Exam 1

Part I: Multiple Choice (2 points each)

Directions: Please circle the *best* answer for each of the following questions.

Question 1. If experimental results do not support your hypothesis, you should

1. do more experiments.
2. pretend that the experimental results do support your hypothesis.
3. write another hypothesis.
4. a and c
5. all of the above

Question 2. 5.21 cm is the same distance as

1. 5.21 mm
2. 52.1 dm
3. 5210 m
4. 0.0521 m
5. 0.000521 km

Question 3. The measurement of the gravitational pull on an object is its

1. volume.
2. length.
3. size.
4. mass.
5. weight.

Question 4. Significant figures are important because they indicate

1. the number of measurements.
2. the number of digits in a measurement.
3. the accuracy of the conversion factor.
4. a counted number.
5. the number of digits on a calculator.

Question 5. Compounds can be broken down into their elements by

1. chemical processes.
2. cooling.
3. physical processes.
4. evaporation.
5. melting.

Question 6. Name the piece of equipment:



Question 7. If you spill chemical on your hand, you should

1. ignore it.
2. take a shower when you get home.
3. rinse for 15 minutes and inform your instructor.
4. use the eye wash.
5. none of the above.

Question 8. There is more traffic between 8 and 9 in the morning because most people start work at 9. This is an example of

1. an observation.
2. an experiment.
3. a hypothesis.
4. a theory.
5. the scientific method.

Question 9. Which of the following is not true about the element sodium?

1. Atomic symbol, Na
2. Atomic number 11
3. Alkali metal
4. Nonmetal
5. all of the above

Question 10. The element in this list with chemical properties similar to magnesium is

1. boron.
2. sodium.
3. strontium.
4. chlorine.
5. carbon.

Part II: Short Answer

Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work.

Question 1. Complete the following sentences (5 points).

1. There are \_\_\_\_\_\_\_eight\_\_\_\_\_\_\_ neutron atoms in a nitrogen atom with mass number 15.
2. There are \_\_\_\_nine\_\_\_\_\_\_\_\_\_\_ neutrons in a neon atom with one more proton that the number of neutrons.
3. There are \_\_\_\_\_\_six\_\_\_\_\_\_\_\_ neutrons in a carbon atom with the same number of protons and neutrons.
4. There are \_\_\_\_\_\_\_seven\_\_\_\_\_\_\_ neutrons in an oxygen atom whose mass number is 15.
5. There are \_\_\_\_\_ten\_\_\_\_\_\_\_\_\_ neutrons in a fluorine atom with mass number 19.

Question 2. Identify each of the following transformations as a chemical or physical change (6 points).

1. Silver tarnishing \_\_\_\_\_\_\_\_\_chemical\_\_\_\_\_\_\_
2. Baking a cake \_\_\_\_\_\_\_\_\_chemical\_\_\_\_\_\_\_
3. Cutting the grass \_\_\_\_\_\_\_\_\_physical\_\_\_\_\_\_\_
4. A nail rusting \_\_\_\_\_\_\_\_\_chemical\_\_\_\_\_\_\_
5. Water boiling \_\_\_\_\_\_\_\_\_physical\_\_\_\_\_\_\_\_
6. A button falling off a shirt \_\_\_\_\_\_\_\_\_physical\_\_\_\_\_\_\_\_

Question 3. The number of kilojoules needed to raise the temperature of 48.7 g of water from 22.8 °C to 62.0 °C. The specific heat of water is 4.184 J/g °C (8 points).

$$q=mc∆T$$

$$q=\left(48.7 g\right)\left(4.184\frac{J}{g ℃}\right)\left(62.0 ℃-22.8 ℃\right)×\frac{1 kJ}{1000 J}$$

$$q=\left(48.7 g\right)\left(4.184\frac{J}{g ℃}\right)\left(39.2 ℃\right)×\frac{1 kJ}{1000 J}$$

$$q=7.98742336 kJ≈7.99 kJ$$

Question 4. Are the numbers in each of the following statements measured or exact (6 points)?

