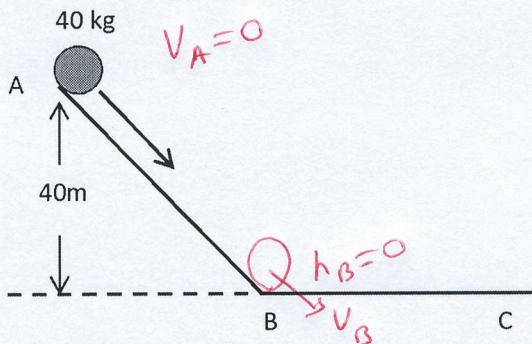


Mechanics II – QUIZ

Quiz-Work-Energy-Power - 2018-2019 Spring

1. The object in the figure is 40 kg. It slides down and moves on the horizontal surface. All surfaces are frictionless. ($g=10 \text{ N/kg}$)

- Calculate the potential energy of the object at the top (Point A).
- What is the kinetic energy of the object at point B.
- What is the velocity of the object at point C?



$$a) \quad PE_A = mgh_A$$

$$= 40 \times 10 \times 40 = 1600 \text{ J}$$

b) There is no friction on the surface. Because of this, the ME is conserved.

$$ME_A = ME_B$$

$$PE_A + KE_A = PE_B + KE_B$$

$$mgh_A + \frac{1}{2}mv_A^2 = mgh_B + KE_B$$

$$1600 \text{ J} = KE_B$$

$$c) \quad KE_B = \frac{1}{2}mv_B^2$$

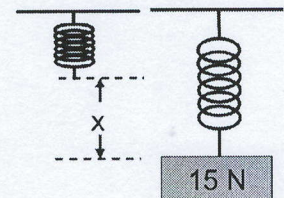
$$1600 = \frac{1}{2} \times 40 \times v_B^2$$

$$\frac{1600}{20} = v_B^2 \quad v_B^2 = 80$$

$$v_B = \sqrt{80} \text{ m/s} = 4\sqrt{5} \text{ m/s}$$

5. A weight of 15 N is attached to a spring that has a spring constant of 300 N/m.

- How much will the spring stretch?
- How much energy is stored?



$$a) \quad F = 15 \text{ N} \quad k = 300 \text{ N/m} \quad x = ?$$

$$F = kx \Rightarrow x = \frac{F}{k} \quad x = \frac{15}{300} = \frac{1}{20} = 0,05 \text{ m}$$

$$b) \quad PE_{\text{spring}} = \frac{1}{2}kx^2 = \frac{1}{2} \times 300 \times (0,05)^2 = 0,375 \text{ J}$$