Billanook College

Year 10: Chemistry Unit Test 2016

Name: Anne Shors ♡ chemistry

Section	Number of questions	Number of questions to be answered	Marks available
A- Multiple Choice			10
B- Short Answer			40
		Total marks available:	**/50**

Directions to students

Materials
- Periodic table and valance table provided on last page.
- A calculator may be used.

Section A: Short answer (circle most correct answer)

1. Which of the following is an example of a chemical reaction?
   a. Paraffin wax melting over the bunsen burner
   b. Liquid nitrogen evaporating to form gaseous nitrogen
   c. Sodium hydroxide and hydrochloric acid added together in a test tube
   d. Water boiling

2. Most of the elements in the periodic table are
   a. Metals
   b. Metalloids
   c. Non metals
   d. Gases

3. Ionic bonding occurs between
   a. Two non-metals
   b. Two metals
   c. A metal and a non-metal
   d. A metal and a noble gas

4. Which of the following would speed up a chemical reaction?
   a. Heating
   b. Stirring
   c. Increasing concentration
   d. All of the above

5. The **maximum** number of electrons in the second shell is:
   a. It can vary.
   b. 8
   c. 18
   d. 2

6. How many electrons would an Aluminium atom lose to become stable
   a. 1
   b. 3
   c. 2
   d. 0

7. The atomic number of an element is equal to:
   a. The number of protons plus the number of neutrons
   b. The number of neutrons in the atom
   c. The number of protons plus the number of electrons
   d. The number of protons in the atom

8. An ionic bond is most likely to form between which two elements?
   a. P and O
   b. C and F
   c. Li and Ne
   d. Be and Br

9. The correct ionic formula for Sodium Oxide is:
   a. SO_2
   b. NaO_2
   c. Na_2O
   d. SO

10. In a chemical equation the products are shown:
   a. on the left hand side of the equation
   b. on the right hand side of the equation
   c. over the arrow
   d. no products are formed during a chemical reaction and don't need to be shown

11. A decomposition reaction always involves:
   a. the formation of 2 or more substances from the 'breaking down' of one substance
   b. the formation of oxygen gas
   c. a solid decomposing to a gas
   d. a catalyst

12. A student held a glowing splint test over a test tube whilst a chemical reaction was taking place. A flame lit up. Which gas could have been given off?

   a. Hydrogen
   b. Oxygen
   c. Helium
   d. carbon dioxide

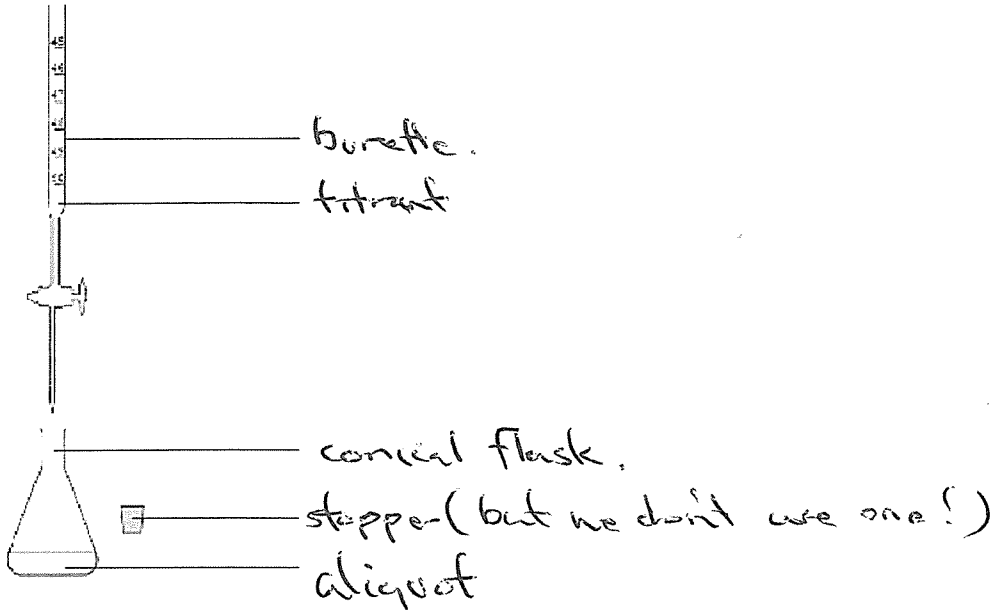
13. The table below shows details of several particles.

