CHEM 160, FALL 2014 NAME_____

EXAM #1 (Chp 1, 2, 3) 105 pt

Mark only one answer on your scantron unless it is written to mark more than one. Each question is worth 2 pt.

Chapter 1.

1. (1.3) Testing a hypothesis is which step of the scientific method?
   A) Observation B) Hypothesis C) Experimentation D) Theory E) Law

2. (1.4) An example of speed is miles per hour. What quantities are measured to determine speed? *Mark two.*
   A) Volume B) Mass C) Temperature D) Length E) Time

(1.4) For the units.

3. 1 gigagram = _____ gram

4. 1 centimeter = _____ meter

5. 1 nanometer = _____ meter

6. 1 mL = _____ cm^3

USE THESE ANSWERS FOR QUESTIONS 3-6

A) 10^9	AB) 10^{-2}
B) 10^6	BC) 10^{-3}
C) 10^3	CD) 10^{-6}
D) 10^2	DE) 10^{-9}
E) 10^0	

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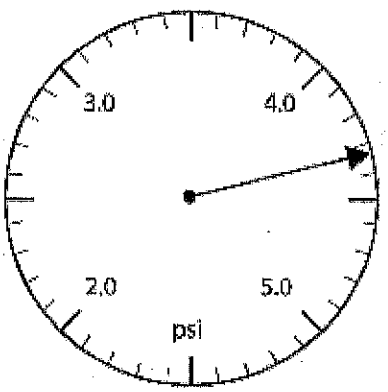
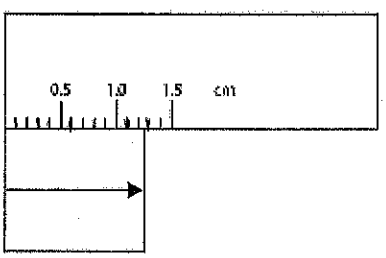
7. (1.4) Which is the smallest increase in temperature:
   A) 10 °C (such as from 100 °C to 110 °C),
   B) 10 K (such as from 100 K to 110 K),
   C) 10 °F (such as from 100 °F to 110 °F)?

(1.5) (6 pt) For each of the following measurements:
   A) Write the volume with the correct number of significant digits.
   B) Circle the uncertain digit
   C) Write the error in this measurement (the ±)



_____ psi?



_____ cm?

20 pt

8. (1.5) How would you describe the following density measurements in terms of accuracy and precision: 1.8 g/cm^3 , 1.7 g/cm^3 , 1.9 g/cm^3 , 1.8 g/cm^3 **The accepted value for this density = 1.8 g/cm^3.**

A) accurate / precise B) inaccurate / precise C) inaccurate / imprecise D) accurate / imprescise

Chapter 2.

(2.1) **USE THESE ANSWERS FOR QUESTIONS 9-14**

A) cancel	E) exact unit	DE) left
B) decrease	AB) given value	ABC) unwanted
C) defined	BC) inexact	BCD) variable
D) desired	CD) known	

9. The first step in the unit analysis procedure is to identify the unit for the value we want to calculate. We write this on the _____ side of an equals sign.
10. Next, we identify the _____ that we will convert into the desired value and we write it on the other side of the equals sign.

11. In the unit analysis process, we multiply by one or more conversion factors that cancel the _____ units and
12. generate the _____ units.

13. Note that the units in a unit analysis setup cancel just like _____ in an algebraic equation.

14. If you have used correct conversion factors in a unit analysis setup, and if your units _____ to yield the desired unit or units, you can be confident that you will arrive at the correct answer.

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15. (2.2) ***Mark all answers on your scantron*** that are exact (E) numbers.

A) 25 pounds of sugar B) 12 dozen apples C) $24.54 D) 55.5 m

16. (2.2) Which value has 3 significant figures?

A) 300 oz B) 0.70 x 10^4 kg C) 0.0230 L D) 231.0 kg

(2.2) (4 pt) Report the answers to the following calculations to the correct number of significant figures

23.40 - 18.2 =

$$\frac{456.8(5280)^2}{(10^3)^2(1.609)^2} =$$

(2.3) (6 pt) When a rubber stopper that weighs 77.7 g is submerged in water in a graduated cylinder, the water level rises from 55.5mL to 62.7 mL. Calculate the density (g/mL) of the riubber stopper. *Round your answer to the correct number of significant figures.*

(2.4) (4 pt) Calculate the grams of alcohol in 100.0 grams of a solution that contains 23.0% alcohol. *Round your answer to the correct number of significant figures.*

(2.3 & 2.5) (7 pt) The density of whole blood is 1.05 g/mL. A typical human has about 5.5 quarts of whole blood. How many kg is this? *Round your answer to the correct number of significant figures.*

17. (2.6) Temperature scales. Which of the following temperatures is the lowest?

