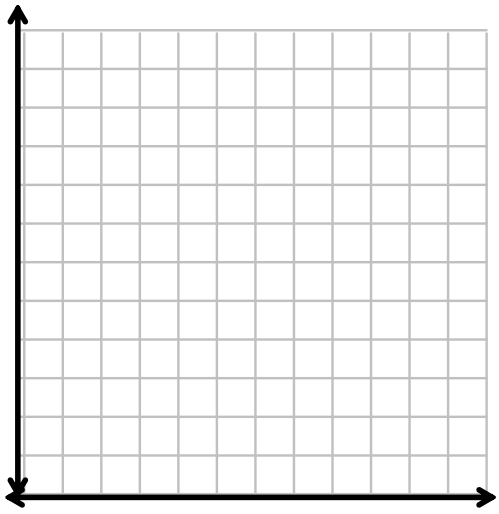
UNIT I COMMON ASSESSMENT ACTION PHYSICS

1. Plot a graph of the following data. Time is the independent variable. **(PS 1.1)**

Time (yrs)	**Sales ($ millions)**
2	27
3.5	40
5	51
6	61
8	78



2. Find the slope of the Line **(PS 1.1)**

3. Write the equation of the line. **(PS 1.2)**

4. How long will it take to make $105 million? **(PS 1.4)**

For problems 5-8, complete the conversion and show your work

5. 16 m = _____ km **(PS 1.3)**

   Ⓐ .0016
   Ⓑ 16000
   Ⓒ .016
   Ⓓ 1600

6. How many seconds are in 23 days? **(PS 1.3)**

   Ⓐ 12696 s.
   Ⓑ 82800 s.
   Ⓒ 1987200 s.
   Ⓓ 33120 s.

7. Convert 4.05 kg. = _____ grams. **(PS 1.3)**

   Ⓐ .0045
   Ⓑ 4050
   Ⓒ 1000
   Ⓓ 405

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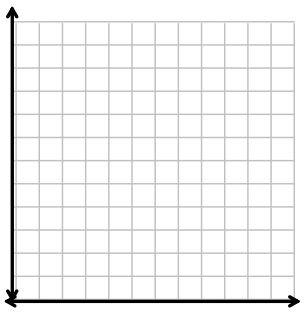
8. 15 m/s = _____ km/hr. **(PS 1.3)**

   Ⓐ 87.1
   Ⓑ 36
   Ⓒ 4.16
   Ⓓ 54

A student uses a video camera to record how far a car has traveled at specific intervals of time. The student is controlling the time interval by way of the camera. The data is as shown below.

Displacement (m)	Time (s)
2.5	0.0
5.3	1.9
7.6	3.7
10.4	6.1
13.1	8.2



9. Graph the above data on the axes provided below and determine the relationship between the two variables. Remember labels and units. **(PS 1.1)**

① ② ③ ④ ⑤

10. What shape is the graph to the right? **(PS 1.1)**

    Ⓐ Ellipse
    Ⓑ Linear
    Ⓒ Hyperbola
    Ⓓ parabola

11. The object in the graph is: **(PS 1.4)**

    Ⓐ moving at a constant velocity
    Ⓑ accelerating uniformly in a positive direction
    Ⓒ accelerating uniformly in a negative direction
    Ⓓ decelerating uniformly in a positive direction

12. Find the slope (with units) for the new graph. **(PS 1.1)**

① ② ③ ④ ⑤

13. Write the mathematical model (equation) for the relationship. **(PS 1.2)**

① ② ③ ④ ⑤

14. For the data shown above, if the time doubles, the displacement will **(PS 1.4)**

    Ⓐ Double
    Ⓑ Be cut in half
    Ⓒ Quadruple
    Ⓓ Decrease by a factor of ¼

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UNIT VII COMMON ASSESSMENT ACTION PHYSICS

1. The rate at which work is done is called _____ . **[PS 7.3]**

   Ⓐ Energy
   Ⓑ Power
   Ⓒ Velocity
   Ⓓ Work

2. Alfredo and Bob have the same mass and climb a set of stairs. It takes Alfredo 4.5 sec and Bob 4.9 sec Which person uses more power? **[PS 7.3]**

   Ⓐ Alfredo
   Ⓑ Bob
   Ⓒ Neither, they both use the same power.
   Ⓓ Not enough information is given to know.

