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CLASS 9 SUBJECT PHYSICS Date-7-12-2021 Subject teacher-pawan kr

Derive an expression for obtain the kinetic energy of an object.

Let us consider an object whose mass is 'm,movingwith a uniform velocity u. When a constant force F applied on a body and the body displace through s in the direction of applied force.

We know that work done =Force×displacement

$W = F \times s$ ----(i)

The work done on the object will cause change in velocity u to v. and a be the acceleration produced

We know that from the 3rd equation of motion

$V^2-u^2=2as$

Therefore $s=(v^2-u^2)/2a$.- --- (ii)

We know that F =ma ---(-lll)

Put the value of F and s in equation (I) $W=F\times s$

$W=ma\times(v^2-u^2)/2a$

So , $w=1/2\ m(v^2-u^2)$

If the object is starting from its stationary position that is u=0

$W=1/2\ mv^2$

Work done is equal to the change in the kinetic energy of an object.

Thus the kinetic energy possessed by an object of mass m and moving with a uniform velocity v is K. E $=1/2\ mv^2$.