 units on x axis.

2 cm represents 10 units on y axis.

Velocity - Time Graph

TITLE Graph of velocity against time (v-t)
NAME _____ DATE _____



$20 \times 2 = 40$
 $7500 + 70 \times 2 = 7100$
 $2 \times 70 = 140$

$1.6 \times 10^4 = 16000$
 $7500 + 70 \times 2 = 7100$
 $2 \times 70 = 140$
 $16000 - 7100 - 140 = 8760$

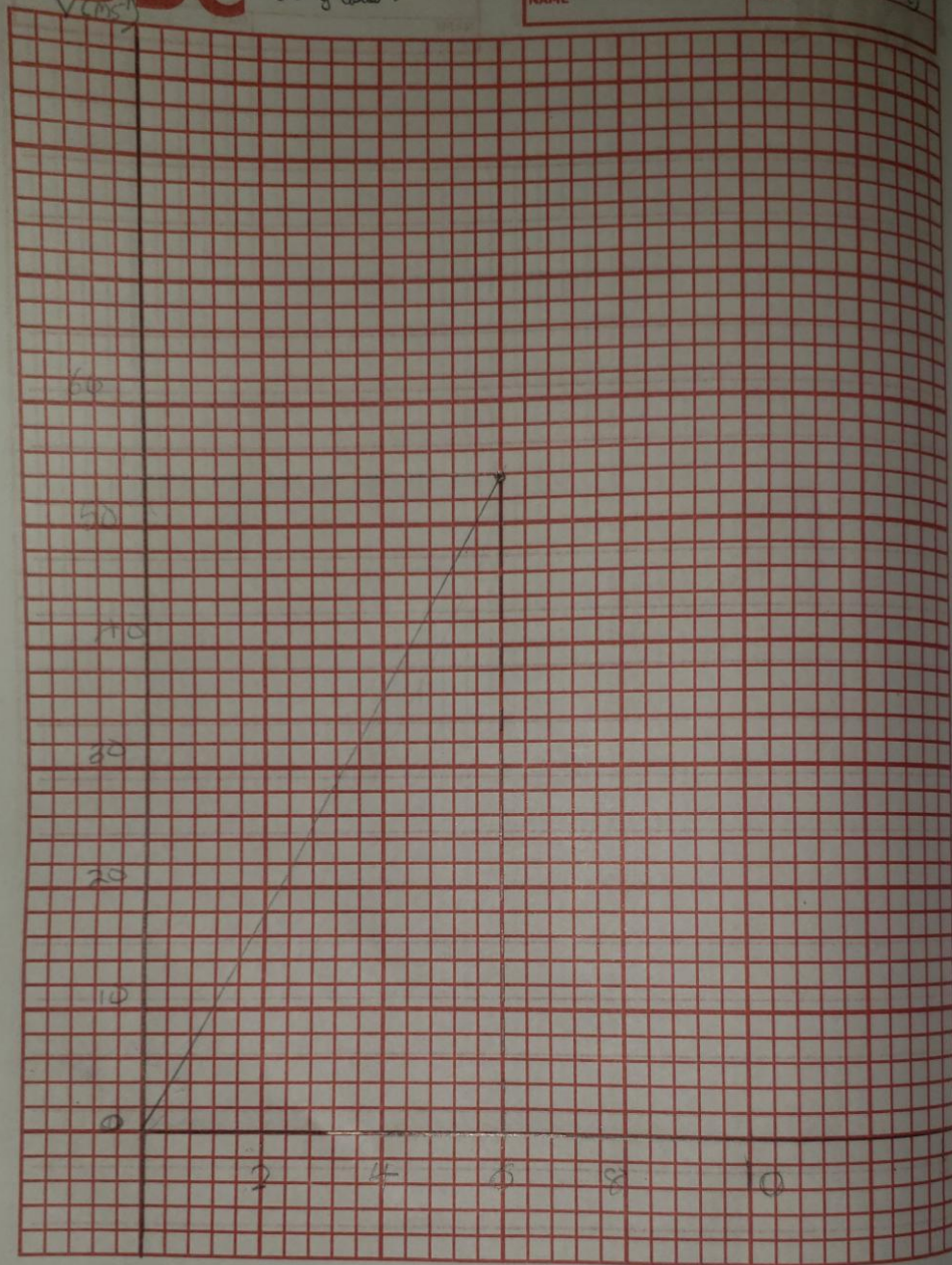
TDDC

2 cm represents 2 units on x axis.

2 cm represents 10 units on y axis.

Velocity - Time Graph.

