

## Chapter - 4.

Q 32).  $V_{0x} = 25 \cos 40 = 19.15$   
 $V_{0y} = 25 \sin 40 = 16.06$

$$\Delta y = V_{0y}t - \frac{1}{2}gt^2$$

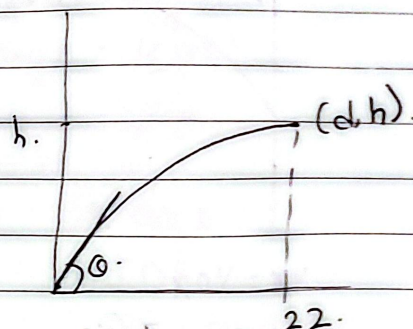
$$\Delta x = V_{0x}t$$

$$22 - 0 = 19.15t$$

$$t = 1.15s$$

$$a) \Delta y = (16.06) \times 1.15 - \frac{1}{2}(9.8)(1.15)^2$$

$$= 12m$$



b).  $V_x = V_{0x} = 19.15$

c).  $V_y = V_{0y} - gt$   
 $= 16.06 - (9.8 \times 1.15) = 4.79$

d) if  $V_y$  is pos, max isn't crossed or else it is.

For max<sup>m</sup> height,  $v^2 = u^2 + 2as$

x axis.

$$V_x^2 = V_{0x}^2 + 2\vec{a}_x \Delta x$$

$$V_x = V_{0x}$$

y axis

$$V_y^2 = V_{0y}^2 + 2a_y \Delta y$$

28. a)  $V_{0x} = 21 \text{ ms}^{-1}$   
 $V_{0y} = 36.37 \text{ ms}^{-1}$   
 $s = ut - \frac{1}{2}at^2$   
 $= 36.37 \cdot 5.5 - \frac{1}{2}(9.8)(5.5)^2$   
 $= 51.83$

c) ~~xy~~

c)  $V_y^2 = V_{0y}^2 - 2as$   
 $0 = (36.37)^2 - 2(9.8)s$   
 $s = 67.49m \text{ (Ans)}$

b).  $V_y = V_{0y} - gt$   
 $= 36.37 - 9.8(5.5) = -17.56$

$$V_x = V_{0x} = 21$$

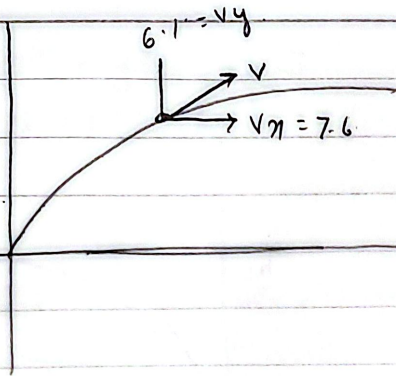
$$= 27$$

$$\sqrt{(-17.56)^2 + (21)^2} = 27.37$$

c).  ~~$v^2 = u^2 + 2as$~~   
 ~~$V_y^2 = V_{0y}^2 + 2(9.8) \cdot s$~~   
 ~~$(-17.56)^2 = (36.37)^2 + 2(9.8)s$~~



43.



$$v_x = v_{0x}$$

$$v_{0x} = 7.6$$

$$v_y^2 = v_{0y}^2 - 2g\Delta y$$

$$6.1^2 = v_{0y}^2 - 2 \times 9.81 (9.1 - 0)$$

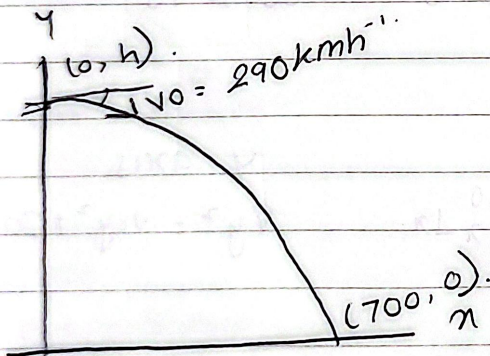
$$v_{0y} = \pm 14.68 \text{ (first quad. } \therefore \text{ pos.)}$$

$$\Delta y = H_{\max} - 0, \quad v_y = 0$$

$$0^2 = 14.68^2 - 2 \times 9.8 (H_{\max} - 0)$$

$$= 11 \text{ m.}$$

27.



