PRIME MINISTER'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

LONGIDO DISTRICT EXAMINATION SYNDICATE

FORM FOUR PRE MOCK EXAMINATION 2021

CODE: 032 CHEMISTRY

TIME 3:00HRS

INSTRUCTIONS

- This paper consist of section A, B and C
- Answer all questions in section A and B and only one (1) question from section C
- Non programmed calculators may be allowed in the examination room
- Write your examination number on every page of your answer sheets
- The following constants may be used;-
  i. Atomic masses $Pb = 207, S = 32, O = 16, H = 1, C = 12, Zn = 65, Na = 23, Ca = 40$, B = 10.8
  ii. Avogadro's constant 6.02×10^{23}
  iii. $1litre = 1dm^3 = 1000cm^3$
  iv. $1Faraday = 96500coulombs$
  v. $G.M.VatSTP = 22.4dm^3 = 22400cm^3$

SECTION A: MULTIPLE CHOICE QUESTIONS (15 MARKS)

1. For item (i-x) choose the correct answer from the given alternatives.
   i. Separation of the constituents of the mixture by fractional distillation is possible because the constituents in the mixture differ in
      A. Vaporizing point
      B. Freezing point
      C. Melting point
      D. Boiling point

   ii. The element 'M' of group one(I) combines with element 'X' of group six (VI) the formula of the compound
      A. X_2M
      B. M_2X
      C. MX_2
      D. MX_6

   iii. A wasp sting is alkaline. The solution help to reduce pain by neutralizing the alkali would be the one with a PH of …
      A. 7
      B. 8
      C. 5
      D. 10

   iv. An element ionizing by gaining electrons may be classified as;-
      A. Non-metal
      B. Ions
      C. Metals and non-metals
      D. Metals

   v. When a metal atom become an ion it;-
      A. Loses protons
      B. Loses electrons
      C. Gain neutrons
      D. Gain electrons

vi. What volume of $0.2M$ H_2SO_4 will be required to neutralize completely $25Cm^3$ of $0.5M$ KOH

A. $0.656Cm^3$
B. $12.50Cm^3$
C. $31.25Cm^3$
D. $13Cm^3$

vii. Stable structure of elements is called;-

A. Duplet
B. Octet structure only
C. Octet
D. Octet or duplet

viii. How many atoms are there in 8g of Lead (II) sulphate?

A. 1.59×10^{23}atoms
B. 1.59×10^{21}atoms
C. 1.59×10^{22}atoms
D. 1.59×10^{19}atoms

ix. The magnesium salt responsible for permanent hardness of water is

A. Hydrogen carbonate
B. Nitrate
C. Sulphate
D. Carbonate

x. A salt which on exposure to air become covered with a liquid is;-

A. Efflorescent
B. Deliquescent
C. Hydroscopic
D. Hygroscopic

2. Match the items in list A with the responses in list B by writing the letters of the correct responses besides its corresponding number.

List A	List B
i. Carbonates of K & Na	A. Decompose on heat into metal oxide, nitrogen dioxide and oxygen gas
ii. $MgSO_4$ & $ZnSO_4$	B. Sublimes when heated strongly
iii. Moderate reactive metals	C. Decomposes on heat into ammonia, carbon dioxide and water
iv. $AgNO_3$	D. Do not decompose on heat
v. $NH_4 CO_3$	E. Decompose into metal oxide, and sulphur trioxide.
	F. Decomposes into metal oxide, sulphur monoxide and oxygen gas
	G. Decomposes into metal, nitrogen dioxide and oxygen gas.
	H. Decomposes into metal nitrate, nitrogen monoxide and oxygen gas.
	I. Decomposes to give out its water of crystallization
	J. Decomposes into unstable products.

SECTION B (70) MARKS

Answer all questions in this section

3. Consider the part of periodic table below and then answer the questions that follows;-

$_3$K	4	5	6	7	8	9	$_{10}$M
$_{11}$N	$_{12}$O	13	$_{14}$P	15	16	$_{17}$Q	18

a) i. Name the elements represented by K to Q
   ii. Which group and period is element represented by letter N?

b) Among the elements lettered K to Q which one is;-
   i. Halogen
   ii. Noble gas
   iii. Would react mostly with chlorine?

c) Give the formula of the following;-
   i. Hydride of P
   ii. Oxide of O

d) Indicate whether the bonding in the oxide of O and P will be ionic or covalent. Give reasons for your answer.

