Name: …… Adm No. ……
Class: …… Date: ….....
233/1
CHEMISTRY
PAPER 1
FORM III
END TERM 2 EXAMS
Time: 2 hours

233/1

CHEMISTRY

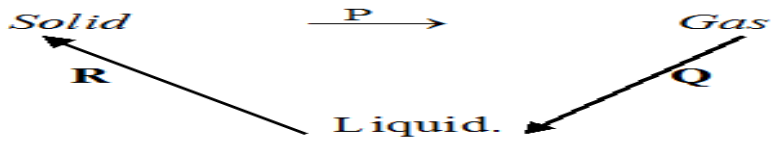
FORM III

INSTRUCTIONS TO THE CANDIDATES:-

- Write your **name** and admission **number** on the spaces provided.
- Answer ***all*** the questions in the spaces provided.
- Mathematical tables and electronic used calculators may be
- All working **MUST** be clearly shown where necessary.

Question	**Maximum score**	**Candidate's score**
1-30	80	

1. Matter exists in three states which can be related as shown in the diagram below.



Name processes: ***P***: …… (1mk)

R: …….. (1mk)

2. (a)Give **one** reason some of the laboratory apparatus are made of ceramics. **(1 mark)**

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(b) Name **two** apparatus that can be used to measure approximately 75 cm of dilute sulphuric (VI) acid. **(2 marks)**

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3. Draw the procedural set-ups that can be used to separate a mixture of sand and calcium chloride to obtain crystals of calcium chloride. **(3 marks)**

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4. State **two** applications of chromatography. **(2 marks)**

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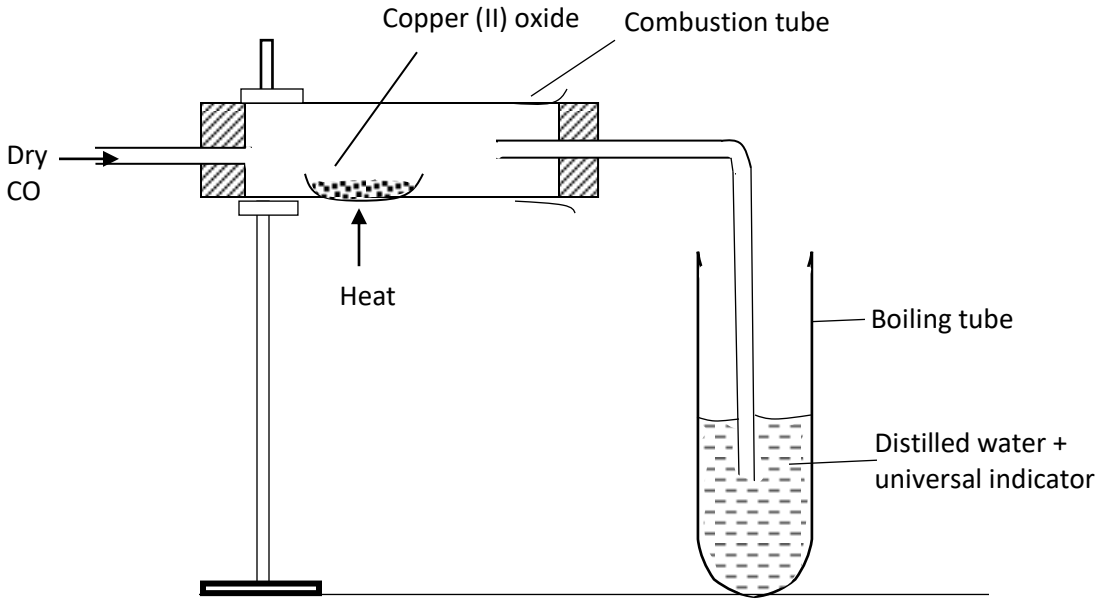

The above set-up was used to determine the chemical properties of carbon (II) oxide.

(a) Write the chemical equation for the reaction taking place in the combustion tube.

(1 mark)

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(b) State and explain the observation made in the boiling tube. **(2 marks)**

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6. A student placed some hydrogen peroxide in a test tube then added a small amount of Solutions can be classified as acids, bases or neutral. The table below shows solutions and their pH values

Solution	**pH – values**
K	1.5
L	7.0
M	14.0

(a) Select any pair that would react to form a solution of pH 7 *(1 Mark)*

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(b) Identify two solutions that would react with aluminium hydroxide. Explain *(2 Marks)*

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7. 9.12g of a gaseous compound contains 8g of silicon while the rest is hydrogen. Determine the empirical formula of the compound. (H = 1, Si = 28) *(3 Marks)*

