cbckenyahub.com

SET 2

GRADE 10 END OF YEAR EXAMS

KENYA CERTIFICATE OF BASIC EDUCATION

SENIOR SCHOOL ASSESSMENT

GRADE 10 – CHEMISTRY

Time: 2 Hours

LEARNER'S DETAILS

Name: _____. **School:** _____.

Assessment Number: _____. **Date:** _____.

School Code: _____. **Signature:** _____.

INSTRUCTIONS TO CANDIDATES

1. Write your name in the spaces provided above.
2. Write the name of your school and your stream in the spaces provided.
3. Write your admission number and the date of the assessment in the spaces provided.
4. This paper consists of two sections: A and B.
5. Answer all questions in section A and section B.
6. Answer the questions in English.
7. All answers MUST be written in the spaces provided in the paper.
8. Do NOT remove any page from this question paper.

FOR OFFICIAL USE ONLY

SECTION	SECTION A	SECTION B	% SCORE	EE1	EE2	ME1	ME2	AE1	AE2	BE1	BE2
SCORE RANGE	30 MARKS	50 MARKS		90-100	75-89	58-74	41-57	31-40	21-30	11-20	1-10
POINTS				8 POINTS	7 POINTS	6 POINTS	5 POINTS	4 POINTS	3 POINTS	2 POINTS	1 POINT
LEARNER'S TOTAL SCORE											

SECTION A (30 MARKS)

Answer ALL questions in this section.

1. Three learners are observing samples of Group II elements (Magnesium and Calcium) placed in beakers of water.

Kibet: "The Calcium is reacting much faster than the Magnesium."

Maina: "I can see bubbles of a colorless gas forming on the surface of both metals."

Ochieng: "When I add phenolphthalein indicator, the water turns pink."

(a) **Identify** the colorless gas mentioned by Maina._____ (1 Mark)

(b) **Name** the product formed that causes the water to turn pink in Ochieng's observation. (1 Mark)