Atomic number	Mass number	Number of neutrons	Number of electrons	Overall charge
W 20	39	19	Y 18	+2
15	31	X 16	17	Z −2

The numbers needed to complete the table in the order W, X, Y, Z are
   a. 20, 16, 18, and –2.
   b. 20, 16, 22, and +2.
   c. 21, 15, 17, and 0.
   d. 20, 17, 18, and –2.

Section B: Short answer

1. Label the following diagram



5 marks

2. Place the following instructions for the titration experiment in the correct order 1-8

Fill a burette with 0.0100M silver nitrate solution, record the initial volume	5 or 6
Transfer all of the biscuit sample to a beaker, add de-ionised water and stir to dissolve the soluble components	2
Accurately weigh a biscuit sample (do not have to say how much)	1
Filter to separate soluble from insoluble components – retain filtrate (solution)	3
Prepare 20.00mL aliquots of the sodium chloride solution, adding potassium chromate indicator	5 or 6
Repeat until 3 concordant results obtained / "several times" is OK	8
Titrate each aliquot to end point (do not have to state colour), record results	7
Make the volume of the solution up to 250mL with de-ionised water in a volumetric flask	4

4 marks

3. The following results were measured during the titration experiment.

a. Complete the table of results:

Volume of silver nitrate	1st titre (rough)	2nd titre	3rd titre	4th titre	5th titre
Final reading (mL)	17.05	21.10	18.55	41.10	23.35
Initial reading (mL)	10.54	14.66	12.30	34.83	17.15
Titre (mL)	6.51	6.44	6.25	6.27	6.20

(Normally the initial subsequent reading is the same as the previous final reading)

3 marks

b. List the concordant results and calculate the average titre.

6.25, 6.27, 6.20

$\frac{6.25 + 6.27 + 6.20}{3} = 6.24\text{mL}$

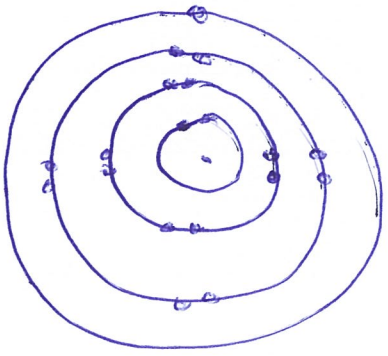
2marks

4. Draw electron shell diagrams for the following elements

a) Nitrogen

(2,5)

b) Potassium



(2,8,8,1)

4 Marks

5. a.. Using the periodic table provided, complete the following for **Beryllium**

   i. Atomic Mass: 9

   ii. Electrons: 4

   iii. Protons: 4

   iv. Neutrons: 5

2 marks

b. Name another element that has similar characteristics to Beryllium.

Magnesium or Calcium.

1 mark

c. Why does it have similar characteristics?

Two electrons in outer shell, so they all want to lose these 2e⁻ to become stable.

1 mark

6. a) What is an isotope?

A form of an element with a particular number of neutrons

Different isotopes have the same number of protons (same element) but a different number of neutrons.