3. Which requires more energy: lifting a 50 kg sack vertically 2 meters or lifting a 25 kg sack vertically 4 meters? **[PS 7.2]**

   Ⓐ Lifting the 50 kg sack.
   Ⓑ Lifting the 25 kg sack.
   Ⓒ Both require the same amount of work.
   Ⓓ Not enough information is given to determine whch.

4. The MKS units of power are _____. **[PS 7.3]**

   Ⓐ kilograms
   Ⓑ Joules
   Ⓒ Newtons
   Ⓓ watts

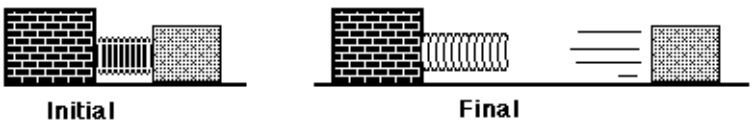
5. If an object is raised from 1m off the floor to 2m off the floor, its GPE (gravitational potential energy) would .. **[PS 7.2]**

   Ⓐ increase by some unknown amount.
   Ⓑ decrease by some unknown amount.
   Ⓒ increase by a factor of 2.
   Ⓓ decrease by a factor of 2.

6. The MKS units of energy are _____ . **[PS 7.1]**

   Ⓐ kilograms
   Ⓑ Joules
   Ⓒ Newtons
   Ⓓ watts

7. The compressed spring is released and pushes a box. **[PS 7.1]**



   Ⓐ The elastic energy of the spring becomes the gravitational potential energy of the box.
   Ⓑ The kinetic energy of the spring becomes the gravitational potential energy of the box.
   Ⓒ The gravitational potential energy of the spring becomes the kinetic energy of the box.
   Ⓓ The elastic energy of the spring becomes the kinetic energy of the box.

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Solve each problem. *Show your work*. Remember units on your answer

8. How much energy does a 33,000kg truck have if it is moving along a level road at 27m/s ? What type of energy is it ? **[PS 7.2]**

④ ③ ② ①

9. A 5.0kg sled with a 45kg person in it starts from rest at the top of a 14m high hill. How much energy does the sled & person have? What type of energy is it? **[PS 7.2]**

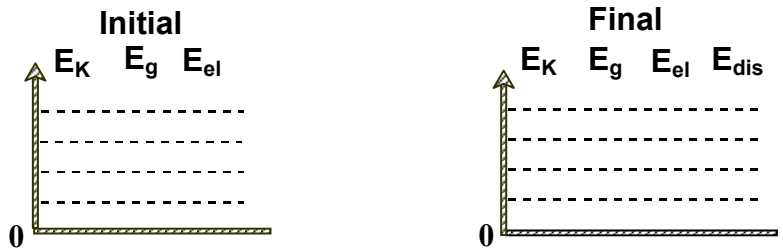
④ ③ ② ①

10. The person and sled in question #9 get to the bottom of the hill and are traveling at 11m/s. How much kinetic energy does the sled & person have? **[PS 7.2]**

③ ② ①

11. Complete the bar graphs for the sled/person combination at the top of the hill and the bottom of the hill. **[PS 7.1]**

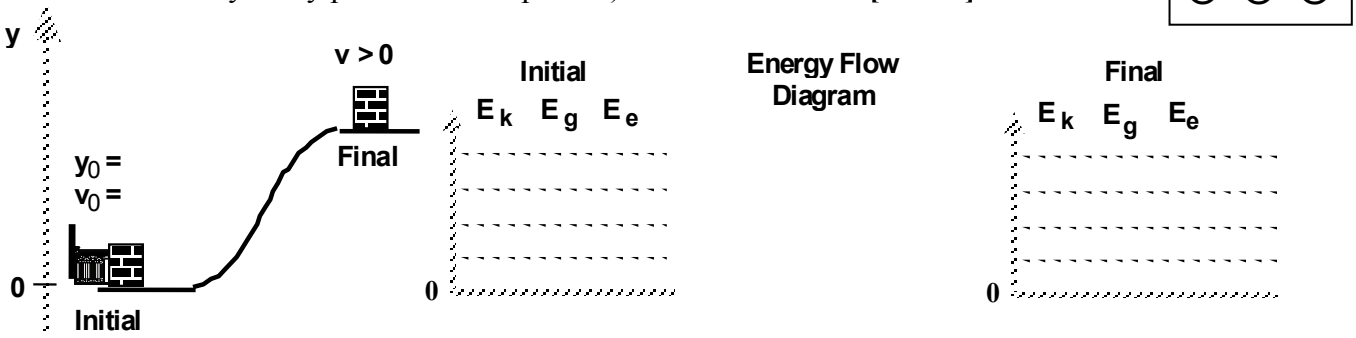
⑤ ④ ③ ② ①



How much energy was dissipated as they slid down the hill?

