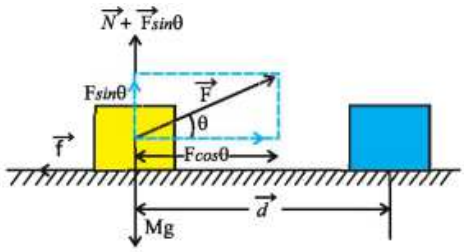
XI PHYSICS 06: WORK ENERGY & POWER | 2018

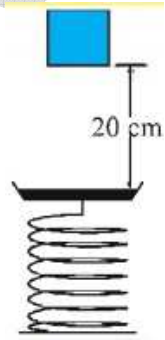
1. A block lying on a rough horizontal surface is displaced through a distance d by a fforce F acting at an angle θ with horizontal. If μ is the coefficient of friction between the block and the surface, find the work done. The mass of the block is M. **Ans:**

$[\ F(cos\theta + \mu sin\theta) - \mu Mg\ ]\ d$

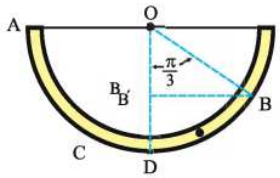


2. A block of mass 1 kg falls freely on a spring from a height of 20 cm as shown in fig. Find the compression in the spring if its force constant is 600 N/m.

(Ans: 0.0167 ± 0.0833)

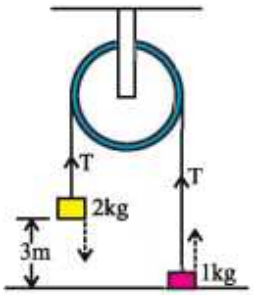


3. A tube is fixed in a vertical plane as shown in figure. Ffrom point A a sphere of mass 0.314 kg is released. During its motion in the tube it faces a constant resistive force R. At B its velocity becomes zero. Calculate: i) the constant resistive fforce R and ii) work done by resistive force. (radius is 1 m) **(Ans: 0.6 N, 1.57 J)**



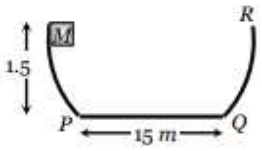
4. A block of mass 2 kg is tied at one end of a light inextensible string. At the other end of the string another book of mass 1 kg is tied. Initially the block of mass 1 kg is tied. Initially the block of mass 1 kg is on the ground and the system of these blocks in stationary as shown in figure. Now the masses are released. Find the common velocity of the blocks when the mass of 2 kg touches the ground. The pulley is smooth and weightless. The initial height of block of 2 kg from the ground is 3 m. (g = 9.8 m/s²)

(Ans: 4.43 m/s)



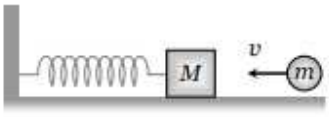
5. A boy is sitting on a swing at a maximum height of 5m above the ground. When the swing passes through the mean position which is 2m above the ground its velocity is approximately. **(Ans: 7.6 m/s)**

6. A block of mass M slides along the sides of a bowl as shown in the figure. The walls of the bowl are frictionless and the base has coefficient of friction 0.2. If the block is released from the top of the side, which is 1.5 m high, where will the block come to rest ? Given

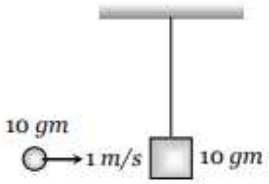


that the length of the base is 15 m. **(Ans: mid point between P and Q)**

7. A 2 kg block is dropped from a height of 0.4 m on a spring of force constant k = 1960 N/m The maximum compression of the spring is? **(Ans: 0.1 m)**
8. A ball moving with velocity of 9 m/s collides with another similar stationary ball. After the collision both the balls move in directions making an angle of o 30 with the initial direction. After the collision their speed will be? **(Ans: 5.2 m/s)**
9. A ball of mass 1kg , moving with a velocity of 0.4m / s collides with another stationary ball. After the collision, the first ball moves with a velocity of 0.3m / s in a direction making an angle of 90^o with its initial direction. The momentum of second ball after collision will be? **(Ans: 0.5 kgm/s)**
10. A body of mass 2 kg is placed on a horizontal frictionless surface. It is connected to one end of a spring whose force constant is 250 N/m . The other end of the spring is joined with the wall. A particle of mass 0.15 kg moving horizontally with speed v sticks to the body after collision. If it compresses the spring by 10 cm , the velocity of the particle is? **(Ans: 15 m/s)**



11. A mass of 10gm , moving horizontally with a velocity of 100cm / sec , strikes the bob of a pendulum and strikes to it. The mass of the bob is also 10gm (see fig.) The maximum height to which the system can be raised is? **(Ans: 1.25 cm)**



12. A bullet of mass m moving with a velocity v strikes a suspended wooden block of mass M as shown in the figure and sticks to it. If the block rises to a height h the initial velocity of the bullet is? **(Ans: $\frac{m+M}{m}\sqrt{2gh}$)**