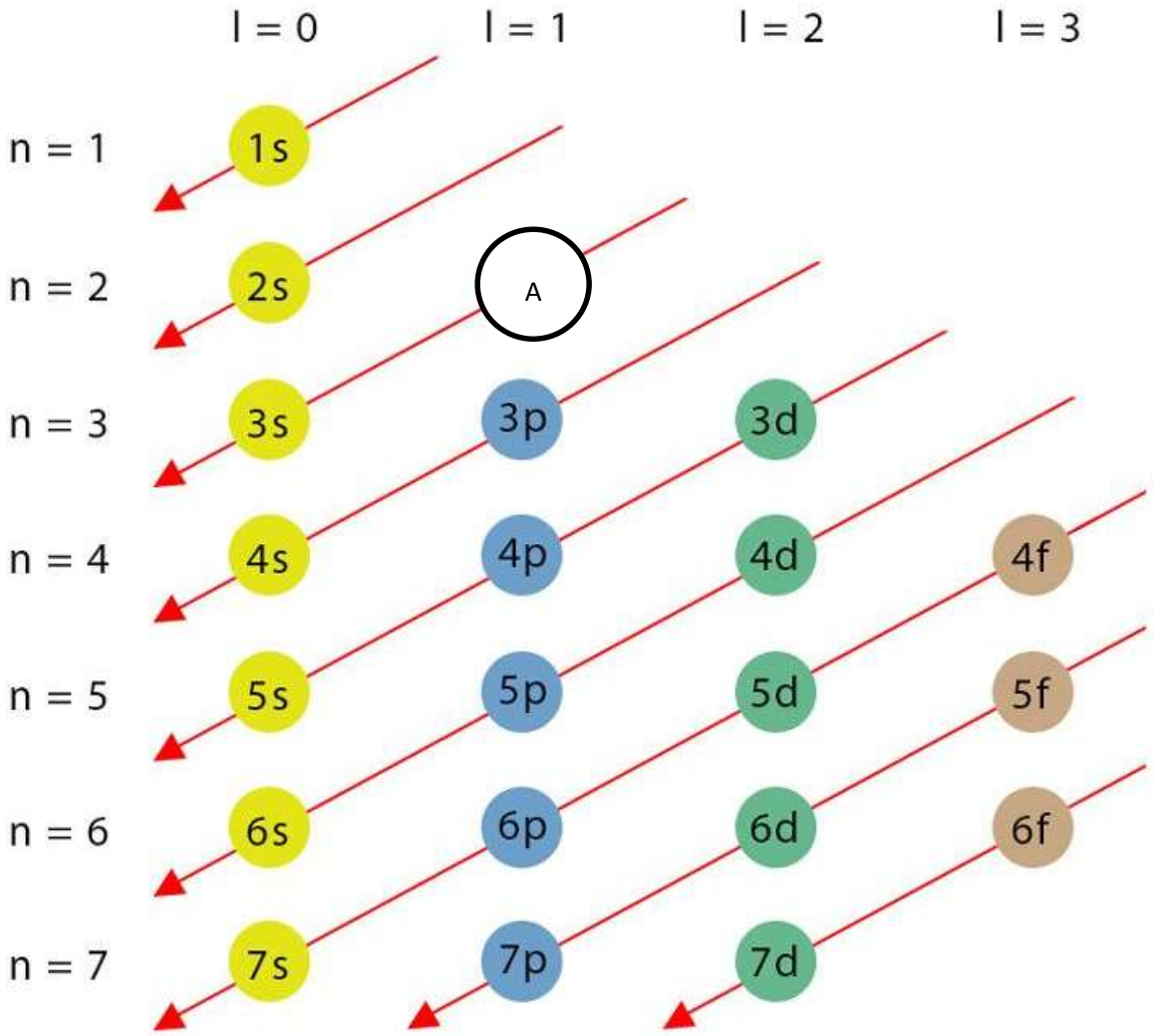
_____

(c) **Explain** why Kibet observed a faster reaction with Calcium than with Magnesium. (2 Marks)

_____

_____

2. Study the diagram below showing the filling order of electrons in sub-orbitals.



(a) **Identify** the sub-orbital labeled **A**. (1 Mark)

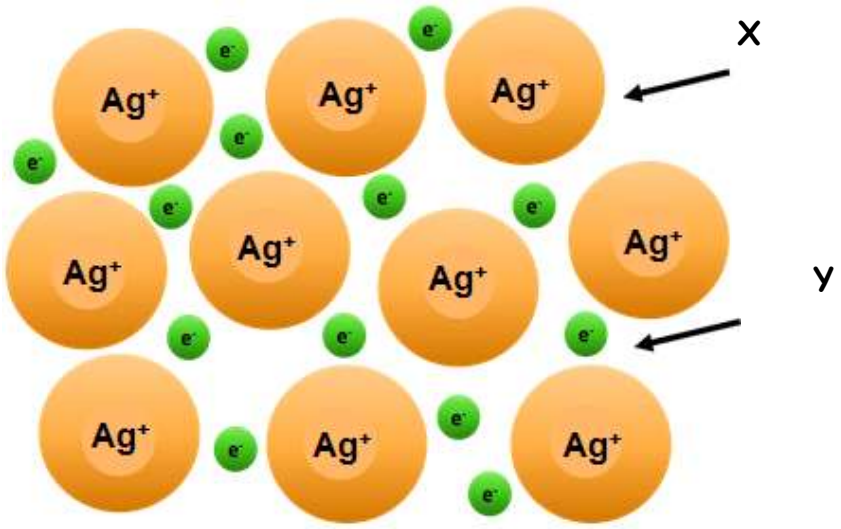
_____

(b) **Write** the full electronic configuration for an atom with atomic number 16 using **s and p notation**. (2 Marks)

_____

_____

3. Look at the illustration below representing the structure of Silver metal.



(a) **Name** the parts labeled **X** (the positive centers) and **Y** (the moving particles). (2 Marks)

X: _____

Y: _____

(b) **Select** one property of Aluminium that makes it suitable for making overhead electric cables. (1 Mark)

_____

_____

4. **Amina** from **Mama Ngina Girls** is performing a "Mystery Salt" identification test. She is given four containers. (a) **Match** the salt to its solubility category in water: (4 Marks)

Salt Name	**Solubility Category**
i) Potassium Nitrate	A. Insoluble
ii) Barium Sulphate	B. Soluble
iii) Silver Chloride	C. Insoluble
iv) Sodium Carbonate	D. Soluble

5. (a) **Identify** the color of the Universal Indicator in a solution of pH 12. (1 Mark)

_____

(b) Write **True or False in the following statement:** Ethanoic acid is a strong acid because it fully dissociates in water. [_____] (1 Mark)

6. (a) **Define** "Relative Atomic Mass" (R.A.M). (2 Marks)

_____

_____

(b) **Calculate** the R.A.M of an element with two isotopes: Isotope A (mass 35, abundance 75%) and Isotope B (mass 37, abundance 25%). (2 Marks)

SECTION B (50 MARKS)

(Answer ALL questions in this section)

7. At **Kapsabet Boys High School**, a group of learners is preparing Copper (II) Sulphate crystals by reacting Copper (II) Oxide with dilute Sulphuric (VI) acid.