TITLE Graph of velocity against time (v-t)
NAME _____ DATE _____



$$v = \frac{25 - 0}{2} = \frac{25 + 0 + 25}{2} = \frac{50}{2} = 25 \text{ m/s}$$

$$v = \frac{25 - 0}{2} = \frac{25 + 0 + 25}{2} = \frac{50}{2} = 25 \text{ m/s}$$

$$v = \frac{25 - 0}{2} = \frac{25 + 0 + 25}{2} = \frac{50}{2} = 25 \text{ m/s}$$

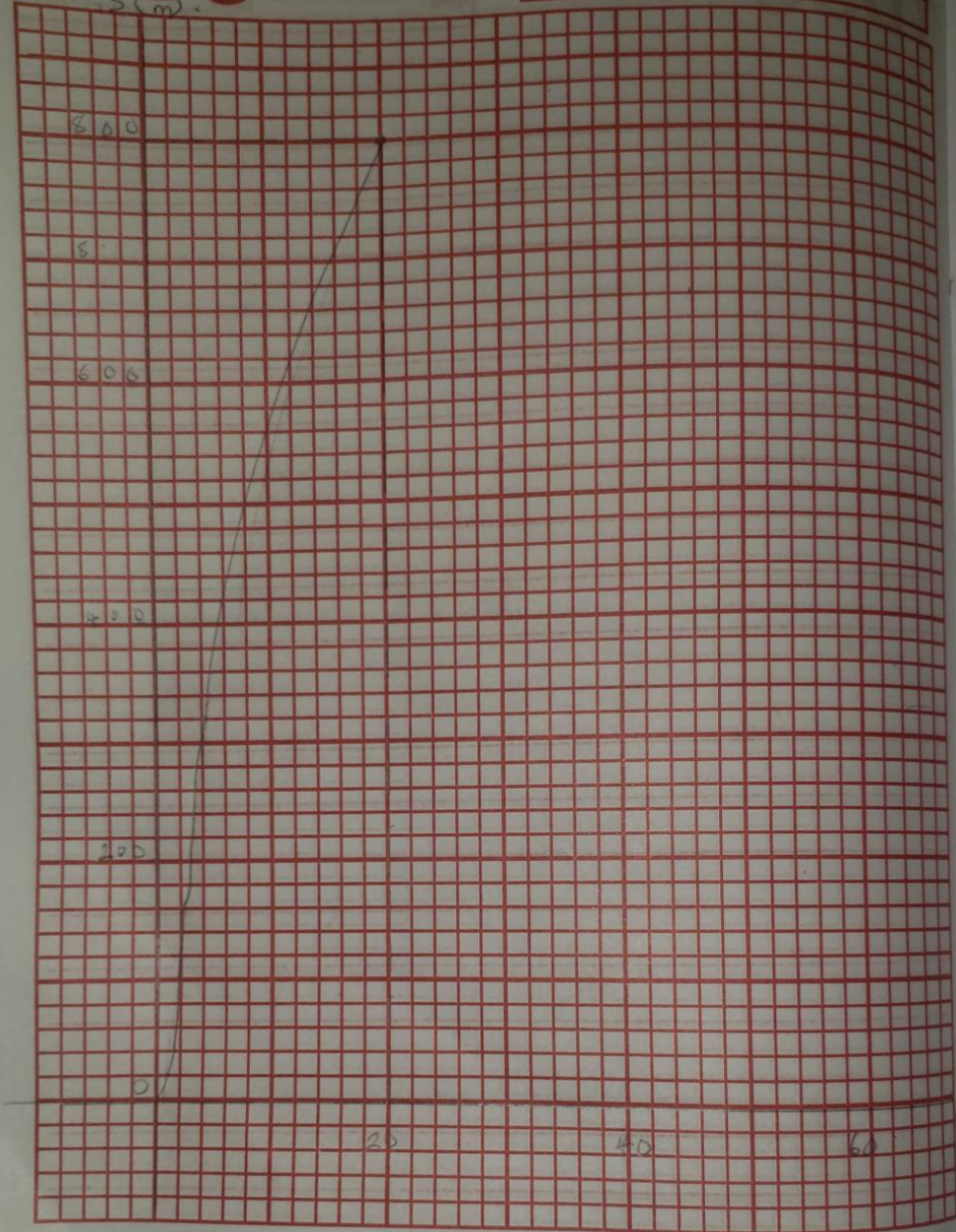
20

TDDC

S (m)

Scale on x axis: 4cm represents 20 units
Scale on y axis: 4cm represents 200 units