1. A lab test showed a blood sugar level

is 350 mg/dL. \_\_measured\_\_\_\_\_\_\_

1. There are 452 pages in a book. \_\_\_\_\_\_exact\_\_\_\_\_\_
2. There are 100 aspirin in a bottle. \_\_\_\_\_\_exact\_\_\_\_\_\_
3. The rabbit weighs 2.5 pounds. \_\_\_\_\_measured\_\_\_\_\_\_\_
4. You feel ill and your temperature is

100.1 °F. \_\_\_\_\_measured\_\_\_\_\_\_\_

1. In the U.S. customary system there are

5280 feet in one mile. \_\_\_\_\_\_\_\_\_exact\_\_\_\_\_\_\_\_\_

Question 5. Perform the appropriate action on each of the following numbers or calculations (6 points)

* 1. Round 539.2453 to four significant figures. 539.2
	2. How many significant figures are in 835000? 3
	3. What is the log of 8.36 x 10-4 -3.077793723 ≈ -3.078
	4. Write the number 0.0006434535425 in scientific notation with 3 significant figures. 6.43 x 10-4
	5. Write 6.356 x 104 as a number 63560
	6. How many significant figures are in 0.00352000 6

Question 6. A cannonball has a mass of 3.25 kg. When the ball is placed in a graduated cylinder containing 600. mL of water, the water level rises to 745 mL. What is the density of the cannonball in g/mL (6 points)?

$$d=\frac{m}{V}=\frac{3.25 kg}{(745 mL-600.mL)}×\frac{1000 g}{1 kg}=\frac{3.25 kg}{145 mL}×\frac{1000 g}{1 kg}=22.4\frac{g}{mL}$$

Question 7. In a paint factory, the pink paint contains 4.36 % titanium dioxide. If 3.75 kg of titanium dioxide were used for pink paint last Thursday, how many pounds of pink paint were produced (6 points)?

$$3.75 kg TiO\_{2}×\frac{100 kg mixture }{4.36 kg TiO\_{2}}×\frac{1000 g}{1 kg}×\frac{1 lb}{454 g}=189.4475205 lb ≈189 lb$$

Question 8. Write the atomic symbols for isotopes with the following characteristics. Express your answer as an isotope $$ (12 points).

1. 27 protons and 32 neutrons $$
2. a neon atom with twelve neutrons $$
3. a mass number of 24 and 13 neutrons $$
4. a titanium cation with 25 neutrons and 19 electrons $^{3+}$

Question 9. For each element give the symbol and identify each element as an alkali metal, alkaline earth metal, halogen, noble gas, transition metal, or inner transition metal (12 points).

1. Cobalt \_\_Co\_\_\_ \_\_\_\_\_transition metal\_\_\_\_\_\_\_
2. Lithium \_\_Li\_\_\_ \_\_\_\_\_\_alkali metal\_\_\_\_\_\_
3. Iodine \_\_I\_\_\_ \_\_\_\_halogen\_\_\_\_\_\_\_\_
4. Uranium \_\_U\_\_\_ \_\_\_\_inner transition metal\_\_\_\_\_\_\_\_
5. Neon \_\_\_Ne\_\_ \_\_\_\_noble gas\_\_\_\_\_\_\_\_
6. Barium \_\_Ba\_\_\_ \_\_\_\_\_alkaline earth metal\_\_\_\_\_\_\_

Question 10. The following questions relate to temperature (8 points).

1. What is the temperature of Figure A in Celsius? 61.5 °C
2. Convert your answer above to Fahrenheit.

$$℉=\frac{9}{5}℃+32=\frac{9}{5}\left(61.5\right)+32=110.7+32=142.7 ℉≈143 ℉$$

1. Convert your answer to Kelvin.

$$K=℃+273.15=61.5+273.15=334.65 K≈334.7 K$$

Question 11. Classify each of the following as macroscopic, microscopic, or particulate (4 points)

* 1. Tree macroscopic
	2. Plant cell microscopic
	3. Protein molecule particulate
	4. Electron particulate