Chemistry 115 Name key

Dr. Cary Willard

Exam 1a February 14, 2011

Multiple Choice (30 points)

Page 5 (22 points)

Page 6 (25 points)

Page 7 (13 points)

Page 8 (16 points)

Total (100 points)

All work must be shown to receive credit. Give all answers to the correct number of significant figures

454 g = 1 lb

2.54 cm = 1 in

946 mL = 1 qt

Grossmont College

Periodic Table

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IA |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  | VIIA | NOBLE GASES |
| 1  **H**  1.008 | IIA |  |  |  |  |  |  |  |  |  | |  | IIIA | IVA | VA | VIA | 1  **H**  1.008 | 2  **He**  4.002 |
| 3  **Li**  6.941 | 4  **Be**  9.012 |  |  |  |  |  |  |  |  |  | |  | 5  **B**  10.81 | 6  **C**  12.01 | 7  **N**  14.01 | 8  **O**  16.00 | 9  **F**  19.00 | 10  **Ne**  20.18 |
| 11  **Na**  23.00 | 12  **Mg**  24.30 | IIIB | IVB | VB | VIB | VIIB | VIII VIII VIII | | | | IB | IIB | 13  **Al**  27.00 | 14  **Si**  28.09 | 15  **P**  30.97 | 16  **S**  32.06 | 17  **Cl**  35.45 | 18  **Ar**  39.95 |
| 19  **K**  39.10 | 20  **Ca**  40.08 | 21  **Sc**  44.96 | 22  **Ti**  47.90 | 23  **V**  50.94 | 24  **Cr**  52.00 | 25  **Mn**  54.94 | 26  **Fe**  55.85 | 27  **Co**  58.93 | 28  **Ni**  58.70 | | 29  **Cu**  63.55 | 30  **Zn**  65.38 | 31  **Ga**  69.72 | 32  **Ge**  72.59 | 33  **As**  74.92 | 34  **Se**  78.96 | 35  **Br**  79.90 | 36  **Kr**  83.80 |
| 37  **Rb**  85.47 | 38  **Sr**  87.62 | 39  **Y**  88.91 | 40  **Zr**  91.22 | 41  **Nb**  92.91 | 42  **Mo**  95.94 | 43  **Tc**  (99) | 44  **Ru**  101.1 | 45  **Rh**  102.9 | 46  **Pd**  106.4 | 47  **Ag**  107.9 | | 48  **Cd**  112.4 | 49  **In**  114.8 | 50  **Sn**  118.7 | 51  **Sb**  121.8 | 52  **Te**  127.6 | 53  **I**  126.9 | 54  **Xe**  131.3 |
| 55  **Cs**  132.9 | 56  **Ba**  137.3 | 57  **La**  138.9 | 72  **Hf**  178.5 | 73  **Ta**  180.9 | 74  **W**  183.9 | 75  **Re**  186.2 | 76  **Os**  190.2 | 77  **Ir**  192.2 | 78  **Pt**  195.1 | 79  **Au**  197.0 | | 80  **Hg**  200.6 | 81  **Tl**  204.4 | 82  **Pb**  207.2 | 83  **Bi**  209.0 | 84  **Po**  (209) | 85  **At**  (210) | 86  **Rn**  (222) |
| 87  **Fr**  (223) | 88  **Ra**  226.0 | 89  **Ac**  227.0 | 104  **Rf**  (261) | 105  **Db**  (262) | 106  **Sg**  (263) | 107  **Bh**  (262) | 108  **Hs**  (265) | 109  **Mt**  (266) | 110  **??**  (269) |  | |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 58  **Ce**  140.1 | 59  **Pr**  140.9 | 60  **Nd**  144.2 | 61  **Pm**  (147) | 62  **Sm**  150.4 | 63  **Eu**  152.0 | 64  **Gd**  157.3 | 65  **Tb**  158.9 | 66  **Dy**  162.5 | 67  **Ho**  164.9 | 68  **Er**  167.3 | 69  **Tm**  168.9 | 70  **Yb**  173.0 | 71  **Lu**  175.0 |
| 90  **Th**  232.0 | 91  **Pa**  231.0 | 92  **U**  238.0 | 93  **Np**  (237) | 94  **Pu**  (244) | 95  **Am**  (243) | 96  **Cm**  (247) | 97  **Bk**  (247) | 98  **Cf**  (251) | 99  **Es**  (252) | 100  **Fm**  (257) | 101  **Md**  (258) | 102  **No**  (259) | 103  **Lr**  (260) |

Lanthanide series

Actinide series

Part 1 – Multiple Choice (30 points)