TITLE	Speed-Time Graph.
NAME	DATE



$$11 + 100 = 200 + 1000 = 2000$$

$$2000 \times 2 = 4000$$

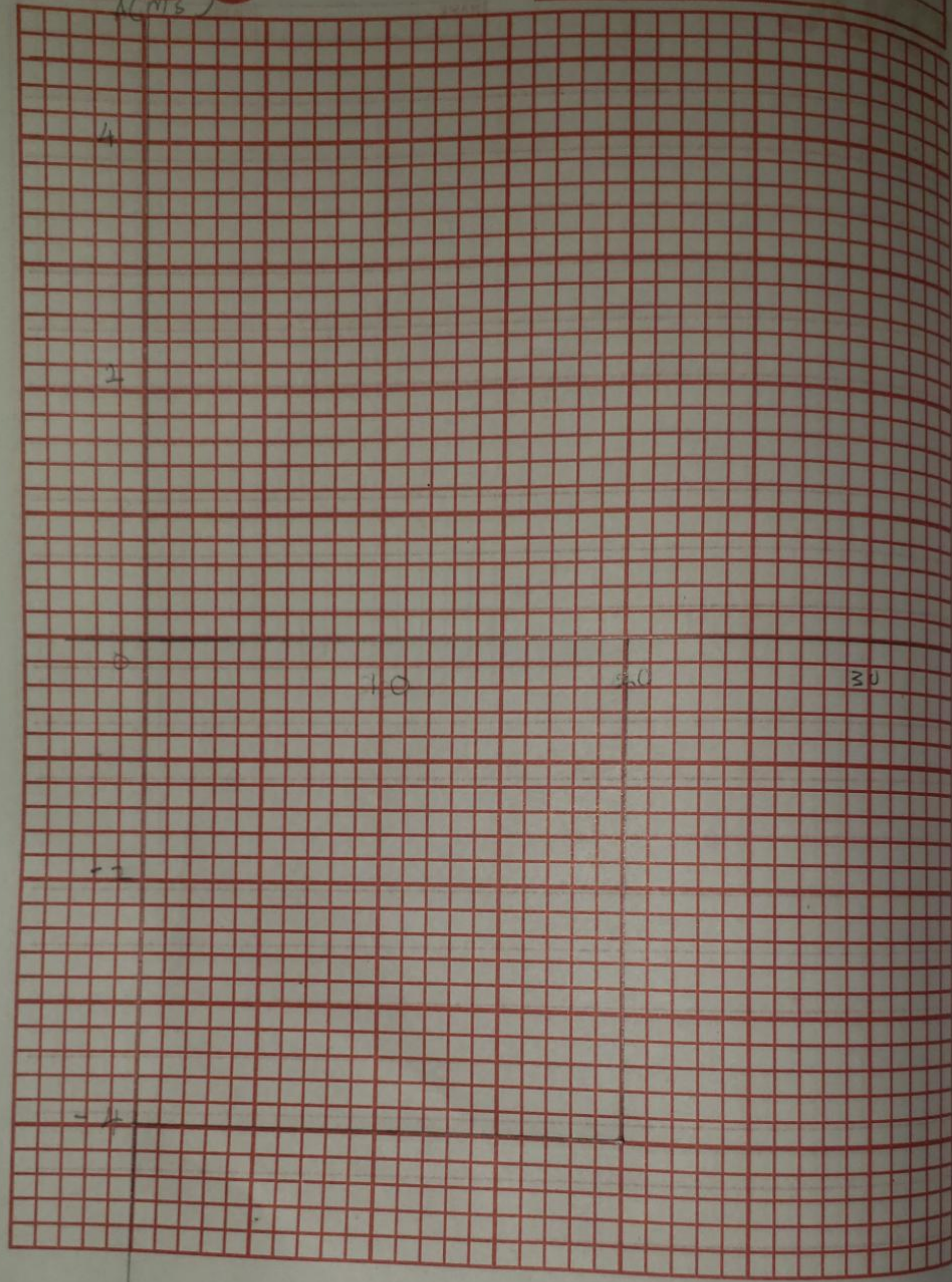
$$4000 \div 2 = 2000$$

16

Scale on + axis: 4 cm represents 10 s
Scale on a axis: 4 cm represents 2 m/s²

TDDC

TITLE Acceleration - Time Graph.
NAME _____ DATE _____



Handwritten notes on the bottom page of the notebook, including mathematical formulas and calculations:

