

Please read all the questions VERY carefully before answering. Start from number 7 on your scantron for multiple choice questions. Write neatly. If I cannot read your answer, you will not receive any point. Use the attached periodic table and constant chart. No outside paper is allowed. Total points =  $38 + (24 \times 3) = 110$

SHORT ANSWER. In all calculations, write the set up equation first, then put the raw data with units. Then do your calculations. Points will be deducted if your answer is not clearly written.

1) Show calculations with units to convert 16.32 pounds (lb) into grams (g) (given  $1 \text{ kg} = 2.205 \text{ lb}$  and  $1 \text{ kg} = 1000\text{g}$ ). (6 pts.) 1) \_\_\_\_\_

2) Calculate (with units) how many  $\text{m}^2$  are in  $2659 \text{ cm}^2$  (given  $1 \text{ m} = 100 \text{ cm}$ )? (6 pts.) 2) \_\_\_\_\_

3) Calculate the volume of 12.8 g of a liquid that has a density of  $0.789 \text{ g/mL}$ . with correct numbers of significant figures (6 pts.) 3) \_\_\_\_\_

4) Show your calculation to find how many kilojoules are there in 95.0 Calories with correct numbers of significant figures? (Note the capital C in Calorie and given  $1 \text{ cal} = 4.18 \text{ joules}$ ) (6 pts.) 4) \_\_\_\_\_

5) Suppose it took 108 joules of energy to raise a bar of gold from  $25.0^\circ\text{C}$  to  $29.7^\circ\text{C}$ . Given that the specific heat capacity of gold is  $0.128 \text{ J/g}\cdot^\circ\text{C}$ , what is the mass (in grams) of the bar of gold? Show all your calculations with set up equation and units. Given  $q = m \cdot C \cdot \Delta T$ . (8 pts.) 5) \_\_\_\_\_

6) Density of a metal A is  $1.7 \text{ g/cc}$  and that of metal B is  $7.9 \text{ g/cc}$ . If a ball made from metal B has a mass of 409.5 grams, then what would be the mass of a ball, made from metal A. The balls have the same volume. (6 pts.) 6) \_\_\_\_\_

MULTIPLE CHOICE. Start from number 7 on your scantron. Choose the one alternative that best completes the statement or answers the question (3 pts. each).

7) The correct scientific notation for the number 0.00050210 is: 7) \_\_\_\_\_  
A)  $5.0210 \times 10^4$   
B)  $5.021 \times 10^{-4}$   
C)  $5.0210 \times 10^{-4}$   
D)  $5.021 \times 10^4$   
E) none of the above

8) The correct number of significant figures in the number " $9.080 \times 10^4$ " is 8) \_\_\_\_\_  
A) ambiguous  
B) 4  
C) 3  
D) 5  
E) none of the above

9) Determine the answer to the following equation with correct number of significant figures: 9) \_\_\_\_\_  
 $(17.103 + 2.03) \times 1.02521 =$  \_\_\_\_\_  
A) 20  
B) 19.62  
C) 19.6153  
D) 19.6  
E) none of the above

10) The correct prefix for the multiplier 1,000,000 is: 10) \_\_\_\_\_  
A) mega.  
B) micro.  
C) milli.  
D) nano.  
E) none of the above

11) What is the standard SI unit for mass? 11) \_\_\_\_\_  
A) kilogram  
B) ton  
C) gram  
D) pound  
E) none of the above

12) How many  $\text{cm}^3$  are there in  $1.25 \text{ ft}^3$ ? 12) \_\_\_\_\_  
A) 38.1  
B)  $3.54 \times 10^4$   
C)  $5.49 \times 10^3$   
D) 246  
E) none of the above

