Study guide for intro to physics test Name: \_\_\_\_\_\_\_\_\_\_\_

1. What is the difference between mass and weight?

2. As you move out of the gravitational field of Earth, what happens to your mass? Your weight? Why?

3. How would your weight change if you went to the moon? What if you went to Jupiter? Explain.

4. The attractive force that causes something that has mass to have weight is called \_\_\_\_\_\_\_\_\_\_\_.

5. List all three of Newton’s Laws of Motion below. Give one example for each.

1st law-

Example-

2nd law-

Example-

3rd law-

Example-

6. A basketball player jumps up and lands on the ground. When he lands, his knees buckle and he falls. Which law of motion, and why?

7. I roll a ball on a smooth, flat surface, and it only stops when it hits a fence. Which law of motion, and why?

8. When my car breaks down I try to push it into the gas station but it is too heavy. I remember it being much easier to push my bike. Which law of motion, and why?

9. Using the formula for Newton’s second law, calculate the mass of a rock that has an acceleration of 3.6m/s2 and a force of 14N acting on it. (Units for your answer are kg, and please use significant figures).

10. What is the difference between speed and velocity?

11. List the formula for calculating speed.

12. List the formula for calculating acceleration.

13. What is the difference between distance and displacement?

14. A person runs southwest for 8.5km in 60 minutes. Calculate the person’s velocity in m/s. Note: You will have to convert units!

15. A ball is rolling down a ramp. Describe how the ball’s velocity changes with time. (Think of the lab and include the word “acceleration” in your answer).

16. Match the following units with the words Velocity, Speed, Distance, and Acceleration.

Km

Km/s West

Km/s

Km/s2

17. List three ways an object could be accelerating (you don’t need to be specific, just general guidelines).

18. If you are going backwards, do you have negative acceleration? Explain your answer.

19. Draw a graph of velocity over time that shows positive and steady acceleration.

20. List the standard **base** units in the metric system for the following:

Volume Mass Length

Temperature Density Time

21. Briefly **explain** the two methods of calculating volume for a rectangular and irregular object.

22. What is the formula and correct units for density? (Any density units will work)

23. How can I tell if something floats or sinks in water without putting it in water?

24. Would a car or a bike have more inertia? Explain.

25. List the following gas laws:

Charles’ Gay-Lussac’s

Boyle’s Ideal gas law

(Note: you will have to solve at least one of these equations on the test, so if you need additional practice, tell Ms. Lowell or find some problems. You are not expected to memorize the equations).

26. Explain the difference between an atom and a molecule and give an example of each.

27. Explain the difference between a homogeneous and heterogeneous mixture and give an example of each.

28. Give an example of acceleration in which your velocity is changing but your speed is not changing.

29. If a car is speeding up in reverse, what is the acceleration positive or negative? Explain.

30. If the final velocity of an accelerating object is 4m/s and the initial velocity is 10m/s, and the time it takes is 30 seconds, what is the acceleration? A = (VF – VI) / T

31. Give an example in which your distance is 12 miles and your displacement is 2 miles south.

31. Match the following units with the words

 m/s length

 h speed

 km acceleration

 m/s2 time

32. What is the formula for calculating speed? (What two things do I need to know?)

33. List whether each state of matter has a definite shape or volume.

 Solid- definite shape, definite volume (example, I did this one for you ☺)

 Liquid-

 Gas-

 Plasma-

35. The \_\_\_\_\_\_\_ point and \_\_\_\_\_\_\_ point of water are both 0 degrees Celcius.

36. Which two things have an inversely proportional relationship? (Choices are temperature, volume, and pressure)

37. In addition to time, what two things do I need to have to calculate acceleration? (Think of the equation)

38. Give an example of negative acceleration but positive velocity.

40. A graph of the change in distance over the change in time is showing \_\_\_\_\_\_\_\_\_\_\_\_\_.

A graph of the change in velocity over the change in time is showing \_\_\_\_\_\_\_\_\_\_\_\_\_.

