UNIT I: Scientific Thinking in Experimental Settings

TEST (v1)

DO NOT WRITE ON THE TEST!! ANSWER ON THE SHEET PROVIDED.

1. In the pendulum lab, the variable(s) which affected the period of the pendulum was (were):
   a. length
   b. mass
   c. amplitude
   d. all of the above

2. In the pendulum lab, the **period** was
   a. the independent variable
   b. graphed on the vertical-axis
   c. graphed on the horizontal-axis
   d. the variable you controlled

For the following questions consider the pendulum apparatus shown below. Bobs a and b have masses of 20. g; bob c has a mass of 10. g.

3. Suppose you pulled bobs a and b back through an angle of 5°, how would their periods compare?
   a. the period of a is greater
   b. the period of b is greater
   c. the periods are equal
   d. you can't tell because the lengths are different

4. Suppose that you pulled bobs b and c back through an angle of 5°, how would their periods compare?
   a. the period of b is greater
   b. the period of c is greater
   c. the periods are equal
   d. you can't tell because the lengths are different
A science class puts wide wheels onto a small cart and lets it roll down an inclined ramp and then across the floor. The investigation is repeated using the same cart but this time fitted with narrow wheels. The angle of the incline of the ramp remains constant. The mass of the cart is kept constant.

5. What is the relationship being studied?
   a. The effect of the cart mass on the distance the cart travels.
   b. The effect of the incline of the ramp on the speed the cart travels.
   c. The effect of wheel width on the distance the cart travels.
   d. The effect of wheel width on the speed the cart travels.

6. What is the dependent variable?
   a. mass of cart
   b. width of wheels
   c. angle of incline
   d. distance cart travels

7. What is the independent variable?
   a. mass of cart
   b. width of wheels
   c. angle of incline
   d. distance cart travels

8. What variable needs to be kept constant during the study?
   a. temperature of room
   b. width of wheels
   c. angle of incline
   d. distance cart travels

In questions 9-13, match a letter from each of the following graphs with its corresponding graphical analysis statement.

9. test plot y vs. $\frac{1}{x}$
10. $y = kx$
11. y is independent of x
12. test plot $y^2$ vs. x
13. test plot y vs. $x^2$
14. In an effort to create a straight line graph from the data graphed at right, you should
   a. square the volume values
   b. invert the volume values
   c. square the pressure values
   d. square root the volume values
   e. do nothing; you can’t get a straight line out of this

15. The relationship for the graph above is best represented by
   a. Pressure is directly proportional to the volume.
   b. Pressure is proportional to the square root of the volume.
   c. Pressure is inversely proportional to the volume.
   d. Pressure is proportional to the square of the volume.
   e. There is no relationship between pressure and volume.

16. The mathematical model for the graph at right is best represented by
   a. \( d = t \).
   b. \( d = kt \).
   c. \( d = kt^2 \).
   d. \( d = \frac{1}{kt} \).
   e. \( d^2 = kt \).

17. The graphical representation between distance and time could best be stated as
   a. Distance is directly proportional to time.
   b. Distance is proportional to the square of time.
   c. Distance is inversely proportional to time.
   d. Distance is proportional to the square root of time.
   e. There is no relationship between distance and time.