SNC 1DI: FINAL EXAM REVIEW ⇒ CHEMISTRY

F13

Checklist:

1) classification of Matter (elements, compounds, heterogeneous/homogeneous mix)
2) Physical properties (clarity, malleability, lustre, etc...)
3) Chemical properties (corrosion, combustions, reaction of metals with acids)
4) Physical Changes (change of state, change of form, dissolving)
5) Chemical Changes (know all of the indications a chemical change has occurred)
6) Atomic structure (protons, neutrons, electrons)
7) Determining atomic number, atomic mass number, protons, neutrons, electrons
8) Periodic Table: locations and properties of metals, non-metals, and metalloids
   name of specific groups and their properties (e.g. alkali metals, noble gases, alkaline earth metals, halogens)
9) ~~Isotopes~~ and Ions (the two different kinds and what charge they have)
10) Bohr-Rutherford diagrams (drawing neutral atoms, ions, and isotopes)
11) Counting atoms in molecules

PART A. Multiple Choice

1. Carbon is best classified as ;

   a) mixture ; solution
   b) pure substance ; element
   c) pure substance ; compound
   d) mixture ; element
   e) none of the above

2. Which of the following statements about solutions is/are TRUE ?

   a) are a pure substance
   b) are composed of two or more pure substances **(CALLED MIXTURES)**
   c) solutions are homogeneous **MIXTURES**
   d) A, B and C are all true
   e) only B and C are true

3. The chemical formula for sucrose (table sugar) is $C_{12}H_{22}O_{11}$. This formula indicates

   a) sucrose is a compound composed of three different elements
   b) a sucrose molecule contains 45 atoms in total
   c) there are twice as many hydrogen atoms as oxygen atoms in one sucrose molecule
   d) all of the above

4. Based on the Bohr Model, which of the following statements about the atom is **FALSE** ?

a) in a neutral atom, the number of protons equals the number of electrons
b) the protons and electrons are located in the nucleus
c) neutrons have no charge (ie. are neutral)
d) electrons orbit the nucleus in specific energy levels
e) the nucleus is dense, positively charged and is located in the centre of the atom

For questions 5 to 14, use the following answer key to classify each substance.

(E) element (C) compound (HOM) homogeneous mix (HEM) heterogeneous mix

5. table salt (sodium chloride)	**C**	10. pure water (H_20)	**C**
6. glass of Kool-Aid	**HOM**	11. milk and cereal	**HEM**
7. sand and water	**HEM**	12. neon (Ne)	**E**
8. sugar dissolved in water	**HOM**	13. potassium iodide (KI)	**C**
9. gold (Au)	**E**	14. nitrogen gas (N_2)	**HEM**

For questions 15 to 25, write **"P"** if it is a physical change and **"C"** if it is a chemical change.

15. crushing an aspirin **P (change of form)**
16. rusting of iron **C (new colour produced)**
17. combustion of acetylene **C (change in temperature (hot), produces light)**
18. evaporation of rubbing alcohol **P (change of state)**
19. tarnishing of silver **C (new colour produced)**
21. dissolving salt in water **P (dissolving)**
22. the melting of snow **P (change of state)**
23. burning magnesium in oxygen **C (change in temperature (hot), produces light)**
24. filtering clay from river water **P (change of form)**
25. mixing two colourless solutions together produces a yellow colour **C (new colour produced)**

PART B: Fill in the Blanks – Put answers on a separate sheet of paper

1. a) the number of protons in an atom is the **ATOMIC** number.
   b) a change in which a new substance is formed **CHEMICAL CHANGE**
   c) only contains one type of atom and is found on the Periodic Table **ELEMENT**
   d) number of protons and neutrons in an atom **ATOMIC MASS NUMBER**
   e) a mixture that only has only one layer or phase that you can see **HOMOGENEOUS**
   f) contains two or more elements that are bonded together **COMPOUND**
   g) the ability of a substance to be stretched into a wire **DUCTILITY**
   h) this is what you call a row on the Periodic Table **PERIOD**
   i) the ability of a substance to transmit light **CLARITY**
   j) these types of elements are shiny, malleable, and can conduct electricity **METALS**
   k) these are two gases which are formed by the electrolysis of water. **OXYGEN HYDROGEN**

