# IGIHOZO SAINT PETER SOUTHERN PROVINCE NYANZA DISTRICT

# CHEMISTRY HOLIDAY PACKAGE

SUBJECT:	CHEMISTRY
CLASS:	SENIOR 2
<b>COMBINATIONS:</b>	ORDINARY LEVEL
DURATION:	3 HOURS

# **INSTRUCTIONS:**

1) Do not open this question paper until you are told to do so.

2) This paper consists of <b>three</b> sections: <b>A</b> , <b>B</b> and <b>C</b> .	
Section A: Attempt all questions.	(55marks)
Section B: Attempt only three chosen questions.	(30marks)
Section C: Attempt only one question.	(15marks)

- 3) Use a blue or black pen and pencil for drawing.
- 4) The use of **periodic table** is not allowed.
- 5) Non- programmable silent calculator may be used.

# SECTION A: ATTEMPT ALL QUESTIONS

## **Multiple choice Questions**

- 1. Atoms always react because they want to\_. (1 mark)
  - A. Be with other atoms.
  - B. Form molecules
  - C. Attain stable electronic configuration.
  - D. Gain electrons
- 2. Which of the following methods can be used to separate iodine from sand?(1 mark)
  - A. Evaporation
  - B. Fractional distillation
  - C. Sublimation
  - D. Filtration
- **3.** Valency is the \_\_\_\_.
  - A. Number of electrons an atom needs to gain to be stable.
  - B. Combining power of an element.
  - C. Number of electrons in the outermost energy level.
  - D. Total number of electrons in an atom.
- 4. The following are uses of water except \_\_\_\_\_. (1 mark)

A. Universal solvent where biochemical reactions in our bodies take place.

- B. Production of electricity.
- C. Irrigation
- D. Soil erosion
- 5. Which of the following statements applies to triads? (1 mark)
  - A. Members of a triad have similar physical properties.
  - B. Triads have similar chemical properties.
  - C. The properties of the middle element are the arithmetic mean of the other two.
  - D. Elements in a triad definitely belong to one group.
- 6. Write true (T) or false (F) for each of the following statements: (5 marks)A. An atom is the smallest particle of an element.
  - B. Protons and neutrons are found to the surrounding of the nucleus.
  - C. The mass of a neutron is very small (negligible).
  - D. Some molecules are compounds.
  - E. Is oxygen a molecule or a compound?

# (1 mark)

(55 MARKS)

**7.** Classify the following reactions according to the type of reactions taking place.

# (3marks)

- (a) Burning of sodium metal in air
- (b) Heating calcium carbonate to form a white solid and colorless gas
- (c) Passing chlorine gas through potassium Bromide solution
- **8.** Match the following processes to their correct examples in the following table:

### (3marks)

Process	Example			
1. Effective waste management	a) Environmental protection			
2. Importance of waste recycling	b) Emergency of diseases			
3. Effect of poor waste disposal	c) Preventing production of waste			

9.

- i. Define the term metallic bond (2marks)
- ii. Give two difference between ionic and covalent compounds. (4marks)
- iii. Give one example of ionic compound and one example of covalent compound **(2marks)**
- **10.** Write the balanced chemical equations for the reactions between:
  - (a) Sodium and water

(2marks) (2marks)

- (b) Magnesium and water vapor (steam)
- **11.** The number of protons, neutrons in particles W, X, Y and Z are shown in the table below.

Particle	No. of protons	No. of neutrons	No. of electrons
W	6	6	6
x	9	10	10
Y	12	12	10
Z	19	20	19

- (a) Which one of the particles is:
  - (i) a cation? (**1mark**)
  - (ii) an anion? (1mark)

(b) (i)Write the electronic configuration of Z (**2marks**)

### Page **3** of **7**

(ii) State the valency of Z. Give a reason (2marks)

**12.** The table below shows the melting points, boiling point and densities of substances A, B, C, D.

Substan	Meltin point	Boiling	Densit
се	g ( <sup>O</sup> C)	point( <sup>o</sup> C )	y (g/cm 3 <sub>)</sub>
А	1110	2606	9.1
В	-266	-252	0.07
С	40	94	1.6
D	-14	60	0.9

(a) Which substance is a gas at room temperature? (1mark)

(b) Which substance is a liquid at room temperature (1mark)

(c) Which substance is most likely to be a metal (1mark)

(d) Which substance will be a liquid at -266<sup>o</sup>C (1mark)

- (e) Which substance is a gas at 72°C (**1mark**)
- (f) What is the melting point of the least dense non-metal? (1mark)

**13.** When a mixture of iron fillings and Sulphur powder is heated, a black compound is formed

(a) Write the name of this type of reaction (1mark)

(b) Name the black compound formed (1mark)

(c) Write a balanced chemical equation for the reaction (2marks)

14. The solubility of a solute at 30°C is 20. What amount of water is required to make saturated solution of 80g of a solute? (2 marks)

15. The below photos show different health hazards caused by polluted water.



As a senior two student, explain different ways you may use to prevent the above health hazards in your village. (At least 5ways) **(5 marks**)

16.