12. A crate is propelled up a hill by a tightly coiled spring. Qualitatively complete the bar graphs for the Initial and Final positions assuming no energy is lost in the process. (Note the details about velocity and y position in the picture) **[PS 7.1]**

③ ② ①



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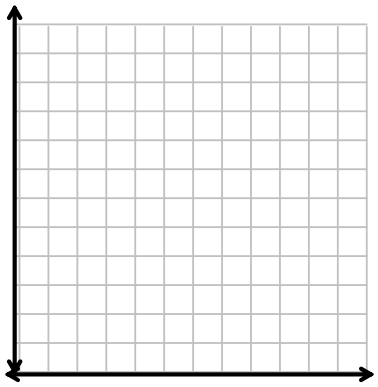
UNIT II & III COMMON ASSESSMENT
ACTION PHYSICS

1. Graph the data set below. Be sure to label your axis. Assume the Right column in each set of values to be the independent variable. **(PS 2/3.2)**

① ② ③ ④ ⑤

V (m/s)	t (s)
4.0	0
5.2	0.9
6.5	2.1
7.3	3.0
8.1	4.1
9.3	5.4
10.8	6.6



2. What is the slope of the line? **(PS 2/3.2)**

① ② ③ ④ ⑤

3. What is the equation to the line? **(PS 2/3.2)**

① ② ③ ④ ⑤

4. What is the object's average acceleration?**(PS 2/3.3)**

① ② ③ ④ ⑤

5. Determine the object's velocity at 18.0 seconds using your mathematical model **(PS 2/3.3)**

① ② ③ ④ ⑤

6. Determine the object's displacement from time t=0 s. to t=10.8 s. **(PS 2/3.3)**

① ② ③ ④ ⑤

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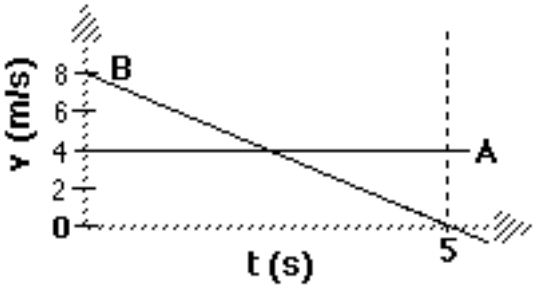
Consider the **velocity** vs. time graph for objects A and B below.