- 13) Given the density of Au is  $19.3 \text{ g/cm}^3$ , determine the mass of gold in an ingot with the dimensions of  $10.0 \text{ in} \times 4.00 \text{ in} \times 3.00 \text{ in}$ . 13) \_\_\_\_\_
- A)  $2.32 \times 10^3$   
 B) 0.161  
 C)  $3.80 \times 10^4$   
 D) 102  
 E) none of the above
- 14) The distance from New York City to Washington, DC is approximately 235 miles. Identify the correct solution map to convert from miles to kilometers using the prefix multipliers and the given conversion factors:  $1 \text{ mile} = 5280 \text{ ft}$ ;  $1 \text{ ft} = 12 \text{ in}$ ;  $1 \text{ in} = 2.54 \text{ cm}$ . 14) \_\_\_\_\_
- A)  $235 \text{ mile} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{2.54 \text{ cm}}{1 \text{ in}} \times \frac{1 \text{ m}}{10^{-2} \text{ cm}} \times \frac{10^3 \text{ km}}{1 \text{ m}}$   
 B)  $235 \text{ mile} \times \frac{1 \text{ ft}}{5280 \text{ mile}} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{1 \text{ in}}{2.54 \text{ cm}} \times \frac{10^{-2} \text{ cm}}{1 \text{ m}} \times \frac{1 \text{ km}}{10^3 \text{ m}}$   
 C)  $235 \text{ mile} \times \frac{5280 \text{ ft}}{1 \text{ mile}} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{2.54 \text{ cm}}{1 \text{ in}} \times \frac{10^{-2} \text{ m}}{1 \text{ cm}} \times \frac{1 \text{ km}}{10^3 \text{ m}}$   
 D)  $235 \text{ mile} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{1 \text{ in}}{2.54 \text{ cm}} \times \frac{10^{-2} \text{ cm}}{1 \text{ m}} \times \frac{1 \text{ km}}{10^3 \text{ m}}$   
 E)  $235 \text{ mile} \times \frac{5280 \text{ ft}}{1 \text{ mile}} \times \frac{1 \text{ ft}}{12 \text{ in}} \times \frac{2.54 \text{ in}}{1 \text{ ft}} \times \frac{1 \text{ m}}{10^{-2} \text{ cm}} \times \frac{10^3 \text{ km}}{1 \text{ m}}$
- 15) Which state of matter has indefinite shape and is compressible? 15) \_\_\_\_\_
- A) plasma  
 B) liquid  
 C) solid  
 D) gas  
 E) none of the above
- 16) How would you classify salt water? 16) \_\_\_\_\_
- A) pure substance-element  
 B) mixture-heterogeneous  
 C) mixture-homogeneous  
 D) pure substance-compound  
 E) none of the above
- 17) Which of the following items is a chemical property? 17) \_\_\_\_\_
- A) the paint color on a new red Corvette  
 B) the tarnishing of a copper statue  
 C) the odor of spearmint gum  
 D) the melting and boiling point of water  
 E) none of the above

- 18) If a particular process is endothermic, the reverse process must be a (an) \_\_\_\_\_  
A) chemical change.  
B) isothermal process.  
C) endothermic process.  
D) exothermic process.  
E) none of the above
- 19) What is the value of 98 °F in units of °C? \_\_\_\_\_  
A) 37  
B) 371  
C) 22  
D) 72  
E) none of the above
- 20) An atom containing 7 protons, 8 neutrons, and 7 electrons \_\_\_\_\_  
A) is an ion.  
B) cannot exist.  
C) is charge-neutral.  
D) is an oxygen atom.  
E) none of the above
- 21) Which of the following elements has only 12 protons? \_\_\_\_\_  
A) O  
B) C  
C) Zn  
D) Mg  
E) none of the above
- 22) The names of the elements whose symbols are Si, P, Mn, and S are respectively, \_\_\_\_\_  
A) silicon, phosphorus, magnesium, and sulfur.  
B) silicon, potassium, magnesium, and sulfur.  
C) silicon, potassium, magnesium, and sodium.  
D) silver, phosphorus, magnesium, and sulfur.  
E) silicon, phosphorus, manganese, and sulfur.
- 23) Metals are located where on the periodic table? \_\_\_\_\_  
A) zig-zag diagonal line  
B) right side  
C) left side  
D) middle  
E) none of the above
- 24) How many protons and electrons are present in  $O^{2-}$ ? \_\_\_\_\_  
A) 8 protons and 10 electrons  
B) 10 protons and 8 electrons  
C) 8 protons and 8 electrons  
D) 16 protons and 8 electrons  
E) none of the above

25) What is the charge on the ion formed by selenium?

25) \_\_\_\_\_

A) 2-

B) 2+

C) 1-

D) 1+

E) none of the above

TRUE/FALSE. In scantron fill the circle "A" for a True answer and "B" for False answer (3 pts. each).

26) The decimal number 0.0000010 expressed in scientific notation is  $1.0 \times 10^6$ .

26) \_\_\_\_\_

27) Zeros located between two numbers are not significant.

27) \_\_\_\_\_

28) One mile measures 5,280 feet long, so one square mile is equivalent to 5,280 square feet.

28) \_\_\_\_\_

29) The atomic number of nitrogen is 14.01.

29) \_\_\_\_\_

30) Protons and electrons each have a mass of 1 amu.

30) \_\_\_\_\_