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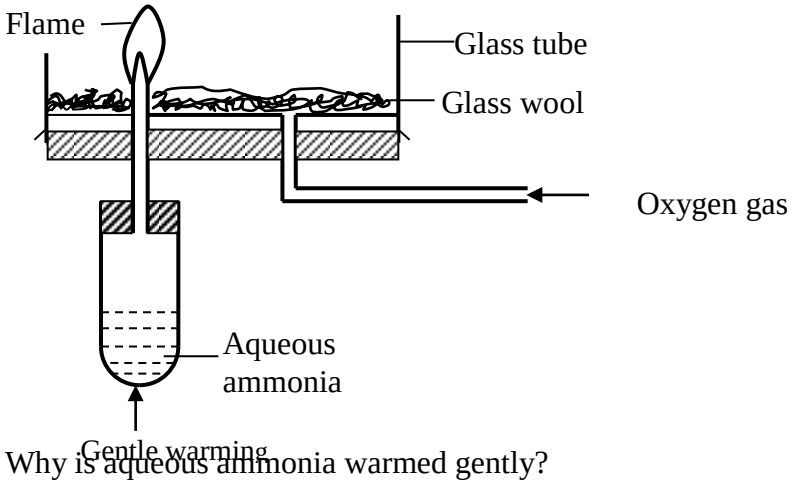
8. Study the set-up below and answer the questions that follow.



(a) Why is aqueous ammonia warmed gently? *(1 Mark)*

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(b) What is the colour of the flame? *(1 Mark)*

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(c) Write the chemical equation for the reaction that takes place *(1Mark)*

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9. (a) Chlorine can be prepared in the laboratory by using the following reagents and chemicals.
Concentrated sulphuric (VI) acid, water, manganese (IV) oxide, concentrated hydrochloric acid.

(i) State the role of concentrated sulphuric (VI) acid. **(1 mark)**

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(ii) Write the equation for formation of chlorine. **(1 mark)**

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(iii) What is the role of manganese (IV) oxide? **(1 mark)**

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10. (a) State Boyle's law. **(1 mark)**

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(b) A gas occupies 270cm^3 at a pressure of 660mmHg at 37^{0}C. What is the new volume if pressure is changed to 810 mmHg at 63^0 C? **(2 marks)**

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11. An organic compound contain s 24.24% carbon, 4.04% hydrogen and the rest chlorine. If its relative molecular mass is 99, what is its molecular formula? **(3 marks)**
(C = 12, H = 1, Cl = 35.5)

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12. A given mass of sodium nitrate was heated completely and 320 cm^3 of the gas was produced at s.t.p. Determine the mass of the sodium nitrate heated.
(Na = 23. N = 14, O = 16, molar gas volume = 22.4L) **(3 marks)**

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13. (a) Give **one** advantage of using methyl orange over phenolphthalein as an indicator.
(1 mark)

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(b) Three drops of litmus solution was added to 20 cm^3 of 2M hydrochloric acid in a beaker followed by 20 cm^3 of 2M ammonium hydroxide. State and explain the observation made. **(2 marks)**

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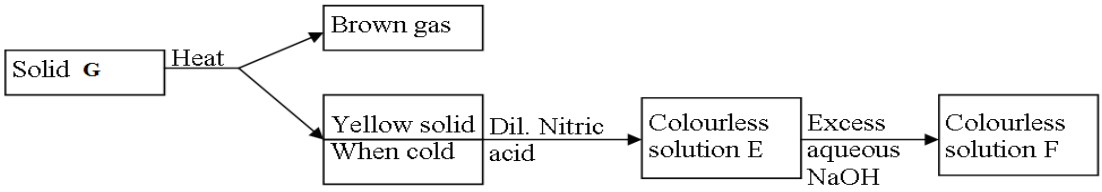
14. Study the flow chart below and answer the questions that follow.



(a) ***Identify*** solid ***G***…… (1mk)

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(a) ***Write*** a balanced ***chemical equation*** between the yellow solid and dilute nitric acid. (1mk)

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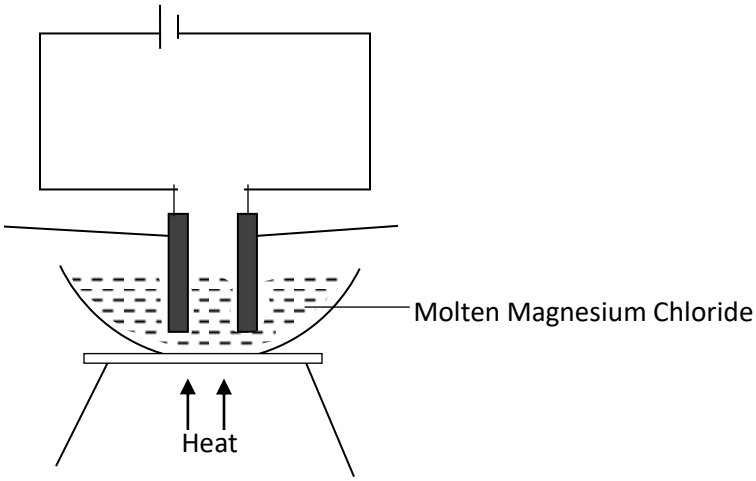
15. Study the diagram below and answer the questions that follow.