$$\frac{290 \times 1000}{60 \times 60} = 80.56 \text{ ms}^{-1}$$

$$\text{Angle} = 30^\circ$$

$$v_{0x} = 30 \cos 80.56 \cos 30$$

$$v_{0y} = -80.56 \sin(30)$$

$$v_{0x} = 69.76$$

$$v_{0y} = -40.28$$

$$a) \Delta x = v_{0x} t$$

$$= (700 - 0) \times t$$

$$(700 - 0) = 69.76 \times t$$

$$t = 10.03 \text{ s.}$$

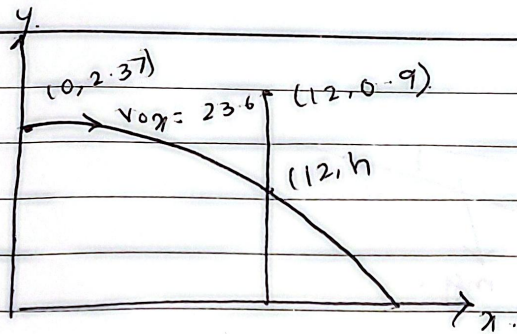
$$b) \Delta y = v_{0y} t - \frac{1}{2} g t^2$$

$$0 - h = -40.28 \times 10.03 - \frac{1}{2} \times 9.8 \times (10.03)^2$$

$$h = 897 \text{ m.}$$



36.



$$v_{0x} = 23.6 \quad v_{0y} = 0$$

$$\Delta y = v_{0y}t - \frac{1}{2}gt^2$$

$$\Delta x = v_{0x}t$$

$$12 - 0 = 23.6 \times t$$

$$t = 0.508$$

$$\therefore (h = 2.37) = 0 \times 0.508$$

$$- \frac{1}{2} \times 9.8 \times (0.508)^2$$

$$h = 2.37 - 1.264$$

$$h = 1.105$$

## Chapter: 5 (Newton's laws of motion).

2nd Law:

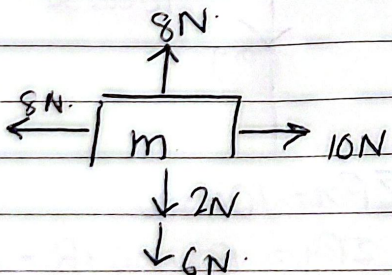
$$\frac{d\vec{p}}{dt}$$

momentum,  $\vec{p} = mv$ 

$$F \propto m \frac{d(m\vec{v})}{dt}$$

$$F \propto m \frac{dv}{dt}$$

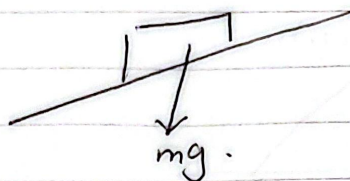
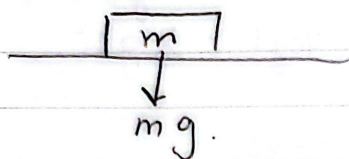
$$F = kma$$



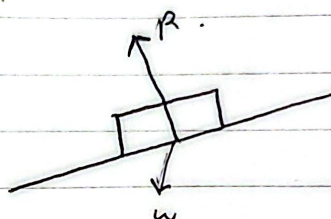
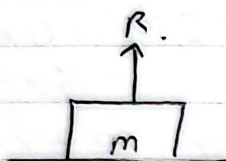
$$\Sigma F_x = 2N$$

$$F_y = 8 - 6 - 2 = 0N$$

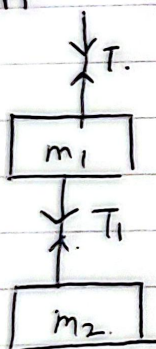
# Gravitational Force / Weight.



## Normal reaction force. (R).



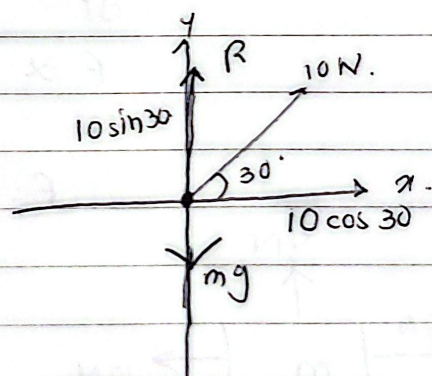
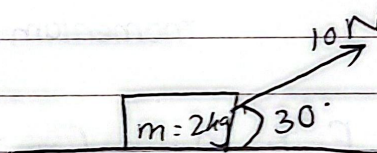
## Tension.



## Frictional Force.

→ Static :  $\mu_s R = F_s$

→ Kinetic :  $\mu_k R = F_k$



W  
R  
T  
F<sub>s</sub>/F<sub>k</sub>  
A/P

$$\Sigma F_x = 10 \cos 30.$$

$$\Sigma F_y = R \sin 30 + R - mg$$

$$F_y : R \sin 30 + R - mg \stackrel{=0}{\text{may}} \quad 10 \sin 30 + R - 2 \times 9.8 = 2 \times 0$$

$$R = 14.6$$