7. Which object traveled the farthest in five seconds? **(PS 2/3.2)**

① ② ③ ④ ⑤



8. What is the acceleration of object A? **(PS 2/3.3)**

① ② ③ ④ ⑤

9. What is the acceleration of object B? **(PS 2/3.3)**

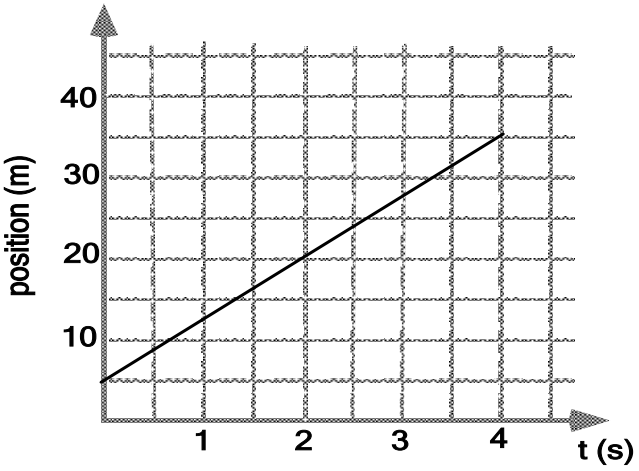
① ② ③ ④ ⑤

10. How long does it take an automobile to travel 400 km if its velocity is 20 km/hr? **(PS 2/3.3)**

① ② ③ ④ ⑤

11. Find the slope and write the equation for the graph at the right. What is the slope a measure of? **(PS 2/3.1)**

① ② ③ ④ ⑤



12. Write the equation for the line**(PS 2/3.1)**

① ② ③ ④ ⑤

13. How far from the zero position would the object be in 16 seconds? **(PS 2/3.3)**

① ② ③ ④ ⑤

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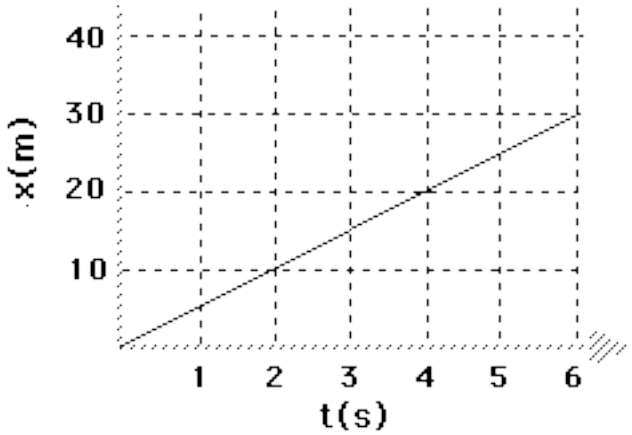
Consider the position vs. time graph for Flipper below



14. Determine Flipper's average speed. Show your work. **(PS 2/3.1)** ① ② ③ ④ ⑤

15. Mathematically model (equation) the relationship between position and time. **(PS 2/3.1)** ① ② ③ ④ ⑤

_____

16. What will Flipper's position be at 8.0 s? Show how you got your answer. **(PS 2/3.3)** ① ② ③ ④ ⑤

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SCIENCE LAB RUBRIC		1	2	3	4	5
Clarity of Purpose	Heading	①	②			
	Problem/ Question	①	②			
	Hypothesis	①	②	③		
	Theory	①	②	③	④	
Organization	Materials	①	②			
	Procedures		②	③	④	⑤
	Results: Data Table	①	②	③		
	Results: Graph	①	②	③	④	⑤
Support	Data Analysis		②	③	④	⑤
	Calculations	①	②	③		
	Conclusion	①	②	③	④	⑤
Mechanic		①	②	③		

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Unit VIII: Test A

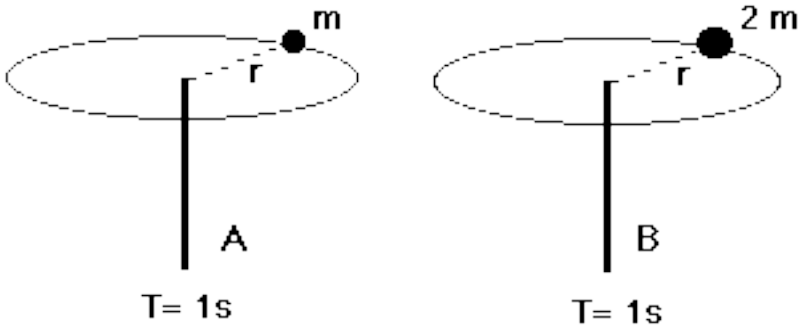
In each of the pairs of diagrams below, a sphere attached to a string is swung in a flat circle (similar to the technique used in the lab). Examine each diagram carefully to note which variable has been changed. Questions 1-6 are **PS. 5/6.3**

1. How would the F_c of A compare to F_c of B?

   Ⓐ A > B
   Ⓑ A < B
   Ⓒ A = B

2. How would the speed of A compare to that of B?

   Ⓐ A > B
   Ⓑ A < B
   Ⓒ A = B



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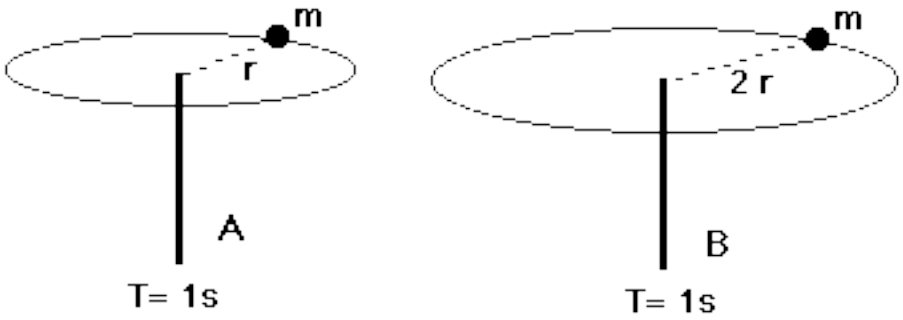
3. How would the F_c of A compare to F_c of B?