4. (a)Define the following :-
   i. Empirical formula
   ii. Molecular formula

(b) A certain compound contains 22.7% of zinc,11.0% of sulphur, 22.3% of oxygen and the rest being water of crystallization. If its vapor density is 143.5. Calculate;-

i. The empirical formula
ii. Molecular formula

5. (a) Write the balanced equations for the reaction between dilute sulphuric acid and;-
   i. Sodium hydroxide solution
   ii. Zinc oxide
   iii. Barium chloride solution
   iv. Sodium hydrogen carbonate powder

   (b) Find the oxidation state of the underlined elements in the following formulae of compounds

   ((i) $\underline{Fe}Cl_2$

   (ii) $\underline{Cu}SO_4$

   (iii) $H_2\underline{S}O_4$

   (iv) $\underline{C}O_2$

6. (a) State first and second Faraday's laws of electrolysis
   (b) What are factors affecting the selective discharge of ions during electrolysis
   (c) A stead current of $2A$ is passed through a solution containing ions of a metal M^{2+} for nine minutes. The mass of metal $'M'$ liberated was $0.3637g$.
   (i) Calculate the relative atomic mass of metal $'M'$.
   (ii) Identify 'M'

7. In a volumetric analysis practical, solution AA of Na_2CO_3 was made by dissolving $10.812g$ and solution BB HCl was used. The result of the experiment was as follows;- The volume of pipette used was $25.00Cm^3$

Final reading (Cm^3)	24.00	25.00	24.70	24.95
Initial reading (Cm^3)	0.40	0.00	0.50	0.70
Volume used (Cm^3)				

a) Calculate the mean titre value
b) Calculate the molarity of solution BB
c) Name the indicator you would choose for the following titrations;-

i. Hydrochloric acid versus ammonia solution
ii. Acetic acid and versus sodium hydroxide

8. (a) Is air a mixture or a compound. Give four reasons to support your answer.
(b) Name the methods by which the following substances could be separated;-
i. Sodium chloride and water
ii. Ammonium chloride and sand
iii. Paraffin from water
iv. Oil from seeds
(c) When oil and water are mixed in the same container which one forms the upper layer? Give reasons.

9. (a) Element X has isotopes A and B whose atomic masses are 10.010 and 11.013 respectively. The proportion in nature of A is 20% and that of B is 80%.
(i) Calculate the relative atomic mass of X
(ii) Name element X
(iii) Write its electronic configuration.
(b) Why solid $CaCl_2$ does not conduct electricity while its aqueous solution does?

10. (a)Draw and label the diagram for preparation of oxygen without application of heat.
(b)Write the chemical formulae for the chemicals involved in (a) above
(c)write the chemical test for oxygen gas collected.

11. (a) Name three sources of organic compounds.
(b)Write the systematic names of the following organic compounds.

(i) $CH_3CHCH{=}CHCH_3$
l
CH_3

CH_3
I
(ii) $CH_3CH_2CHC{=}CHCH_3$
I
C_2H_5

(iii) $CH_3C{=}CH_2$
I
CH_3

(iv) $CH_3CHCH_2CHCH_2CH_3$
I I
OH CH_3

12. (a) Mention two factors affecting the rate chemical reaction.

(b) The following equations show the reaction between hydrogen and iodine gases to form hydrogen iodide gas.

$H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$ + Heat

Explain what would happen to the position of equilibrium if;-

i. Temperature is increased
ii. Pressure is lowered
iii. $HI_{(g)}$ is added to the system
iv. $H_{2(g)}$ is added to the system
v. $I_{2(g)}$ is removed from the system

SECTION C (15 MARKS)

Answer only ONE (1) question.

13. (a) Define the following terms
i. Mole
ii. Molecular weight

(b) Calculate the volume of carbon dioxide gas that will be produced at S.T.P when $10g$ of calcium carbonate is completely decomposed by heating as shown in the following equation.

$$CaCO_{3(S)} \rightarrow CaO_{(S)} + C0_{2(g)}$$

(c) What volume of $10M$ acetic acid is required to prepare $1.0dm^3$ of $0.5M$ acetic acid?
(d) How many moles of nitrogen gas are there in 2.2×10^{12} molecules of the gas?

14. (a) With the aid of diagram illustrate the chemical reactions involved in blast furnace during iron extraction
(b) list two uses of pigs and two of wrought iron
(c) What are two uses of calcium silicate produce in iron extraction?

THE END