(a) **Identify** the type of reaction taking place. (1 Mark)

_____

(b) **Explain** why the Copper (II) Oxide is added in excess to the acid. (2 Marks)

_____
_____

(c) **Describe** the purpose of the "filtration" step in this process. (1 Mark)

_____
_____

(d) **Outline** the remaining steps needed to obtain pure crystals from the resulting solution. (2 Marks)

i. _____
ii. _____
iii. _____
iv. _____

(e) **State** the color of the Copper (II) Sulphate crystals formed. (1 Mark)

_____

8. Study the trend in melting points for Period 3 elements (Na, Mg, Al, Si, P, S, Cl, Ar) shown in the graph below.

(a) **Name** the element with the highest melting point in Period 3. (1 Mark)

_____

(b) **Explain** why Silicon has a much higher melting point than Phosphorus. (2 Marks)

_____
_____

(c) **Describe** the trend in atomic radius from Sodium to Argon and **give a reason** for this trend. (2 Marks)

_____
_____
_____
_____

(d) **Distinguish** between *Ionization Energy* and *Electron Affinity*. (2 Marks)

_____
_____
_____
_____

9. (a) **Draw** a dot and cross diagram to show the bonding in a Hydroxonium ion (H_3O^+). (2 Marks)

(b) **Identify** which bond in H_3O^+ is a *Dative Covalent bond* and **explain** how it is formed. (2 Marks)

_____
_____
_____
_____

(c) **Compare** the electrical conductivity of molten Sodium Chloride and liquid Carbon Tetrachloride. Give a reason. (2 Marks)

_____
_____
_____

10. A student at **Lenana School** is cleaning rusted iron gates using a commercial "Rust Remover" which contains phosphoric acid.

(a) **Mention** two safety precautions the student should take when handling the rust remover. (2 Marks)

i. _____
ii. _____

(b) **Describe** how Chemistry has helped in the "Entertainment Industry" and "Sports Industry." (2 Marks)

i. _____
ii. _____
iii. _____
iv. _____

(c) **Examine** three effects of drug and substance abuse on a learner's health. (3 Marks)

i. _____
ii. _____
iii. _____

(d) **Outline** the role of Chemistry in the manufacturing of inorganic fertilizers to boost Kenyan agriculture. (4 Marks)

i. _____
ii. _____
iii. _____

11. Define the following terms. (2 Marks)

a) **Cation**

_____
_____

b) **Anion**

_____
_____

12. State one application of Chemistry in each of the following fields. (3 Marks)

a) **Agriculture**

_____
_____

b) **Clothing Industry**

_____

_____

c) **Medicine**

_____

_____

13. Describe the contributions of the following scientists to the development of Atomic Theory. (3 Marks)

a) **John Dalton**

_____

_____

b) **J. J. Thomson**

_____

_____

c) **Ernest Rutherford**

_____

_____

14. Lithium has two isotopes with mass numbers 6 and 7 respectively. If the Relative Atomic Mass (R.A.M.) of lithium is 6.94, calculate the percentage abundance of each isotope. (3 Marks)

15. An element P has two isotopes with relative abundances of 65% and 35%. If the mass numbers of the isotopes are X and 31 respectively, determine the value of X given that the Relative Atomic Mass (R.A.M.) of P is 30. (3 Marks)

16. Write the electron arrangement of the alkali metals using the s and p notation. (3 Marks)

a) Lithium

_____

_____

b) Sodium

_____

_____

c) Potassium

_____

_____

17. Explain how electron spin contributes to the stability of an atom. (2 Marks)

_____

_____

18. Briefly explain the contribution of the following scientists to the development of the Periodic Table. (2 Marks)

a) **Dmitri Mendeleev**

_____

_____

b) **Henry Moseley**

_____

_____

19. Using dots (•) and crosses (×) to represent electrons, illustrate how the following atoms form ions. (3 Marks)

a) **Aluminium**

_____

_____

b) **Oxygen**

_____

_____

c) **Fluorine**

_____

_____

20. Derive the chemical formulae for the following compounds. (3 Marks)

a) Aluminium chloride

_____

_____

b) Ammonium sulphate

_____

_____

c) Magnesium nitride

_____

_____

d) Silicon (IV) oxide

_____

_____

e) Sulphur (IV) oxide

_____

_____

f) Nitrogen (II) oxide

_____

_____

21. Write and balance the chemical equations for the following reactions. (4 Marks)

a) Iron + Sulphur → Iron(II) sulphide

_____

_____

b) Sodium hydroxide + Nitric(V) acid → Sodium nitrate + Water

_____

_____

22. Balance the following chemical equations. (12 Marks)

a) $Mg(s) + HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$

_____

_____

b) $Na(s) + H_2O(l) \rightarrow NaOH(aq) + H_2(g)$

_____

_____

c) $NaOH(aq) + H_2SO_4(aq) \rightarrow Na_2SO_4(aq) + H_2O(l)$

_____

_____

d) $CuCO_3(s) + HNO_3(aq) \rightarrow Cu(NO_3)_2(aq) + CO_2(g) + H_2O(l)$

_____

_____

e) $H_2S(g) + O_2(g) \rightarrow SO_2(g) + H_2O(l)$

_____

_____

f) $C_2H_6(g) + O_2(g) \rightarrow CO_2(g) + H_2O(l)$

_____

_____