Write the ionic equation for the following chemical reaction:

- i. BaCl2(aq) + H2SO4(aq)  $\rightarrow$  BaSO4(s) + 2HCl(aq) (2 marks)
- ii.  $2HCl(aq) + Mg(s) \rightarrow MgCl2(aq) + H2(g ($ **2 marks**))

# SECTION B: ATTEMPT ONLY THREE QUESTIONS OF YOUR CHOICE (30 MARKS)

**17.** The table below shows the elements A, B, C, D, E, F and G from period 2 and 3 in Different groups of the periodic table. The letters are not the usual symbols for the

elements. Use the letters to answer the questions that follow:

	Ι	II	III	IV	V	VI	VII	VIII
2					F	А	В	
3	С		D	Е				G

- (a) Write the electronic arrangement of atoms of A /1mark
- (b) State the number of electrons in the outermost shell of an atom of D /1mark
- (c) Which is the most reactive metal **/1mark**
- (d) Which is the most reactive nonmetal /1mark
- (e) Which element forms no compounds? Explain your answer /2marks
- (f) State the type of bond between elements:i) C and A ii)E and B

## /2marks

(g) The element E combine with element A to form a covalent compound EA2. Use a **dot** and a **cross** diagram to show the bonding in compound EA2. Use electrons on the outermost shell /2marks

## 18.

- a) The atomic number of an element X is12
- i. Write the electronic configuration of X(1mark)
- ii. To which group and period of the periodic Table does X belong? Give a reason for each(**3marks**)
- iii. Study and complete the table below which shows how compounds are formed from metal ions and non-metal ions. (**6marks**)

Page **5** of **7** 

Cation/Anio	OH-	SO4 <sup>2</sup> -	NO3-
n			
Ca <sup>2+</sup>			
NH4 <sup>+</sup>			

- **19.** Calcium (atomic number 20) and fluorine (atomic number 9) combine to form a chemical compound called calcium Fluoride.
  - A. Explain the type of bonding that is present in calcium fluoride/2mark
  - B. Give the electronic configuration of the calcium ion and fluoride ion /2marks
  - C. Would you expect the melting point of calcium fluoride to be high or low? Explain your answer/**2marks**
  - D. Mg (atomic number12) is in the same group of the periodic table as calcium
    - i In Which group are two metals found. Give a reason for your answer/2marks
    - ii Compare the reactivity of the two metals with water and give a reason of your answer/**2marks**
  - **20.** A) Aqueous sodium sulphate solution is added to aqueous barium nitrate to form an insoluble precipitate.
    - (i) Which type of reaction is this? **/1mark**
    - (ii) Write the name of precipitate formed /1mark
    - (iii) Write a full chemical equation for the reaction / 1mark
    - (iv) Write an ionic equation for the reaction /2marks
    - B) Hydrated magnesium sulphate crystals contains water of crystallization.
      - (i) What is meant by water of crystallization? /1marks
      - (ii) Write an equation for the reaction between magnesium oxide and dilute sulphuric acid. /2marks
      - (iii) Calculate the percentage of oxygen by mass in the compound MgSO4.7H2O

a. (Mg=24, S=32, O=16, H=1) /2marks

# SECTION C: ATTEMPT ONLY ONE QUESTION OF YOUR CHOICE (15 MARKS)

- **21.** Oxygen is suitably prepared in the laboratory by decomposition of hydrogen peroxide.
  - a) Write a balanced equation for the decomposition of hydrogen peroxide (2 marks)
  - b) Normally the decomposition of hydrogen peroxide is slow.name the catalyst used to increase the rate of decomposition of hydrogen peroxide **(2marks)**

- c) Draw a well labelled diagram of the apparatus that can be used to prepare oxygen from hydrogen peroxide **(5marks)**
- d) Name the method used to collect in the diagram c) above and state a reason why the method is suitable for oxygen gas (2marks)
- e) State four physical properties of oxygen (4marks)
- 22.
  - a) What is meant by the term solubility(2marks)
  - b) Give the difference between saturated solution and supersaturated solution **(4marks)**
  - c) The table below shows the solubility of potassium nitrate at various temperatures

# (5marks)

Temperature in <sup>o</sup> C	20	30	40	50	60	70
Solubility in g per 100g H2O	32	46	64	86	110	138

- i. Draw a graph of solubility of potassium nitrate against temperature. Use the graph to determine:
- ii. The solubility of potassium nitrate at 35°C (1mark)
- iii. What mass of potassium nitrate will saturate 25g of water at 35°C.

(3marks)

End !!!