SUBJECT:- PHYSICS   CLASS:- IXTH   DATE:15/07/XX

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CHAPTER 4. (WORK, ENERGY & POWER)(BASED ON NCERT PATTERN)

Energy

The capacity of a body to do work is called the energy of the body.
Unit of energy = Joules

1KJ = 1000 J

Forms of Energy

The various forms of energy are potential energy, kinetic energy, heat energy, chemical energy, electrical energy and light energy.

Kinetic Energy

- It is the energy possessed by a body due to its motion. Kinetic energy of an object increases with its speed.

- Kinetic energy of body moving with a certain velocity = work done on it to make it acquire that velocity

Derivation

Let an object of mass m, starts from rest and attains a uniform velocity v, after a force F is applied on it. Let during this period the object be be displaced by distance s.

Thus, Work done on object, $W = F \times s$ ....(i)

Let the acceleration produced after applying force on object be a.

So, using third equation of motion, we have:

$$v^2 - u^2 = 2as$$

$$\Rightarrow \quad s = \frac{v^2 - u^2}{2a} \qquad ....(ii)$$

Also, Force is given as, $F = ma$ ....(iii)

Substituting F and s frome quations (ii) and (iii) in equation (i), we get:

$$W = F \times s$$

$$\Rightarrow \quad W = ma \times \frac{v^2 - u^2}{2a}$$

$$\Rightarrow \quad W = \frac{1}{2} mv^2 \left[\text{As, initial velocity}, u = 0 \right]$$

But, work done on object = Change in kinetic energy of object

$$\therefore \quad E_k = \frac{1}{2} mv^2$$