1. Which of the following is the largest unit?
   1. millimeter
   2. kilometer
   3. micrometer
   4. meter
   5. decimeter
2. The cubic centimeter (cm3 or cc) has the same volume as a \_\_\_\_\_\_\_\_.
   1. cubic inch
   2. milliliter
   3. cubic liter
   4. centimeter
   5. cubic decimeter
3. The dietary calorie (Cal) is equal to \_\_\_\_\_\_\_\_.
   1. 1 000 kilocalories
   2. 100 kilocalories
   3. 100 calories
   4. 10 calories
   5. 1 kilocalorie
4. Which of the following is not a chemical?
   1. salt
   2. water
   3. light
   4. carbon dioxide
   5. sugar
5. A value of 25 °C is a measurement of \_\_\_\_\_\_\_\_.
   1. temperature
   2. distance
   3. volume
   4. mass
   5. density
6. Which of the following numbers is the largest?
   1. 2.05 × 108
   2. 2.05 ×103
   3. 2.05 × 10-12
   4. 2.05 × 105
   5. 2.05
7. The number of significant figures in the measurement of 45.030 mm is \_\_\_\_\_\_\_\_.
   1. none
   2. three
   3. four
   4. five
   5. six
8. A pure substance is matter that consists of matter with a composition that \_\_\_\_\_\_\_\_.
   1. is fixed in a definite proportion at all times
   2. varies according to the amount of water present
   3. depends on the temperature
   4. always contains oxygen
   5. always contains two or more substances
9. Identify the chemical change in the following list.
   1. Wax is melted out of a mold in a kiln.
   2. Plaster of paris is ground to a powder for making a mold.
   3. A gold ring is resized to fit a new owner.
   4. Gold metal is formed from gold chloride in solution.
   5. A diamond is set into a gold ring.
10. Which of the following is a property of a solid?
    1. It takes the shape of the container.
    2. The particles have fixed positions and are very close together.
    3. It fills the volume of the container.
    4. The particles move at a rapid rate.
    5. The interactions between its particles are very weak.
11. The atomic number of an atom is equal to the number of \_\_\_\_\_\_\_\_.
    1. nuclei
    2. neutrons plus protons
    3. electrons plus protons
    4. neutrons
    5. protons
12. Isotopes are atoms of the same element that have \_\_\_\_\_\_\_\_.
    1. different atomic numbers
    2. the same atomic numbers but different numbers of protons
    3. the same atomic numbers but different numbers of electrons
    4. the same atomic number but different numbers of neutrons
    5. the same atomic mass but different numbers of protons
13. The correct symbol for the isotope of potassium with 22 neutrons is \_\_\_\_\_\_\_\_.
    1. 
    2. 
    3. 
    4. 
    5. 
14. The Rutherford gold foil experiment demonstrated that atoms
    1. consist of an almost empty nucleus surrounded by a dense cloud of electrons.
    2. are homogeneous.
    3. consist of a dense nucleus surrounded by mostly empty space.
    4. are visible to the naked eye.
    5. consist of a single type of subatomic particle.
15. The atomic number of iron is \_\_\_\_\_\_\_\_.
    1. 55.85
    2. 29.85
    3. 26
    4. 56
    5. 27.78

Part 2 – 70 points (68)

1. (4 points) Differentiate between a hypothesis and a theory.

A hypothesis is a preliminary explanation of a result which is yet to be fully tested. A theory is an accepted explanation for a result that has been well tested.

1. (3 points) How does Dalton describe matter?

Dalton describes matter as being composed of small particles called atoms.

1. (9 points) Identify the 3 main subatomic particles in and atom and describe them. Tell the charge of each and where in the atom it is found.

|  |  |
| --- | --- |
| Particle | Description |
| Protons | Found in nucleus of an atom  Has a positive charge |
| Electrons | Found surrounding nucleus  Has a negative charge |
| Neutrons | Found in nucleus of atom  Has a neutral charge |

1. (6 points) A beaker is filled with three liquids which form separate layers. The three layers are gasoline with a density of 0.74 g/mL, mercury with a density of 13.6 g/mL, and water with a density of 1.0 g/mL. Identify the position of each liquid in the beaker.

|  |  |
| --- | --- |
| Top layer | Gasoline |
| Middle layer | Water |
| Bottom layer | Mercury |

1. (8 points) Perform the following actions on each of the following

|  |  |
| --- | --- |
| Round 0.000036502 mL to 3 significant figures and write it in scientific notation. | 3.65 x 10-5 mL |
| How many significant figures are in 52.300g? | 5 |
| Circle the exact number | **5 pizzas** or **50.0 g cheese** |
| Add the following masses and report the sum to the proper number of significant figures.  4.33265 g, 65.43 g and 352.99g | 422.75 g |

1. (4 points) A gold nugget has a mass of 3.82 x 10-5 kg. What is the mass of the nugget in mg?
2. (4 points) A turtle is 21.7 cm long. How long is the turtle in mm?
3. (4 points) A bottle of kerosene contains 6.83 L of kerosene. What is the volume of kerosene in quarts?
4. (5 points) Paleontologists will sometimes use the unit elephant (the mass of an African bull elephant) when describing the mass of large dinosaurs. 1 elephant (El) is defined as 6.00 tons (1 El = 6.00 tons) If a dinosaur is estimated to have a mass of 4.6 elephants, what is its mass in grams? (1 ton= 2000 lbs)
5. (4 points) An alloy is composed of 35.4 grams of copper and 8.27 grams of tin. What is the mass percent of copper in the alloy?
6. (5 points) A graduated cylinder is filled with 15.0 mL of a green liquid at 35oC. This liquid is weighed and found to have a mass of 38.2 g. What is the density of the liquid?

Describe two physical properties of this liquid.

Green color, liquid at 35oC, and density = 2.55 g/mL

1. (4 points) A silver figurine has a mass of 6.34 kg. If the density of silver is 10.5 g/mL, what is the volume of the figurine in mL?
2. (10 points) For each of the following circle the proper classification

|  |  |
| --- | --- |
| A blueberry muffin | Pure substance or Mixture |
| Hydrogen peroxide (H2O2) | Element or Compound |
| Fruit salad | Homogeneous or Heterogeneous |
| At room temperature, mercury is a liquid. | Physical or Chemical Property |
| The particles in the substance are very far apart. | Gas Liquid or Solid |

1. (6 points) You borrowed a thermometer from the chemistry lab to use in the kitchen. If you want to heat a mixture of sugar and cream to 263 oF, what temperature do you need in oC?

In K?