

► Work - Energy theorem

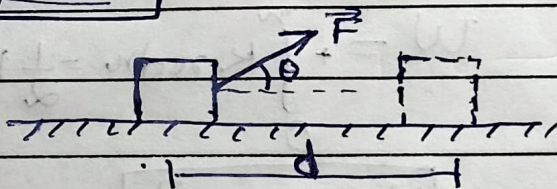
→ The change in kinetic energy of a particle is equal to the work done on it by net force.

$$[K_f - K_i = W]$$

► Work. $W = (F \cos \theta) d$
 $= \vec{F} \cdot \vec{d}$

$$W = \int \vec{F} \cdot d\vec{s}$$

$$\left[\begin{array}{l} 0: \theta = 90^\circ \\ \text{maximum } \therefore \theta = 0^\circ \end{array} \right]$$

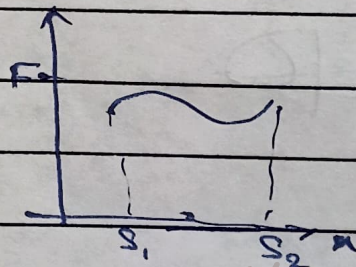


► Kinetic Energy

$$KE = \frac{1}{2} m v^2 = \frac{p^2}{2m}$$

► Work done by variable force

$W =$ Area under the force, displacement graph



$$W = \int_{s_1}^{s_2} \vec{F} \cdot d\vec{s}$$

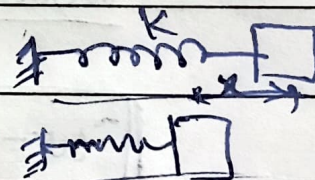
► Potential Energy (U(x))

$$F(x) = \frac{d(U(x))}{dx}$$

$$\Delta U = U_f - U_i = - \int_{x_i}^{x_f} F(x) dx$$

► Potential Energy of a Spring

$$F = -kx$$



$$W = + \int_0^x kx dx = \frac{1}{2} kx^2$$

$$U = \frac{1}{2} kx^2$$