Part C: Short Answer and Calculations

1. List the 6 indications that a chemical reaction has taken place.

   ① **A NEW COLOUR IS PRODUCED**

   ② **A NEW GAS IS PRODUCED (SEE BUBBLING)**

   ③ **LIGHT IS PRODUCED**

   ④ **TEMPERATURE CHANGE (GETS WARMER OR COLDER)**

   ⑤ **A PRECIPITATE (SOLID) IS FORMED WHEN 2 LIQUIDS ARE MIXED**

   ⑥ **A NEW ODOUR OR TASTE IS PRODUCED**

2. List the 5 parts of the Particle Theory of Matter.

① **ALL MATTER IS COMPOSED OF TINY PARTICLES.**

② **EACH PURE SUBSTANCE HAS ITS OWN KIND OF PARTICLE, WHICH IS DIFFERENT FROM THE PARTICLES OF OTHER PURE SUBSTANCES.**

③ **PARTICLES ARE ALWAYS IN MOTION. INCREASING THE TEMPERATURE INCREASES THE MOTION OF THE PARTICLES.**

④ **PARTICLES OF MATTER ARE SEPARATED BY EMPTY SPACE.**

⑤ **PARTICLES IN MATTER ARE ATTRACTED TO ONE ANOTHER.**

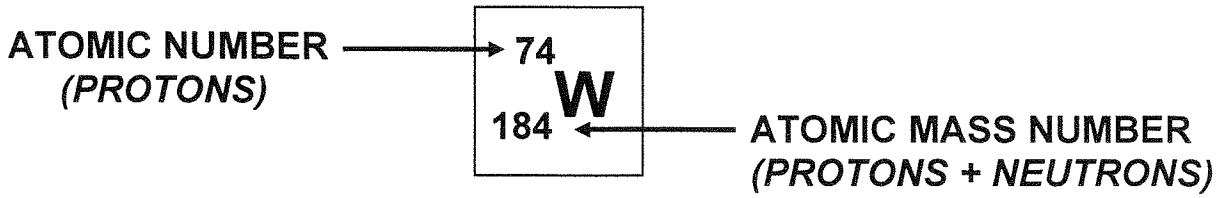
3. Describe how you would test for:

a) Hydrogen gas – **TAKE A BURNING SPLINT AND PUT NEAR THE MOUTH OF A TEST TUBE. IF HYDROGEN IS PRESENT THEN A POPPING NOISE IS HEARD (SEE FIRE SHOOT OUT THE TEST TUBE)**

b) Oxygen gas – **TAKE A GLOWING SPLINT AND PUT INTO THE TEST TUBE. IF OXYGEN IS PRESENT THE SPLINT WILL BURST INTO FLAME.**

c) Carbon dioxide gas – **BUBBLE THE GAS INTO LIMEWATER. IF CARBON DIOXIDE IS PRESENT THE LIMEWATER WILL GO CLOUDY WHITE.**

4. a) Label the mass number and the atomic number on the diagram to the side.



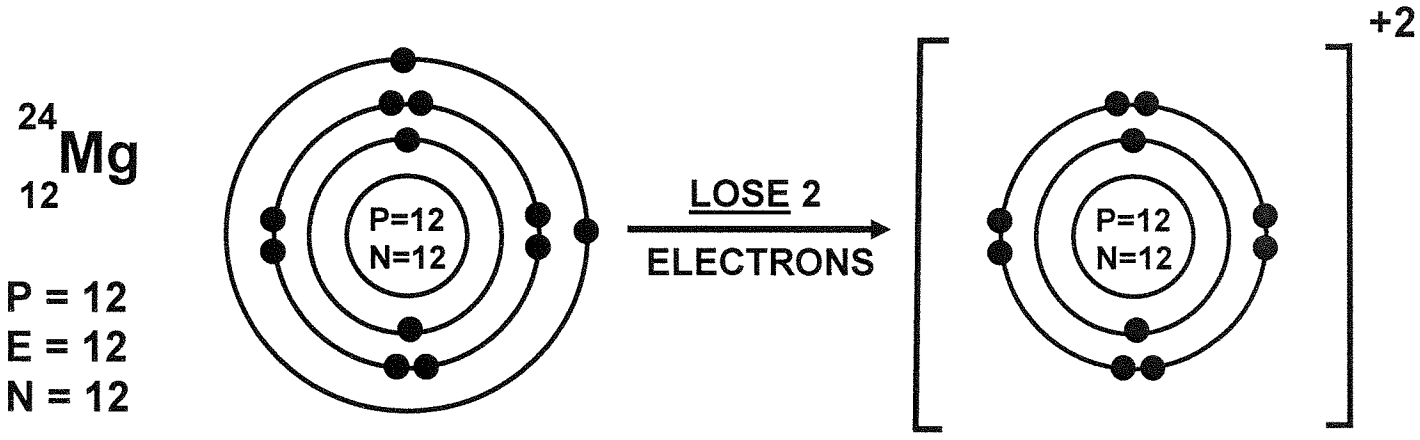
b) Fill in the missing information in the table given below.