$$s = ut + \frac{1}{2}at^2$$

$$v = u + at$$

$$v^2 = u^2 + 2as$$

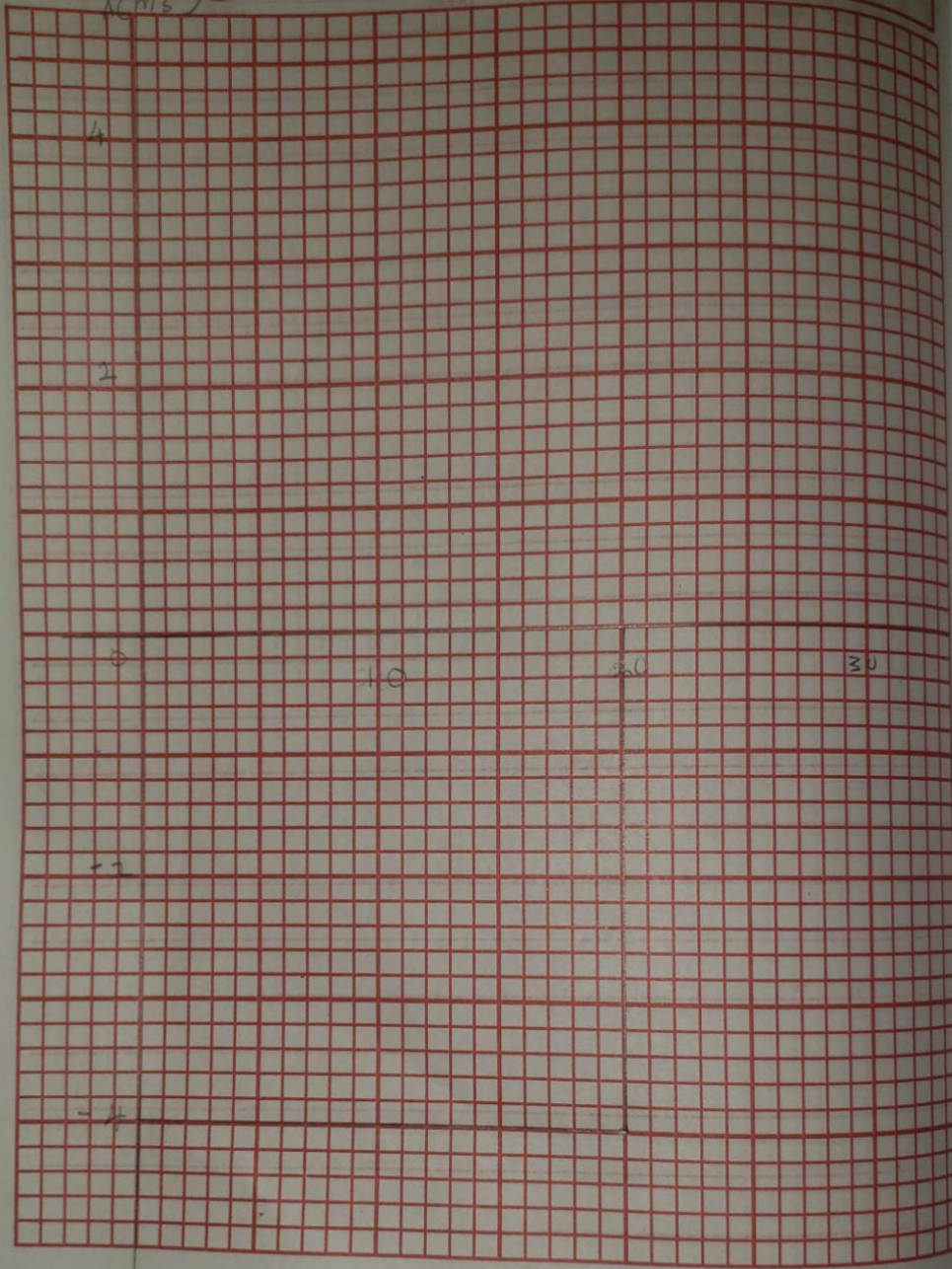
$$s = \frac{v^2 - u^2}{2a}$$

$$t = \frac{v - u}{a}$$

TDDC
N. 1115

Scale on x axis: 1 cm represents 1 sec
Scale on y axis: 1 cm represents 2 m/s²

TITLE Acceleration - Time Graph
NAME _____ DATE _____

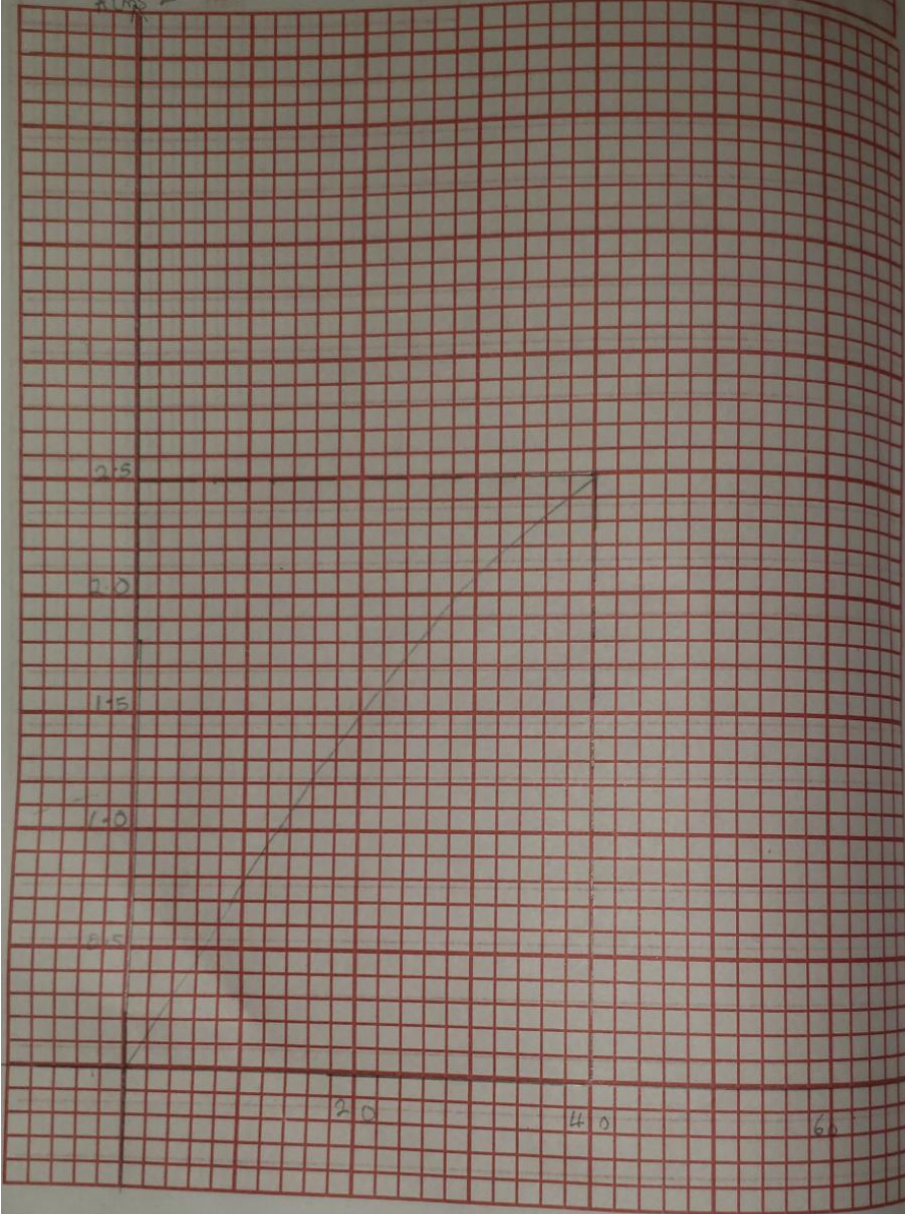


$$v = u + at$$
$$s = ut + \frac{1}{2}at^2$$
$$v^2 = u^2 + 2as$$

TDDC

Scale on S axis: 1cm represents 20ms
