Chem 51, Spring 2016 NAME_____
Exam 1 (Chapter 1) 75 pt
Answer Questions 1-24 on your scantron. Each question is worth (2 pt ea). Some question require marking more than one answer.

1.1 Classification of Matter
Use the following to answer Questions 1-4

A) pure substance B) mixture. C) homogeneous. D) heterogeneous E) compund DE) element

How would you classify…(*Mark all answers that apply*)
1. Coins in a piggy bank.

2. Salt water.

3. Iron.

4. H_2O

1.2 Elements, Compounds and the Periodic Table
5. Which of the following elements is an alkali metal?
A) nitrogen B) fluorine C) argon D) strontium E) potassium

6. The Group 8A(18) elements
A) are unreactive and are rarely found in combination with other elements.
B) are good conductors of electricity.
C) melt at high temperatures.
D) are liquids at room temperature.
E) react vigorously with water.

7. Which of the following properties is NOT a characteristic of metallic elements?
A) They are shiny.
B) They are good conductors of heat.
C) They react vigorously with water.
D) Most of them are liquids at room temperature.
E) They are good conductors of electricity.

8. What elements are in hydroxyapatite, $Ca_5(PO_4)_3OH$, a major compound in human bones and teeth?
A) carbon, potassium, oxygen, hydrogen
B) calcium, phosphorous, oxygen, hydrogen
C) carbon, phosphorous, oxygen, helium
D) calcium, phosphorous, oxygen, helium
E) carbon, potassium, oxygen, helium

9. The most abundant element on the earth surface is
A) hydrogen B) helium C) oxygen D) silicon E) aluminum

(8 pt) Match the following element names with their symbols or symbols with names, whichever is missing.

Barium		Silver	
	Be		Au
Uranium			V
Iodine			Si

BONUS (2 pt) What is another name for a pyromaniac?_____*Look on the periodic table for an element name that will fill the blank.*

27 pt

1.3 Math Counts

10. Mark your scantron for each one that is correct. *Mark all that apply.*

A) 1 microsecond = 10^6 s B) 1000 L = 1 mL C) 1 cm = 0.01 m D) 1000 km = 1 m

11. Which statement contains an exact number?
A) A gross of paper contains 144 sheets.
B) One sheet of paper is 0.0042 inches thick.
C) One sheet of paper measures 8.5 × 11 inches.
D) A ream of medium weight paper weighs 20 pounds

12. Which measurement is consistent with a graduated cylinder which has an uncertainty of ±0.1 mL?
A) 21.14 mL B) 21 mL C) 21.1 mL D) 21.140 mL E) 21.1400 mL

13. Perform the following mathematical operations. Express your answer to the proper number of significant figures.

$(93.789 - 5.40) \times 18.057 =$

A) 1600 B) 1590 C) 1596.2 D) 1596 E) 1596.239

14. How is this (105,006) written in correct scientific (exponential) notation?
A) 1.0 x 10^5 B) 1.05006 x 10^5 C) 1.1 x 10^5 D) 1.05 x 10^5

15. What is the percent by mass of salt in a mixture that contains 1.2 g of flour, 150 g of salt, and 650 g of sugar?
A) 8.1% B) 7.5% C) 19% D) 0.075%

1.4 Matter: The "Stuff" of Chemistry

16. Which of the following is/are characteristics of gases?
A) high compressibility
B) relatively long distances between molecules
C) formation of homogeneous mixtures regardless of the natures of non-reacting gas components
D) all of the above
E) none of the above

17. Which of the following statements bests describes the particles (atoms or molecules) in a liquid?
A) They are close together and in a fixed arrangement.
B) They are far apart and randomly arranged.
C) They are close together and randomly arranged.
D) They are far apart and in a fixed arrangement.

1.5 Measuring Matter

(10 pt) The doctor orders a drug to be administered once a day at 15 mg per kg body weight. The drug is supplied as 25 mg per 1.0 cc. The patient is a child and weighs 5.5 lb. How many mL of drug should be given?

18. Which of the following is a mass unit?
A) cg B) mL C) dm D) yd

19. Which of the following is the correct unit for length?
A) cg B) mL C) dm D) gal

(6 pt) Express the following quantity of energy, 74.6 joules, in cal and Cal.

