

Q:- 3

As,

$$W = F dx$$

$$W = ma dx$$

$$= m \frac{dv}{dt} dx \rightarrow v$$

$$W = m dv v$$

$$W = \int m v dv$$

$$W = \int_{v_1}^{v_2} m v dv \Rightarrow W = m \left[\frac{v^2}{2} \right]_{v_1}^{v_2}$$

$$W = \frac{m}{2} [v_2^2 - v_1^2]$$

$$W = \frac{1}{2} m v_2^2 - \frac{1}{2} m v_1^2$$

$\downarrow \qquad \qquad \downarrow$
 $K_f - K_i$

$$W = K_f - K_i$$

$$\boxed{W = \Delta K} \rightarrow \text{Work energy Theorem}$$

($W = \text{change in } K.E.$)