Scale on A axis: 2cm represents 0.5ms⁻²

TITLE Acceleration Speed Graph
NAME _____ DATE _____



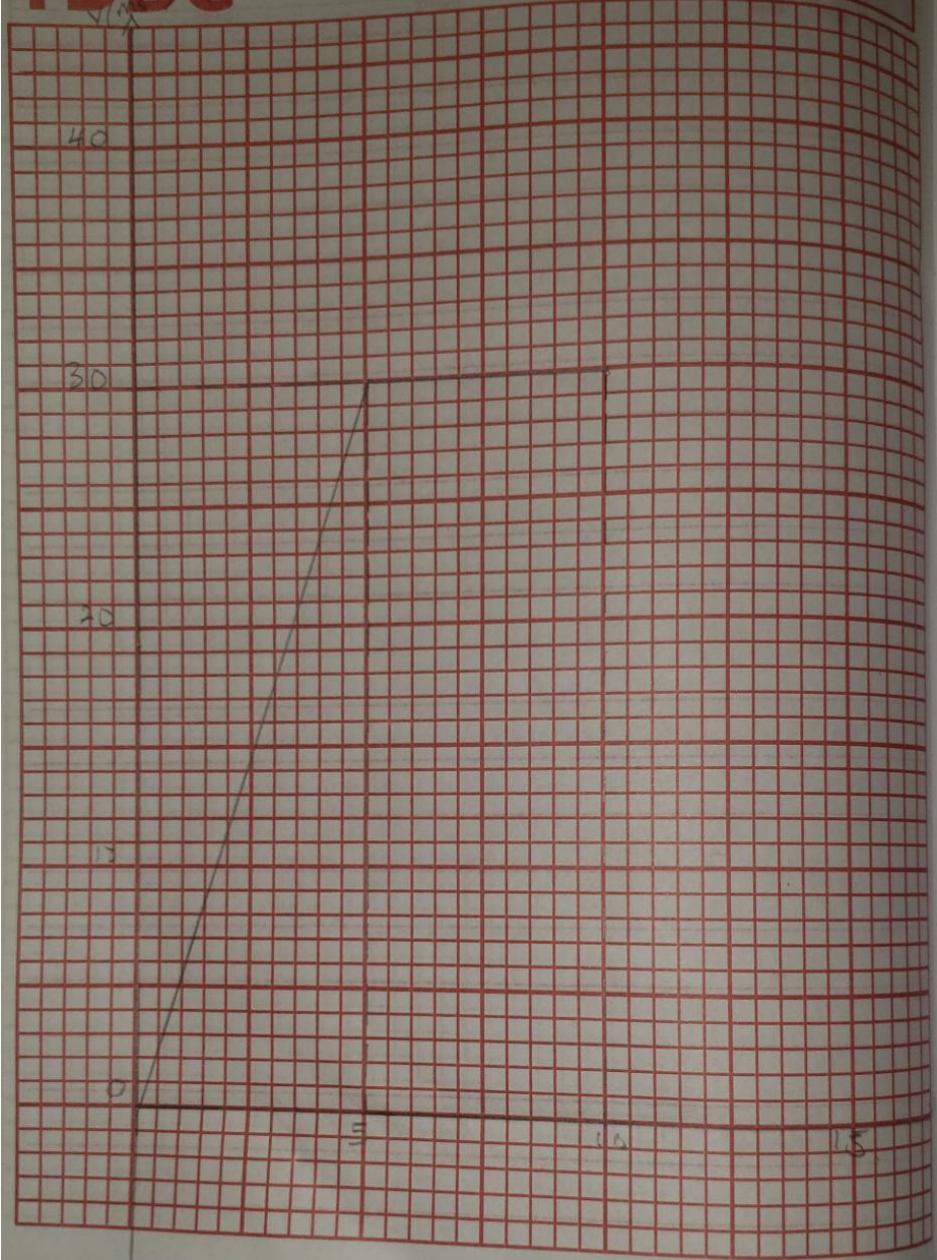
$$a = \frac{v}{t} = \frac{20}{2.5} = 8 \text{ ms}^{-2}$$
$$v = at = 8 \times 2.5 = 20 \text{ ms}$$
$$a = \frac{v}{t} = \frac{40}{2.5} = 16 \text{ ms}^{-2}$$
$$v = at = 16 \times 2.5 = 40 \text{ ms}$$
$$a = \frac{v}{t} = \frac{60}{2.5} = 24 \text{ ms}^{-2}$$
$$v = at = 24 \times 2.5 = 60 \text{ ms}$$

