**6-WORK, ENERGY AND POWER**

**1. Work Done by a Constant Force**

1.  2. If a body of mass *m* is raised through height *h*, then  3. If a body moves up a plane inclined at an angle  with a constant speed, then 

**2.Work done by a Variable Force**

1.  2.  3. W = Area under the force-displacement curve between the initial and final positions of the body.

**3. K.E. and W.E. Theorem**

1. Kinetic energy,  2. According to work-energy theorem, 

**4. P.E. and Conservation of Energy**

1. Gravitational P.E.,  2. For a conservative force,  3. *F dx* 4. When work is done only by conservative forces only, mechanical energy is conserved. K + U = constant

**5. Potential Energy of a Spring**

1. According to Hooke’s law, F = ­- *kx* 2. Force constant,  3. Work done on a spring or P.E of a spring stretched through distance *x, W = U *

**6. Mass-Energy Equivalence** According to Einstein, energy equivalent of mass *m* is E = *mc2* where *c* = speed of light in free space = 3 x 108 ms-1.

**7. Power**

1. Power =  or  2. Also  when , 

**8. Collisions**

1. Linear momentum is conserved both in elastic and inelastic collisions.  2. Kinetic energy is conserved in elastic collision.  3. In one-dimensional elastic collision, velocities after the collision are given by   4. Coefficient of restitution for a collision is given by  5. For a ball rebounding from a floor, *e *  6. For an elastic collision (involving no loss of K.E.), *e = 1* 7. For an inelastic collision (involving loss of K.E.), *e < 1*