

0.4 Pre-Lab 4: Conservation of Mechanical Energy

Name _____ Section _____ Date _____

Reading: Hobson Ch.6: section 6.5 & section 6.6

- Potential energy is given by $PE = mgh$
- Kinetic energy is given by $KE = \frac{mv^2}{2}$

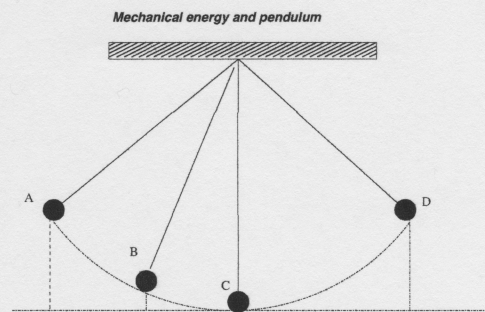


Figure 7: Trade in joules between potential and kinetic energy

Consider the situation in figure 7, the total mechanical energy is 6 J. There is no loss or gain of mechanical energy, only a transformation from kinetic energy to potential energy (and vice versa). The ball, of mass $m = 1\text{ kg}$ is released from rest. Answer the following questions:

Question #:1 At point A:

- What is the potential energy of the ball?
- What is the height of the ball?
- What is the velocity of the ball at that point?
- What is the kinetic energy?

Question #2 At point B, if the potential energy is equal to the kinetic energy ($PE = KE = 3J$)

- What is the height H of the ball?
- What is the velocity of the ball at that height?

Question #3 At point C, the potential energy is zero.

- What is the kinetic energy of the ball?
- What is the velocity of the ball at that point?
- How would you describe the velocity at this particular point? Explain

Question #4 At point D, the ball is at the same height as in point A, it reaches a maximum height then stops before reversing direction.

- What is the potential energy?
- What is the kinetic energy of the ball?
- What happened to kinetic energy at that position?

Question #5 While the pendulum is oscillating between positions, use the words **increase**, **decrease**, or **constant** to describe the trend of the different forms of energies. Complete table 2

	Potential Energy	Kinetic Energy	Mechanical Energy
From A to C			
From C to D			

Table 2: Trend of the different forms of energy of a swinging pendulum

Question #6

- Using figure 7, identify the corresponding positions A , B and C in figure 8
- Discuss the different energies, and speeds of the glider on those points based on your study of the pendulum.

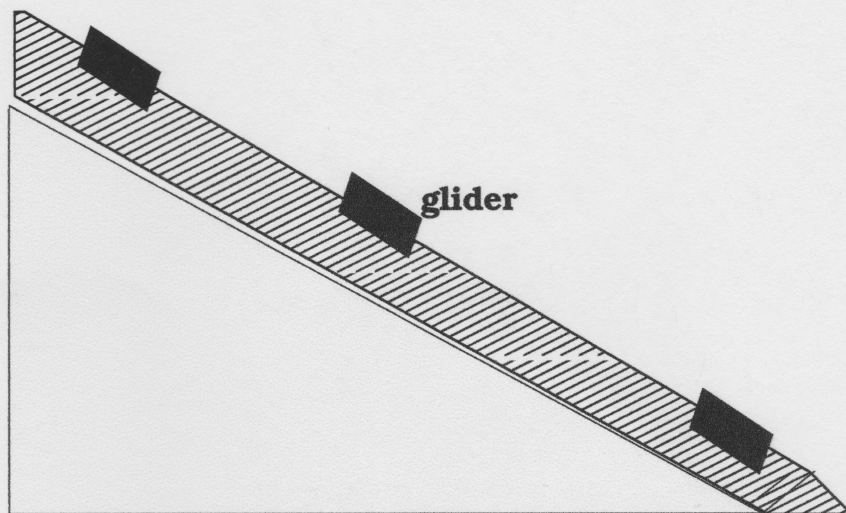


Figure 8: Sliding glider down an incline