2)

TDDC

Scale on t axis 4cm represents 5 sec
 Scale on v axis 4cm represents 10 m/s

TITLE Velocity-Time Graph
 NAME _____ DATE _____



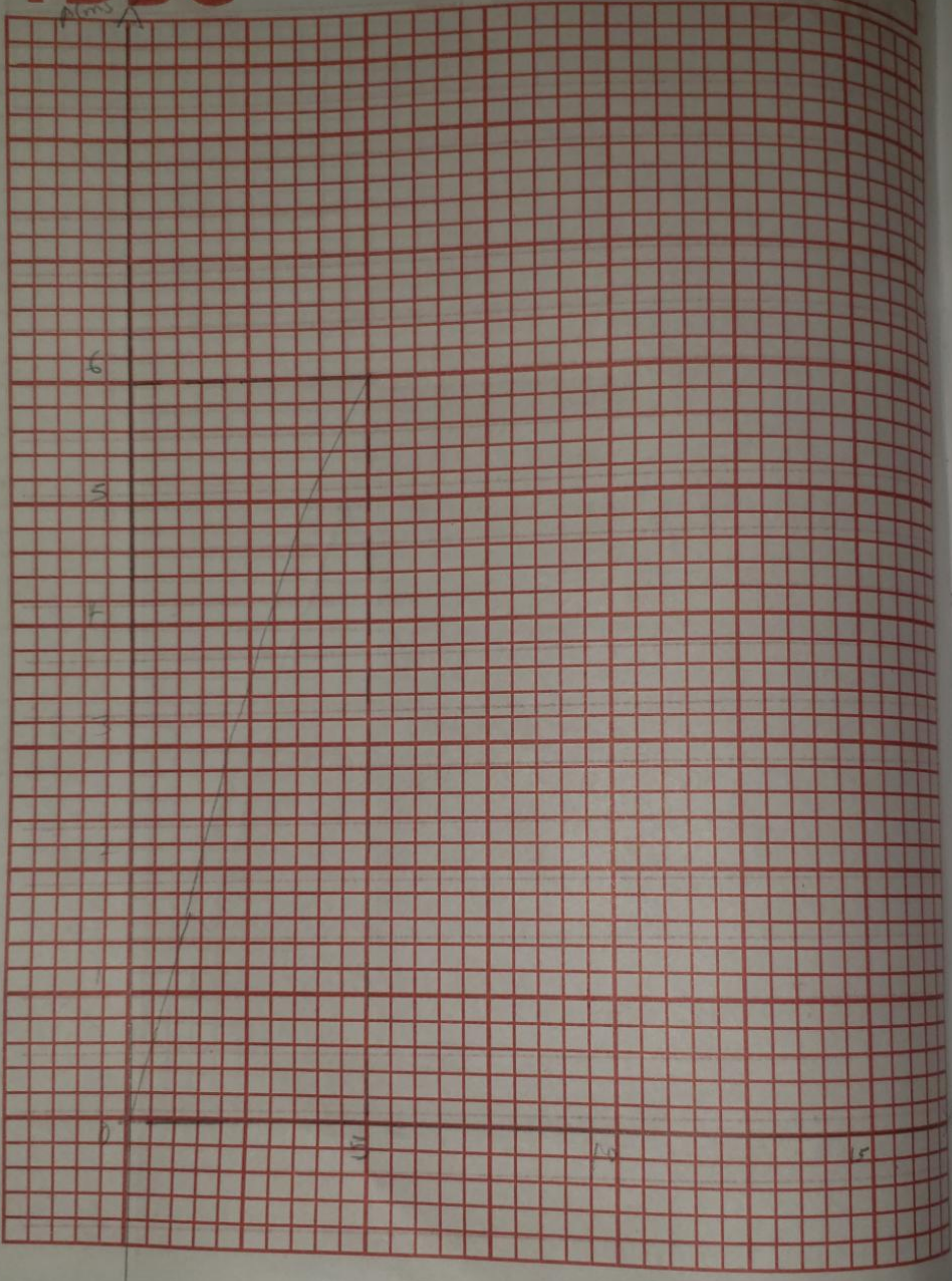
[Faint handwritten notes on the page below the graph, including mathematical expressions and calculations.]