1 mark

b) Complete the following table of isotopes

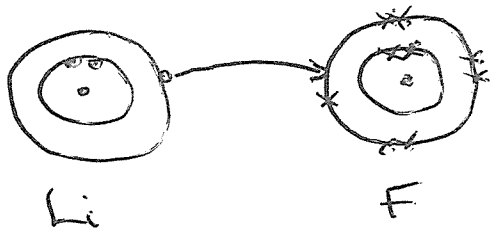
Isotope	Atomic number	Number of neutrons	Mass number	Symbol
Oxygen-16	8	8	16	$^{16}_{8}O$
Oxygen-18	8	10	18	$^{18}_{8}O$

2 marks

7. Using the periodic table and the valency table provided, draw electron valency diagrams (show how the electrons are ~~shared~~) for the following:

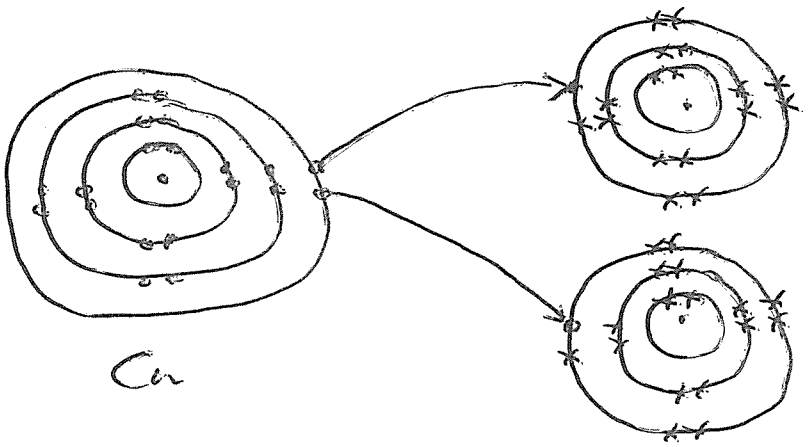
the e⁻ are not shared, they are transfered.

a. Lithium and Fluorine



1 : 1
⇒ LiF

b. Calcium and chlorine



1 : 2
⇒ $CaCl_2$.

4 marks

8. For the ionic substance, Mg(OH)2

a) Write the symbols for the ions that make up this substance?

Mg^{2+}, OH^-

1 mark

b) How many of each type of ion is present in $Mg(OH)_2$?

1 × Mg^{2+} 2+ OH^-

1 mark

9. Using the periodic table and the valence table provided to help you, write the symbolic formulae for the following compounds.

(a) Potassium chloride KCl

(b) Calcium fluoride CaF_2

(c) Lithium sulphate Li_2SO_4

(d) Aluminium oxide Al_2O_3

(e) Sodium hydroxide NaOH

(f) Copper nitrate $CuNO_3$ - if copper(I) nitrate

$Cu(NO_3)_2$ - if copper(II) nitrate

3 marks

10. Using the periodic table and the valence table provided to help you, write the name of the following compounds

a. NaBr Sodium bromide

b. $ZnSO_4$ zinc sulfate

c. $PbCO_3$ lead(II) carbonate

d. KOH potassium hydroxide

e. $Zn_3(PO_4)_2$ zinc phosphate

f. H_2O water (it's not ionic)

3 marks

11. State **two** observations that you could observe during a practical lesson that suggests a chemical reaction has occurred.

i Any two of: gas produced / heat produced /

ii colour change / light produced / solid produced

1 mark

12. When magnesium ribbon is added to hydrogen sulphate (sulfuric acid) it reacts to produce magnesium sulphate and hydrogen gas.

a. Write a **word** equation for this reaction.

magnesium (s) + sulfuric acid (aq) → magnesium sulfate (aq) + hydrogen (g)

1 mark

13. Write balanced chemical equations for the following reactions

a. $2\ HCl + \_\_\_\ Cr \rightarrow \_\_\_\ CrCl_2 + \_\_\_\ H_2$

b. Aluminium reacts with Sulphur to produce aluminium sulfide

(Sulfur exists as S_8 which was probably not intended in the question.)

$16\ Al_{(s)} + 3\ S_{8(s)} \rightarrow 8\ Al_2S_3\ (s)$ (II)

c. Lead (II) nitrate + potassium iodide → lead iodide and potassium nitrate

$Pb(NO_3)_{2(aq)} + 2KI_{(aq)} \rightarrow PbI_{2(s)} + 2KNO_{3(aq)}$

(1+1+2+2) = 5 marks