Element	Element Symbol	Atomic Number	Atomic Mass	# of Protons	# of Electrons	# of Neutrons
Carbon	**C**	6	12	**6**	**6**	**6**
Potassium	K	**19**	39	**19**	19	**20**
FLUORINE	**F**	9	**19**	**9**	9	10
Nitrogen	N	**7**	**14**	7	**7**	7

5. Draw a Bohr-Rutherford diagram for the following elements...

a) An element with 12 protons
12 electrons
12 neutrons.

b) Draw the Bohr-Rutherford diagram of the ion for the element in part a)

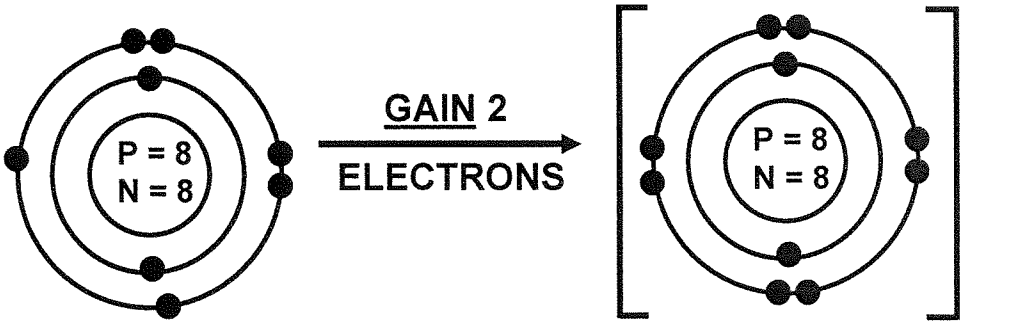


c) Draw a Bohr-Rutherford diagram of the following atom. Also draw the Bohr-Rutherford diagrams of its ion.

$^{16}_{8}O$

$^{16}_{8}O$

P = 8
E = 8
N = 8



6. Determine the number of atoms present in each of the following compounds:

a) $CaCO_3$ **1** Ca-atoms; **1** C-atoms; **3** O-atoms

b) $2NaHCO_3$ **2** Na-atoms; **2** H atoms; **6** O-atoms

c) $Ca_3(PO_4)_2$ **3** Ca-atoms; **2** P-atoms; **8** O-atoms

d) $3Mg(NO_3)_2$ **3** Mg-atoms; **6** N-atoms; **18** O-atoms

7. You have a graduated cylinder with 20 mL (V_i) of water in it. You add 250 g (m) of lead weights, and the volume rises to 42 mL (V_f). What is the density of lead? (d = ?) Show all your equations.

$V_{object} = V_{final} - V_{initial}$

$V_{object} = 42\ mL - 20\ mL$

$V_{object} = 22\ mL$

$d = \frac{m}{V}$

$d = \frac{250\ g}{22\ mL}$

$d = 11.4\ g/mL$

8. A metal tool found by an archeologist studying an ancient civilization. The mass of the tool is found to be 750 g. The volume is measured as 66 mL. Based on this information, is this tool made of silver or lead? Silver density = 10.5 g/mL
Lead density = 11.4 g.mL

m = 750 g
V = 66 mL

d = ?

$$d = \frac{m}{V}$$

$$d = \frac{750\ g}{66\ mL}$$

$$d = 11.4\ g/mL$$

Therefore this metal is lead because it has the same density as lead in the list above.