

Dynamics.

Slide ①

Formula.

$$F = ma$$

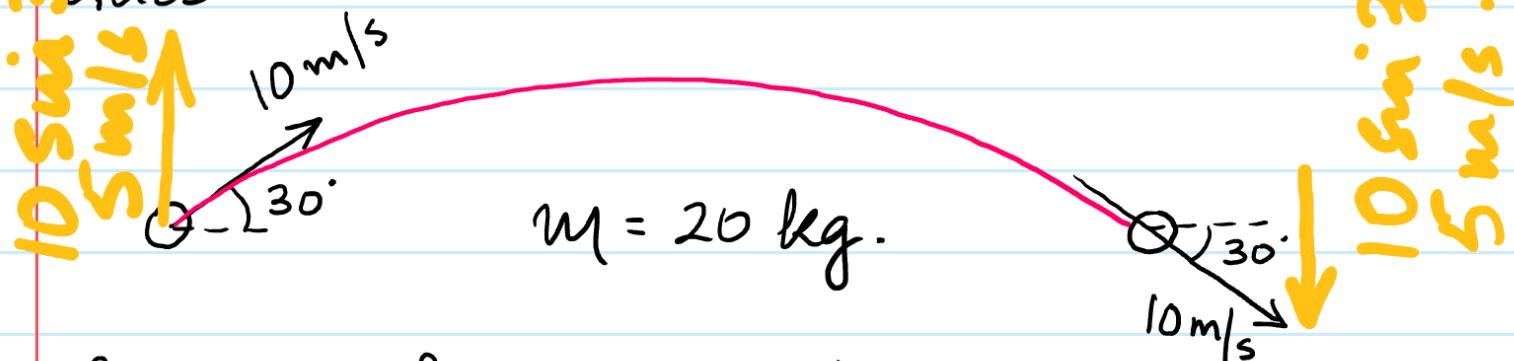
$$p = mv$$

$$\Delta p = F \cdot t$$

$$\Delta p = p_f - p_i$$

$$\text{Impulse} = \Delta p = F \cdot t$$

Ques.



Cal Δp for this projectile motion?

① Δp (in the horizontal plane).

Since H_v remains **Constant throughout**

$$\therefore \Delta p \text{ (in the horizontal plane)} = 0$$

② Δp (in the vertical plane)

$$\begin{aligned} +\downarrow \Delta p &= p_f - p_i \\ &= (20)(5) - (20)(-5) \\ &= 200 \text{ Ns.} \end{aligned}$$

OR

$$\begin{aligned} +\uparrow \Delta p &= p_f - p_i \\ &= (20)(-5) - (20)(5) \\ &= -200 \text{ Ns.} \end{aligned}$$

my suggestion / CIE They take final direction as positive.

• How to obtain a relationship b/w momentum of an object (p) and its Kinetic Energy (K.E)

Prove that $K.E = \frac{p^2}{2m}$

$$p = mv$$

make v the subject

$$v = \frac{p}{m}$$

replace this answer into eq ①

$$K.E = \frac{1}{2} m v^2 \rightarrow \text{①}$$

$$K.E = \frac{1}{2} m \left(\frac{p}{m} \right)^2$$

Simplify.

$$K.E = \frac{p^2}{2m} \text{ (proved)}$$