41. Differentiate between distance and displacement.

1. Chanice drives her scooter 7 kilometres north. She stops for lunch and then drives 5 kilometres east. What distance did she cover? What was her displacement?
2. Anthony walks to the pizza place for lunch. He walk 1 km east, then 1 km south and then 1 km east again. What distance did he cover? What was his displacement?
3. On his fishing trip Justin rides in a boat 12 km south. The fish aren’t biting so they go 4 km west. They then follow a school of fish 1 km north. What distance did they cover? What was their displacement?
4. Tara goes on a camel safari in Africa. She travels 5 km north, then 3 km east and then 1 km north again. What distance did she cover? What was her displacement?
5. Define balance force.
6. Define unbalance force.
7. Are any of the forces acting on the freezer balanced?

**N**

**Ffriction**

**W**

**Fpush**

If so, which ones?

1. Are any of the forces acting on the freezer unbalanced?

If so, which ones?

1. Describe the motion of the freezer.
2. Two men of equal strength have a tug-of-war. Draw the forces that are acting onto the picture.

 Which man will win the tug-of-war? **Left** or **Right**

1. Another man joins each end of the rope. Does this affect the result of the tug-of-war? If not, why not? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Another man joins the team on the left. Which team will win the tug-of-war now? Why?

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In the picture for Question 6 above, each man pulls with a force of 10 Newtons.

1. How much force do the team on the left pull with? \_\_\_\_\_\_\_\_\_\_ Newtons
2. How much force do the team on the right pull with? \_\_\_\_\_\_\_\_\_\_ Newtons
3. What is the formula for density?
4. What is the density of CO gas if 0.196 g occupies a volume of 100 ml?
5. A block of wood 3 cm on each side has a mass of 27 g. What is the density of the block? (Hint, don’t forget to find the volume of the wood.)
6. An irregularly shaped stone was lowered into a graduated cylinder holding a volume of water equal to 2 ml. The height of the water rose to 7 ml. If the mass of the stone was 25 g, what was its density?

60. A 10.0 cm3 sample of copper has a mass of 89.6 g. What is the density of copper?

61. Silver has a density of 10.5 grams/cm3 and gold has a density of

19.3 g/cm3. Which would have the greater mass, 5cm3 of silver or 5cm3 of gold?

62. Elements:

* A pure substance containing only one kind of \_\_\_\_\_\_\_\_\_\_\_\_.
* An element is always uniform all the way through (homogeneous).
* An element \_\_\_\_\_\_\_\_\_\_\_\_\_ be separated into simpler materials (except during nuclear reactions).
* Over 100 existing elements are listed and classified on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Compounds:

* A pure substance containing two or more kinds of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* The atoms are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ combined in some way. Often times (but not always) they come together to form groups of atoms called molecules.
* A compound is always homogeneous (uniform).
* Compounds \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ be separated by physical means. Separating a compound requires a chemical reaction.
* The properties of a compound are usually different than the properties of the elements it contains.

Mixtures:

* Two or more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ NOT chemically combined.
* No reaction between substances.
* Mixtures can be uniform (called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) and are known as solutions.
* Mixtures can also be non-uniform (called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_).
* Mixtures can be separated into their components by chemical or physical means.
* The properties of a mixture are similar to the properties of its components.

**63.** Classify each of the following as elements (E), compounds (C) or Mixtures (M). Write the letter X if it is none of these.

\_\_\_Diamond (C) \_\_\_Sugar (C6H12O6) \_\_\_Milk \_\_\_Iron (Fe)

\_\_\_Air \_\_\_Sulfuric Acid (H2SO4) \_\_\_Gasoline \_\_\_Electricity

\_\_\_Krypton (K) \_\_\_Bismuth (Bi) \_\_\_Uranium (U) \_\_\_Popcorn

\_\_\_Water (H2O) \_\_\_Alcohol (CH3OH) \_\_\_Pail of Garbage \_\_\_A dog

\_\_\_Ammonia (NH3) \_\_\_Salt (NaCl) \_\_\_Energy \_\_\_Gold (Au)

\_\_\_Wood \_\_\_Bronze \_\_\_Ink \_\_\_Pizza

\_\_\_Dry Ice (CO2) \_\_\_Baking Soda (NaHCO3) \_\_\_Titanium (Ti) \_\_\_Concrete

**Part 3:** Match each diagram with its correct description. Diagrams will be used once.

 **A B C D E**

\_\_\_64. Pure Element – only one type of atom present.

\_\_\_65. Mixture of two elements – two types of uncombined atoms present.

\_\_\_66. Pure compound – only one type of compound present.

\_\_\_67. Mixture of two compounds – two types of compounds present.

\_\_\_68. Mixture of a compound and an element.