1.6 How Matter Changes

In the following reaction $Mg(s) + Cl_2 \rightarrow MgCl_2$ how would you classify each substance according to answers A-E (*mark all that apply*)

A) Mixture B) Element C) Compound D) Homogeneous E) Heterogeneous

20. $Cl_2(g)$

21. $MgCl_2(s)$

22. $Mg(s)$

(3 pt) Balance the following chemical equation:

___H_2 + ___O_2 → ____H_2O

23. Which of the following is not a *physical change*?
A) Boiling water
B) Dissolving kool-aid
C) Frying an egg
D) Liquefying oxygen

24. An example of a chemical reaction is:
A) TNT is explosive
B) Gasoline is flammable
C) Zinc reacts with hydrochloric acid to produce hydrogen gas
D) All the above

23 pt

SI Units and Conversion Factors

Length

SI unit: meter (m)

1 meter	= 1.0936 yards
1 centimeter	= 0.39370 inch
1 inch	= 2.54 centimeters (exactly)
1 kilometer	= 0.62137 mile
1 mile	= 5280 feet
	= 1.6093 kilometers
1 angstrom	= 10^{-10} meter
	= 100 picometers

Mass

SI unit: kilogram (kg)

1 kilogram	= 1000 grams
	= 2.2046 pounds
1 pound	= 453.59 grams
	= 0.45359 kilogram
	= 16 ounces
1 ton	= 2000 pounds
	= 907.185 kilograms
1 metric ton	= 1000 kilograms
	= 2204.6 pounds
1 atomic mass unit	= 1.66056×10^{-27} kilograms

Volume

SI unit: cubic meter (m^3)

1 liter	= 10^{-3} m^3
	= 1 dm^3
	= 1.0567 quarts
1 gallon	= 4 quarts
	= 8 pints
	= 3.7854 liters
1 quart	= 32 fluid ounces
	= 0.94633 liter

Temperature

Energy

SI unit: joule (J)

1 joule	= 1 kg · m^2/s^2
	= 0.23901 calorie
	= 9.4781×10^{-4} btu (British thermal unit)
1 calorie	= 4.184 joules
	= 3.965×10^{-3} btu
1 btu	= 1055.06 joules
	= 252.2 calories

Pressure

SI unit: pascal (Pa)

1 pascal	= 1 N/m^2
	= 1 kg/m · s^2
1 atmosphere	= 101.325 kilopascals
	= 760 torr (mmHg)
	= 14.70 pounds per square inch
1 bar	= 10^5 pascals

PERIODIC CHART OF THE ELEMENTS

1 H 1.00797																1 H 1.00797	2 He 4.0026
3 Li 6.939	4 Be 9.0122											5 B 10.811	6 C 12.0112	7 N 14.0067	8 O 15.9994	9 F 18.9984	10 Ne 20.183
11 Na 22.9898	12 Mg 24.312											13 Al 26.9815	14 Si 28.086	15 P 30.9738	16 S 32.064	17 Cl 35.453	18 Ar 39.948
19 K 39.102	20 Ca 40.08	21 Sc 44.956	22 Ti 47.90	23 V 50.942	24 Cr 51.996	25 Mn 54.9380	26 Fe 55.847	27 Co 58.9332	28 Ni 58.71	29 Cu 63.54	30 Zn 65.37	31 Ga 69.72	32 Ge 72.59	33 As 74.9216	34 Se 78.96	35 Br 79.909	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.905	40 Zr 91.22	41 Nb 92.906	42 Mo 95.94	43 Tc (99)	44 Ru 101.07	45 Rh 102.905	46 Pd 106.4	47 Ag 107.870	48 Cd 112.40	49 In 114.82	50 Sn 118.69	51 Sb 121.75	52 Te 127.60	53 I 126.904	54 Xe 131.30
55 Cs 132.905	56 Ba 137.34	✳57 La 138.91	72 Hf 178.49	73 Ta 180.948	74 W 183.85	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.09	79 Au 196.967	80 Hg 200.59	81 Tl 204.37	82 Pb 207.19	83 Bi 208.980	84 Po (210)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	‡89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (262)	108 Hs (265)	109 Mt (266)	110 ? (271)	111 ? (272)	112 ? (277)						

✳ Lanthanide Series

58 Ce 140.12	59 Pr 140.907	60 Nd 144.24	61 Pm (147)	62 Sm 150.35	63 Eu 151.96	64 Gd 157.25	65 Tb 158.924	66 Dy 162.50	67 Ho 164.930	68 Er 167.26	69 Tm 168.934	70 Yb 173.04	71 Lu 174.97

‡ Actinide Series

90 Th 232.038	91 Pa (231)	92 U 238.03	93 Np (237)	94 Pu (242)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (249)	99 Es (254)	100 Fm (253)	101 Md (256)	102 No (256)	103 Lr (257)

SCRATCH PAPER