FREEDOM INTERNATIONAL SCHOOL

WORKSHEET

PHYSICS

CLASS XI

WORK, ENERGY AND POWER

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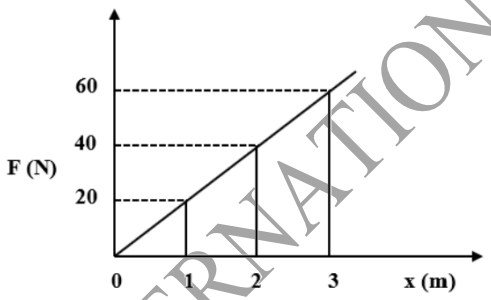
1. A gardener pushes a lawn roller through a distance of 20 m. If he applies a force of 20 kg wt in a direction inclined at 60^0 to the ground, find the work done by him. Take g= 9.8 m/s^2
2. Find the work done by forces $\vec{F}= \left(2\,\hat{\imath} - 3\hat{\jmath} + \hat{k}\right)$ when its point of application moves from the point A (1, 2, -3) to the point B (2,0, -5)
3. A force F= (15 + 0.50 x) acts on a particle in the X- direction, where F is in newton and x in metre. Find the work done by this force during a displacement from x = 0 to x = 2.0 m.
4. Calculate the work done in moving the object from x = 2m to x = 3m from the following graph:



5. A shot travelling at the rate of 100 m/s is just able to pierce a plank 4 cm thick. What velocity is required to just pierce a plank 9 cm thick?
6. A bullet of mass 20 g is found to pass two points 30 m apart in a time interval of 4 s. Calculate the kinetic energy of the bullet if it moves with constant speed.
7. A body of mass 2 kg is resting on a rough horizontal surface. A force of 20 N is now applied to it for 10 s, parallel to the surface. If the coefficient of kinetic friction between the surfaces in contact is 0.2, Calculate: (a) work done by the applied force in 10 s (b) change in kinetic energy of the object in 10 s. Take g = 10 m/s^2
8. The string of a pendulum is 2.0 m long. The bob is pulled sideways so that the string becomes horizontal and then the bob is released. What is the speed with which the bob arrives at the lowest point? Assume that 10% of the initial energy is dissipated against air resistance, g = 10 m/s^2
9. The length of a steel wire increases by 0.5 cm when it is loaded with a weight of 5 kg. Calculate (i) force constant of the wire and (ii) work done in stretching the wire.
10. A 16 kg block moving on a frictionless horizontal surface with a velocity of 5 m/s compresses an ideal spring and comes to rest. If the force constant of the spring is 100 N/m, then how much is the spring compressed?
11. A car of mass 1000 kg accelerates uniformly from rest to a velocity of 54 km/h in 5 seconds. Calculate (i) its acceleration (ii) its gain in kinetic energy (iii) average power of the engine during this period, neglecting the friction.

12. A machine can take out 100 kg of mud per hour from a depth of 100 m. If efficiency of the machine is 0.9, calculate its power.
13. Two particles of masses 0.5 kg and 0.25 kg moving with velocities 4.0 m/s and -3 m/s collide head on in a perfectly inelastic collision. Find (i) the velocity of the composite particle after the collision and (ii) the kinetic energy lost in the collision.