   Ⓐ A > B
   Ⓑ A < B
   Ⓒ A = B

4 How would the speed of A compare to that of B?

   Ⓐ A > B
   Ⓑ A < B
   Ⓒ A = B



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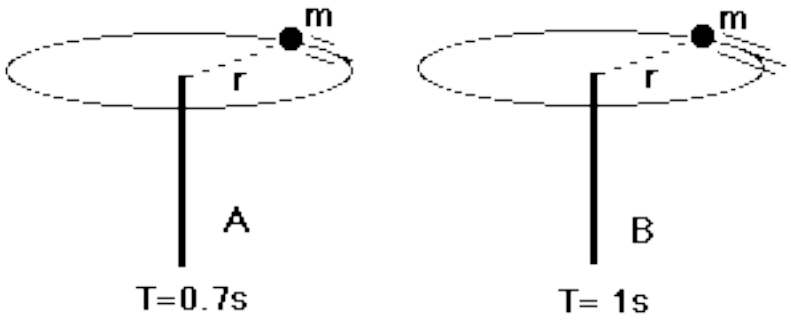
5. How would the F_c of A compare to F_c of B?

   Ⓐ A > B
   Ⓑ A < B
   Ⓒ A = B

6 How would the speed of A compare to that of B?

   Ⓐ A > B
   Ⓑ A < B
   Ⓒ A = B



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7. A 1500 kg car is on a road that makes a rather tight right turn. The turn in the road has a radius of 70.0 m. The road is not banked and the coefficient of static friction between the tires and the road is 0.80. Determine the maximum speed the car can have without sliding off the road. **PS. 5/6.3**

1 2 3 4 5 6 7 8

8. A 2000 kg car takes the same turn. How does its maximum speed compare to that of the 1500 kg car? By what factor does the speed change? **PS. 5/6.3**

1 2 3 4 5 6

9. Neptune has a mass of 1.0243×10^{26} kg and an orbital radius of 4.553×10^{9} km from the sun. The sun's mass is 1.99×10^{30} kg. How long does it take Neptune to make one full orbit around the sun? (The earth takes one year to orbit the sun; I'm asking you to calculate Neptune's Orbital Period). **Convert your answer into years: Assuming 365 days in one year** **PS. 5/6.4**

1 2 3 4 5 6 7 8

10. What is the velocity of an electron that circles a proton due to the gravitational attraction between the two particles assuming that the atom is that of a hydrogen atom (one proton and one electron)? For this problem, we will neglect the electrostatic force between the two oppositely charged particles. Assume the mass of a proton $m_p = 1.67\times10^{-27}$ kg and the mass of an electron $m_e = 9.11\times10^{-31}$ kg. Assume that the proton and electron are separated by a distance of $r = 5.29\times10^{-11}$ m. **PS. 5/6.4**

1 2 3 4 5 6 7 8

11. You sit at the edge of a merry-go-round of radius 2.2 m. Your friends spin the ride faster and faster. The coefficient of static friction is 0.84. Right before you slide off on a tangent. Determine the period of rotation for the ride. **PS. 5/6.3**

1 2 3 4 5 6 7 8

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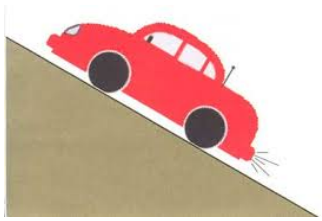
Unit IV Re-Take Quiz



A 900 kg. Car is parked on a hill with an incline of 36°.

1. Draw a force diagram and label it with all forces acting on the car. ① ② ③ ④

2. What is the value of the normal force acting on the car? ① ② ③ ④

3. What is the value of the force of friction acting on the car? ① ② ③ ④

4. What is the value of the coefficient of friction? ① ② ③ ④

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