Chem 51, Spring 2015 NAME_____KEY_____
Exam 1 (Chapter 1) 85 pt

Mark the answers for Questions 1-35 on your Scantron. Each Question is worth 2 pt

1) Which of the following is an example of a heterogeneous mixture?
A) Sugar water B) Oil/vinegar salad dressing C) Air D) Vodka

2) Which of the following is a pure substance?
A) Sugar B) Sand C) Gold D) Maple syrup

3) All the different kinds of substances that make up all of the material of the universe are known collectively as:
A) elements B) compounds C) matter D) electrolytes

4) Which of the following is an element?
A) Carbon dioxide B) Sodium C) Ammonia D) Sand

5) Which of the following is a homogeneous mixture?
A) A cup of black coffee
B) A package of cake mixture
C) Iron filings and sulfur
D) Oil and vinegar salad dressing

6) What is the correct symbol for the element copper
A) Ca B) Cr C) Co D) Cu

7) Which of the following combinations represents only alkali metals?
I. Li II. Ba III. Rb IV. Ca

A) I + II B) III + IV C) I + IV D) II + III E) I + III AB) II + IV

8) Which of the following is a metal?
A) Chlorine B) Silicon C) Magnesium D) Hydrogen

9) Which of the following is a nonmetal?
A) Chlorine B) Magnesium C) Sodium D) Aluminum

10) Which of the following is a metalloid?
A) Bromine B) Silicon C) Iron D) Copper

11) Which of the following combinations represents compounds rather than elements?
I. O_3 II. CCl_4 III. S_8 IV. H_2O

A) I + II B) III + IV C) I + III D) II + IV

12) How many O atoms are in the formula unit $GaO(NO_3)_2$?
A) 3 B) 4 C) 5 D) 7

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

26 pt

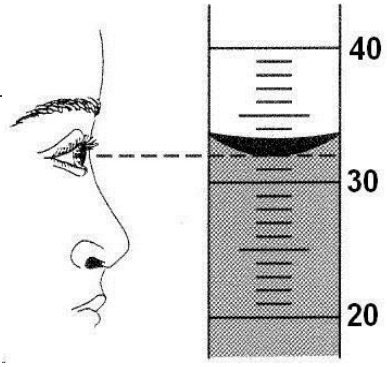
14) Which of the following is the correct unit for length?
A) cg B) mL C) dm D) gal

15) Which of the following conversion factors is correct for converting from grams to kilogram?
A) 1 g = 1000 kg B) 1000 g = 1 kg C) 100 g = 1 kg D) 1 g = 100 kg

16) How many mL of solution are there in 0.0500 L?
A) 50.0 mL B) 0.50 mL C) 500. mL D) 0.0000500 mL

17) Convert 152 miles into kilometers, using proper significant figures, given that 1 mile = 1.609 km.
A) 94.4 km B) 94 km C) 244.57 km D) 245 km

18) How many significant figures are there in the following number: 53,000 pounds?
A) 1 B) 2 C) 3 D) 4



(2 pt) How would you record this measurement on your lab data sheet? 32.0 mL

(2 pt) What is the uncertainty in this measurement? +/- 0.1 mL

19) Round the following number to 3 significant figures: 546.85 grams.
A) 546 B) 547 C) 546.9 D) 540

20) Round the following number to 2 significant figures: 105,006
A) 100,000 B) 110,000 C) 1.1×10^5 D) 1.1×10^6

21) The numerical value for 56,000 ÷ 7.89 is equal to, with the proper number of significant figures:
A) 70.976 B) 71 C) 70.98 D) 71.0

22) Which of these samples has the smallest mass?
A) 160 µg B) 0.016 g C) 0.00016 mg D) 0.000000016 kg

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

24) Which of the following statements bests describes a liquid?
A) Definite shape and volume
B) Indefinite shape and volume
C) Indefinite shape but definite volume
D) Definite shape but indefinite volume

25) Which of the following statements bests describes a gas?
A) Definite shape and volume
B) Indefinite shape and volume
C) Indefinite shape but definite volume
D) Definite shape but indefinite volume

26) Matter is nearly incompressible in which of these states?
A) Gas B) Liquid C) Solid D) Solid and liquid

30 pt

27) Identify the correct ordering of attractions among particles in the three states of matter.
A) solid < liquid < gas
B) solid > liquid > gas
C) gas < solid < liquid
D) solid < gas < liquid

28) Which of the following substances has the lowest density?
A) A mass of 1.5 kg and a volume of 1.2 L → 1.25 g/mL
B) A mass of 25 g and a volume of 20 mL →1.25 g/mL
C) A mass of 750 g and a volume of 70 dL→0.107 g/mL
D) A mass of 5 mg and a volume of 25 uL→0.2 g/mL

29) Using the specific heats for each of the substances listed below, determine which of these substances will show the largest temperature increase, if equal masses of each were heated with the same quantity of energy
A) air (0.24 cal/g ^{o}C)
B) gold (0.031 cal/g ^{o}C) smallest
C) iron (0.11 cal/g ^{o}C)
D) paraffin wax (0.60 cal/g ^{o}C)

30) What is the total dose required for a 140 lb patient if the amount required is 28 mg/kg bodyweight?
A) 1.8 mg B) 1.8 g C) 3.9 mg D) 3.9 g

31) Which of the following is <u>not</u> a *physical change*?
A) Boiling water
B) Dissolving kool-aid
C) Frying an egg
D) Liquefying oxygen

32) 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

33) What is the coefficient for O_2 when this equation is balanced with the lowest whole number coefficents?

$$C_2H_6 + O_2 \rightarrow CO_2 + H_2O$$

A) 3 B) 4 C) 6 D) 7

34) What is the total of all the coefficients when the following equation is balanced with the lowest whole number coefficients?

$$\mathbf{(1)}N_2H_4 + \mathbf{2}H_2O_2 \rightarrow \mathbf{(1)}N_2 + \mathbf{4}H_2O$$

A) 4 B) 8 C) 10 D) 12

35) Kinetic energy is stored energy. A) TRUE or B) FALSE

18 pt

(4 pt) Express the following quantity of energy, 74.6 cal, in joules if 4.184 J = 1 cal.

74.6 ~~cal~~ x 4.184 J/~~cal~~ = 312 J

(6 pt) Calculate the mass percent of fat in a candy bar that contains 12 g fat, 26 g carbohydrate, 6 g protein and 4 g of other material.

12 g fat
26 g carb
6 g protein
4 g other

48

% fat = 12/48 x 100 = 25%

(5 pt) Insert the coefficients to balance the following equations.

_2___VCl_3 + _3___Mg → 2 V + 3 $MgCl_2$

4 HI + __1__MnO_2 → _1___MnI_2 + _2___H_2O + I_2

15 pt

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)

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 = $1.6605402 \times 10^{-24}$ 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

SCRATCH PAPER