TDDC

Along A

Scale on T axis : 4cm represents 1 sec
Scale on A axis : 2cm represents 1 m/s²

TITLE Acceleration-Time Graph
NAME _____ DATE _____



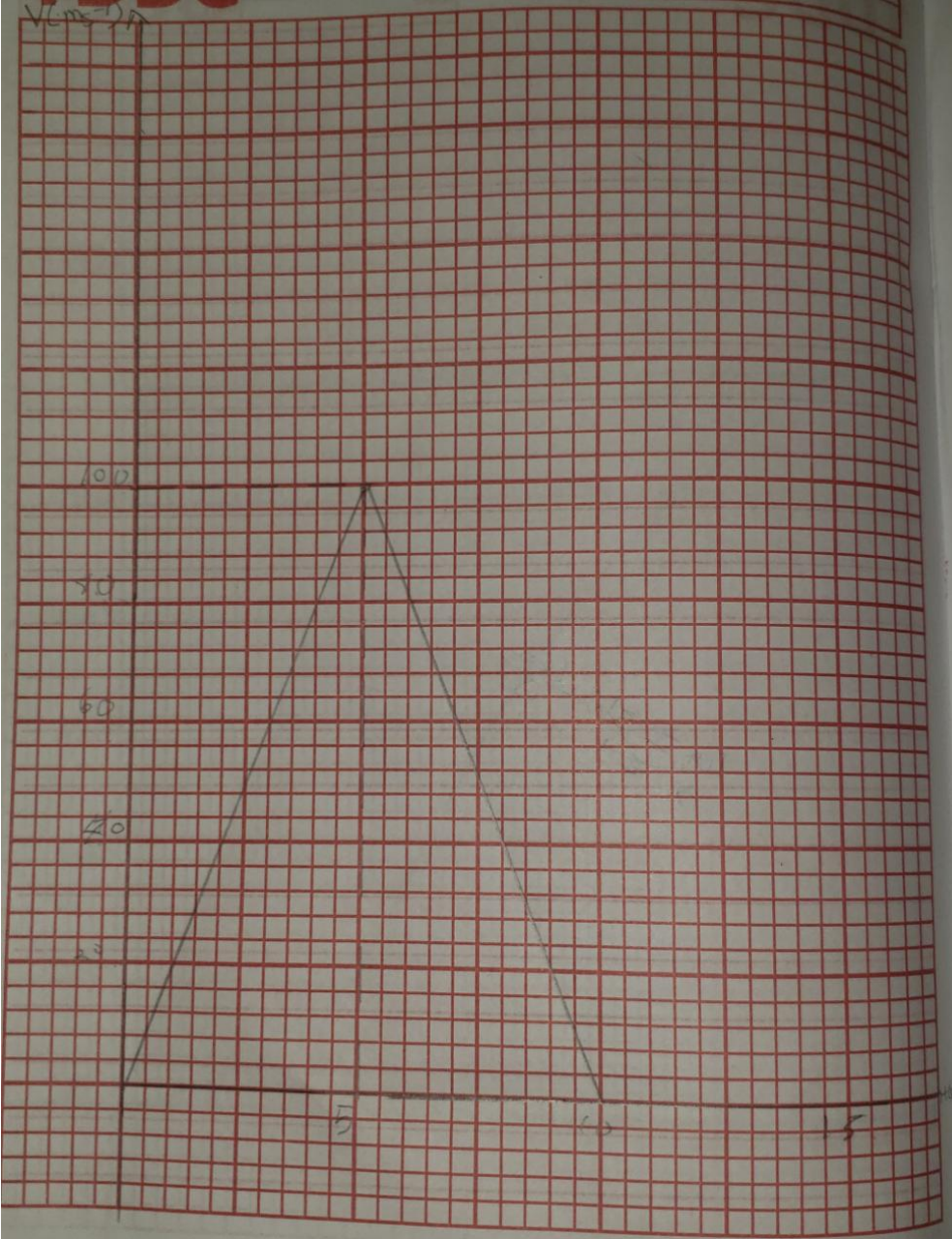
$$y = mx + c$$
$$2.5 = 1(1) + c$$
$$2.5 = 1 + c$$
$$2.5 - 1 = c$$
$$1.5 = c$$
$$y = 1x + 1.5$$
$$y = x + 1.5$$

