Name Answer Key Date _____

Honors Physics Energy WS #9H

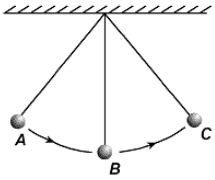
Period _____ Mrs. Nadworny

Pendulum

Directions: Read online textbook pages 443 – 444. Solve the following problems using the GUESS method and proper significant figures. Be sure to show ALL work.

Use the following information to answer questions 1 and 2.

The diagram below shows three positions, A, B and C, in the swing of a pendulum, released from rest at point A. [Neglect friction.]



1. As the pendulum swings from position B to position C, what happens to the total mechanical energy?

(A) It decreases (B) It increases (C) It remains the same

2. Which statement is true about this swinging pendulum?

(A) The potential energy at A equal the kinetic energy at C.

(B) The potential energy at A equal the kinetic energy at B.

(C) The speed at A equals the speed at B.

(D) The potential energy at B equals the potential energy at C.

3. A trapeze artist, Claire Voyance, is swinging from a 11.5 meter long rope.

   a. Calculate her period in the circus is on Earth. (g = 9.81 m/s^2)

$$T = 2\pi\sqrt{\frac{L}{g}} = 2\pi\sqrt{\frac{11.5m}{9.81\,\frac{m}{s^2}}} = 6.80s$$

   b. Calculate her period if the circus is on the Moon. (g = 1.60 m/s^2)

$$T = 2\pi\sqrt{\frac{L}{g}} = 2\pi\sqrt{\frac{11.5m}{1.60\,\frac{m}{s^2}}} = 16.8s$$

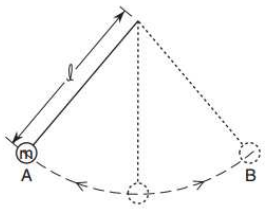
4. Assume the local value of g is 9.8082 m/s^2. What would be the length of a simple pendulum with a period of 1.00 minute?

$$T = 2\pi\sqrt{\frac{L}{g}} \rightarrow \left(\frac{T}{2\pi}\right)^2 g = \left(\frac{60.0s}{2\pi}\right)^2 9.8082\,\frac{m}{s^2} = 894m$$

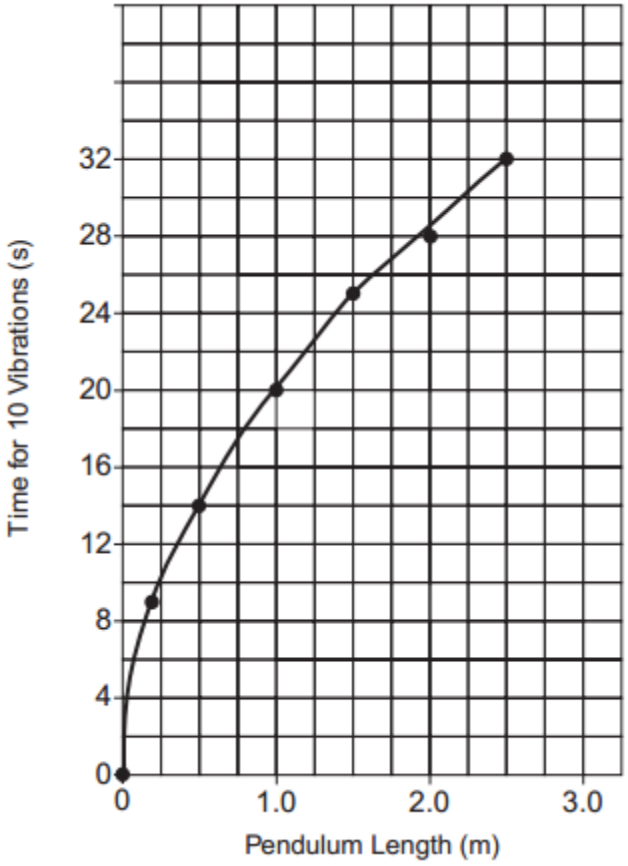
Continued on next page

The diagram below shows a light string attached to a mass m forming a pendulum of length l. One complete vibration of the pendulum consists of mass m moving from position A to position B and back to the position A. The data table shows the results of an experiment measuring the time for 10 complete vibrations of the pendulum for various pendulum lengths.

Pendulum Length (meters)	**Time for 10 Vibrations** (seconds)
0	0
0.2	9
0.5	14
1.0	20.
1.5	25
2.0	28
2.5	32



a. Mark an appropriate scale on the axis labeled "Time for 10 Vibrations".
b. Plot the data points for time for 10 vibrations versus length.
c. Draw the best fit curve.



d. Determine the period of the 1.0 meter pendulum.

$$T = \frac{t_{tot}}{\#} = \frac{20.s}{10} = 2.0s$$

Answers in size order: 2.0, 6.80, 16.8, 894