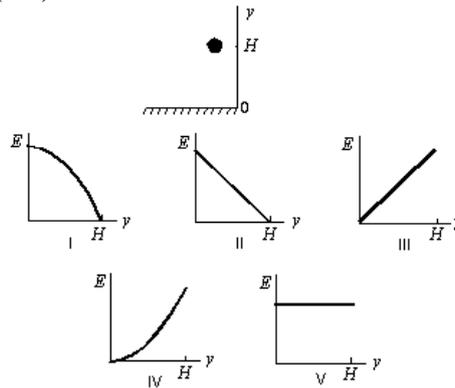


Ayman Ghannam

Chapter 8 “Potential Energy and Conservation of Energy”

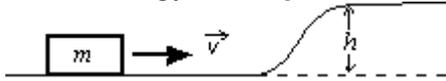
1. A ball is held at a height H above a floor. It is then released and falls to the floor. If air resistance can be ignored, which of the five graphs below correctly gives the mechanical energy E of the Earth-ball system as a function of the altitude y of the ball? (V)



2. A 2-kg block is thrown upward from a point 20 m above the Earth's surface. At what height above Earth's surface will the gravitational potential energy of the Earth-block system have increased by 500 J? (46 m)

3. A projectile of mass 0.50 kg is fired with an initial speed of 10 m/s at an angle of 60° above the horizontal. The potential energy of the projectile-Earth system when the projectile is at its highest point (relative to the potential energy when the projectile is at ground level) is: (18.75 J)

4. For a block of mass m to slide without friction up the rise of height h shown, it must have a minimum initial kinetic energy of: (mgh)



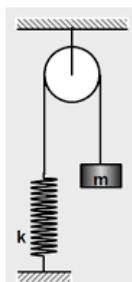
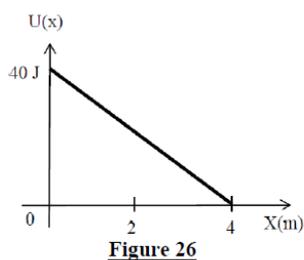
5. A projectile is fired from the top of a 40-m high building with a speed of 20 m/s. What will be its speed when it strikes the ground? (Ans: 34 m/s)

6. A 6.0-kg box starts up a 30 degrees incline with 158 J of kinetic energy. How far will it slide up the incline if the coefficient of kinetic friction between box and incline is 0.40? (Ans: 3.2 m)

7. A 75-kg parachutist releases himself off a tower that is 85 m high. Assume that he starts from rest and reaches the ground with a speed of 5.0 m/s. How much work was done by the non conservative forces on him? (Ans: -6.2×10^4 J)

8. A particle moves under the influence of a single conservative force. At point (A), the potential energy associated with the conservative force is +40 J. As the particle moves from (A) to (B), the force does +25 J of work on the particle. What is the value of the potential energy at point B? (Ans: +15 J)

9. As a particle moves along the x -axis it is acted on by a conservative force $F(x)$. The potential energy $U(x)$ of the particle as a function of x is shown in figure 26. What is the force $F(x)$? (Ans: + 10 N)



10. A 20-kg mass is attached to a massless spring ($k = 380$ N/m) that passes over a frictionless massless pulley, as shown in Figure 3. The mass is released from rest with the spring unstretched. What is the speed of the mass at the instant when it has dropped a vertical distance of 0.40 m?