TDDC

Velocity

Scale on t axis: 1 cm represents 5 units
Scale on v axis: 2 cm represents 5 units

TITLE	Velocity-Time Graph	
NAME		DATE



$200 = 200 + 200 = 400$
 $200 = 200 + 200 = 400$
 $200 = 200 + 200 = 400$
 $200 = 200 + 200 = 400$

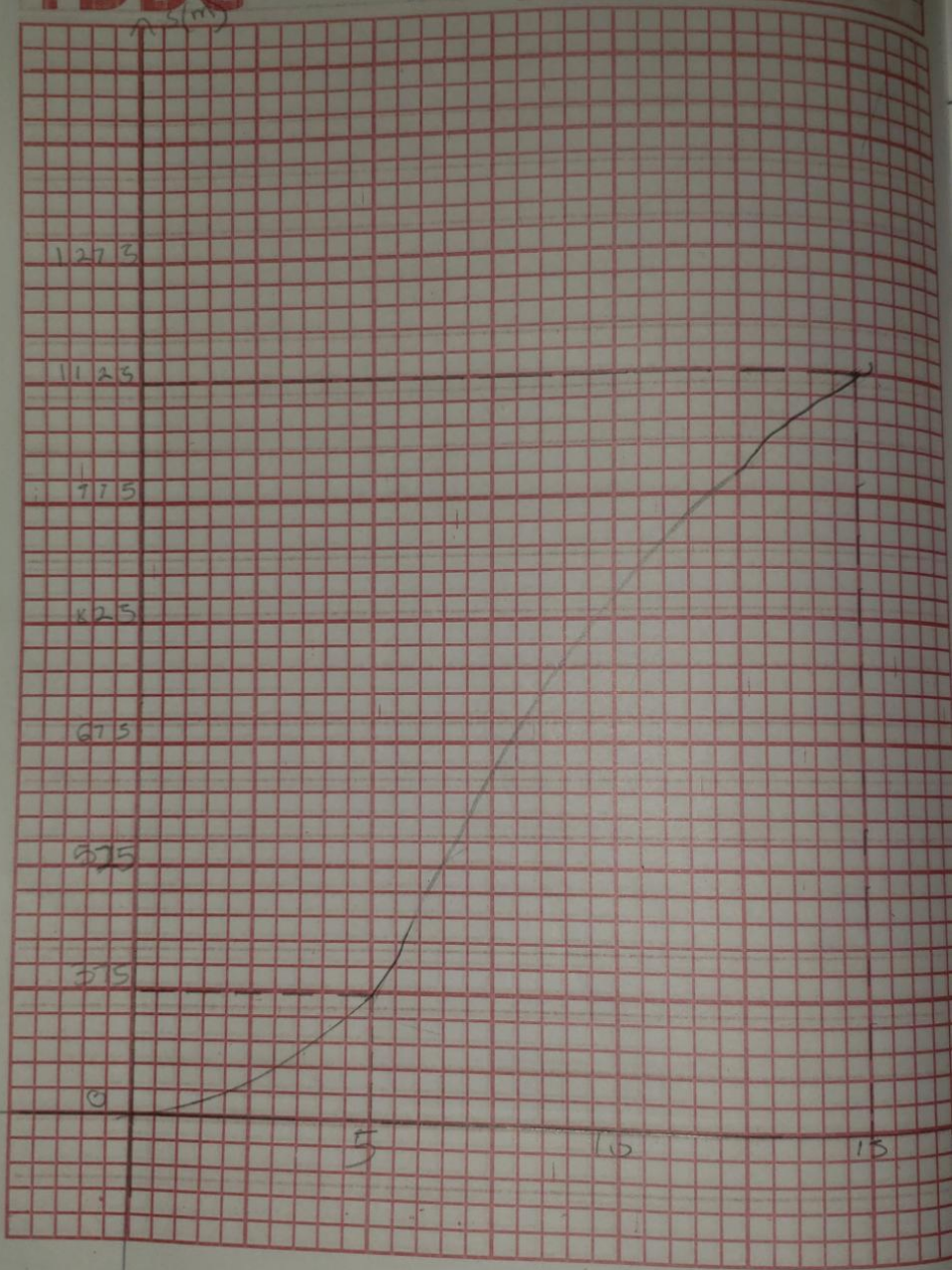
6

Scale on t axis: 4 cm represents 10 s
Scale on s axis: 2 cm represents 100 m

TDDC
A.S.(M)

TITLE: Speed - Time Graph

NAME: _____ DATE: _____



$$2000 - 2(1000) = 0$$

$$2000 - 2000 = 0$$

$$0 = 0$$