A) 0 °C B) 0 °F C) 32 °F D) 212 K

Chapter 3.

18. (3.1) Which of the following ***does not*** describe the gaseous state?
    A. Same shape as a closed container
    B. Same volume as a closed container
    C. Random, independent particle movement
    D. Easily compressed
    E. All describe the gaseous state

19. (3.1) The change of state from a gas to a solid is called

A) evaporation B) condensation C) sublimation D) freezing E) deposition AB) melting

20. (3.2) Which is the most abundant element on the earths surface?
(a) hydrogen (b) oxygen (c) silicon (d) iron

21. (3.3) Which two elements have similar properties?
A) Kr B) He C) K D) F E) Se

22. (3.3) Group 1A elements are also called:
A) noble gases. B) halogens. C) alkaline earth metals. D) alkali metals.

(3.3) (10 pt)
Complete the following table.

Name	Symbol	Group number	Metal, nonmetal, or metalloid?	Representative element, transition metal,	Number for period
	Al				
silicon					
	Ni				
sulfur					

(3.4) (10 pt) Fill in the following table for these elements.

ISOTOPE NAME	ISOTOPE SYMBOL	ATOMIC #	MASS #	# PROT	# ELEC	# NEUT	CHARGE #
	$^{27}_{13}Al$						0
Chlorine-37				17	18		

(3.4) (8 pt) Calculate the average atomic mass of an element that has two isotopes.

	Mass (amu)	Percent Abundance
Isotope 1	10.012937	19.9
Isotope 2	11.009305	80.1

What element is this?_____

23. (3.5) Which of the following is NOT a physical property of metals?
A) are solids, liquids or gases B) shiny C) conduct electricity D) conduct heat E) ductile

36 pt

(3.6)The Mole

24. One mole of copper atoms is 6.022×10^{23} copper atoms.
A) True B) False

25. One mole of copper has a mass of 29 grams.
A) True B) False

26. How many atoms are in 1.50 moles of fluorine gas?
A) 6.022×10^{23} B) 9.03×10^{23} C) 18.98 D) 1.81×10^{24} E) none of the above

27. How many moles of Cu are in 1.48×10^{25} Cu atoms?
A) 0.0408 B) 24.6 C) 1.54×10^{25} D) 6.022×10^{23} E) none of the above

8 pt

USEFUL CONVERSION FACTORS AND RELATIONSHIPS

Length

SI unit: meter (m)

1 km = 0.62137 mi
1 mi = 5280 ft
= 1.6093 km
1 m = 1.0936 yd
1 in. = 2.54 cm (exactly)
1 cm = 0.39370 in.
1 Å = 10^{-10} m

Mass

SI unit: kilogram (kg)

1 kg = 2.2046 lb
1 lb = 453.59 g
= 16 oz
1 amu = 1.6605402 x 10^{-24} g

Energy (derived)

SI unit: Joule (J)

1 J = 1 kg-m^2/s^2
1 J = 0.2390 cal
= 1 C x 1 V
1 cal = 4.184 J
1 eV = 1.602 × 10^{-19} J

Pressure (derived)

SI unit: Pascal (Pa)

1 Pa = 1 N/m^2
= 1 kg/m-s^2
1 atm = 101,325 Pa
= 760 torr
= 14.70 lb/in^2
1 bar = 10^5 Pa

Volume (derived)

SI unit: cubic meter (m^3)

1 L = 10^{-3} m^3
= 1 dm^3
= 10^3 cm^3
= 1.0567 qt
1 gal = 4 qt
= 3.7854 L
1 cm^3 = 1 mL
1 in^3 = 16.4 cm^3

PERIODIC CHART OF THE ELEMENTS

1																	2
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	59	60	61	62	63	64	65	66	67	68	69	70	71
Ce 140.12	Pr 140.907	Nd 144.24	Pm (147)	Sm 150.35	Eu 151.96	Gd 157.25	Tb 158.924	Dy 162.50	Ho 164.930	Er 167.26	Tm 168.934	Yb 173.04	Lu 174.97

† Actinide Series

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