(a) Define the term electrolysis. **(1 mark)**

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(b) On the diagram, label the Anode and Cathode. **(2 marks)**

(c) Write the equation at the anode. **(1 mark)**

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16. In order to find the proportion by volume of gases in air, a sample of air was passed through two wash bottles, the first containing sodium hydroxide solution and the second containing concentrated sulphuric (VI) acid. The remaining gas was then collected in a syringe.

(a) Why was the air passed through;

(i) sodium hydroxide solution? **(1 mark)**

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(ii) concentrated sulphuric (VI) acid? **(1 mark)**

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(b) Name is the major gas collected in the syringe. **(1 mark)**

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17. During the manufacture of sodium carbonate in the industry.

(a) Give the name of the process to manufacture sodium carbonate. **(1 mark)**

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(b) Write the final equation to form sodium carbonate during the process. **(1 mark)**

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(c) Give **one** use of sodium carbonate. **(1 mark)**

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18. Describe how to prepare crystal of magnesium sulphate starting with magnesium powder.**(3mks)**

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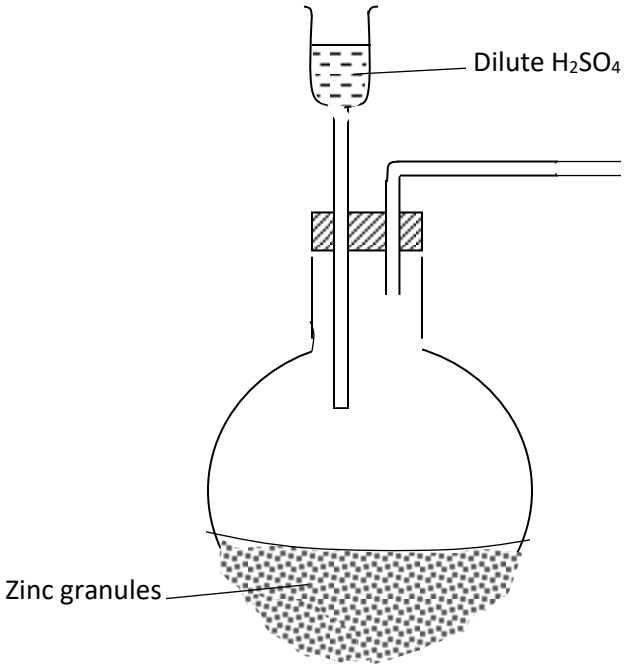
19. (a) Complete the diagram below to show how dry sample of hydrogen gas is prepared in the laboratory. **(2 marks)**



(b) Name the catalyst which could be used to increase the reaction rate of production of hydrogen gas in the set up drawn above. **(1 mark)**

20. An element consists of two isotopes with atomic masses 59 and 61 in the ratio of 3 : 2 respectively.

(a) What are isotopes? **(1 mark)**

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(b) Calculate the relative atomic mass of the element. **(2 marks)**

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21. An element: $^{24}_{12}R$

(a) To which chemical family does it belong? **(1 mark)**

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(b) Write the electron arrangement of the atom. **(1 mark)**

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(c) Draw the structure of its ion. **(1 mark)**

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22. If $25cm^3$ of 0.1M H_2SO_4 solution neutralized a solution contain 1.06g of sodium carbonate in $250cm^3$ of solution, calculate the morality and volume of sodium carbonate solution. (Na = 23, O = 16, C = 12) *(3 Marks)*

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23. $50cm^3$ of oxygen gas diffused through a porous plug in 80 seconds. How long will it take $100cm^3$ of sulphur (IV) oxide to diffuse through the same plug? (S = 32, o = 16) *(3 Marks)*

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24. (a) State the role of the following parts during fractional distillation of a mixture of water and ethanol

(i) Glass beads in the fractionating column *(1 Mark)*

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(ii) Fractionating column *(1 Mark)*

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(b) State any one application of fractional distillation *(1 Mark)*

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25. (a) State what is observed when sodium hydroxide pellets are left in air overnight.**(1 mark)**

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(b) What name is given the process shown by the salt in (a) above? **(1 mark)**

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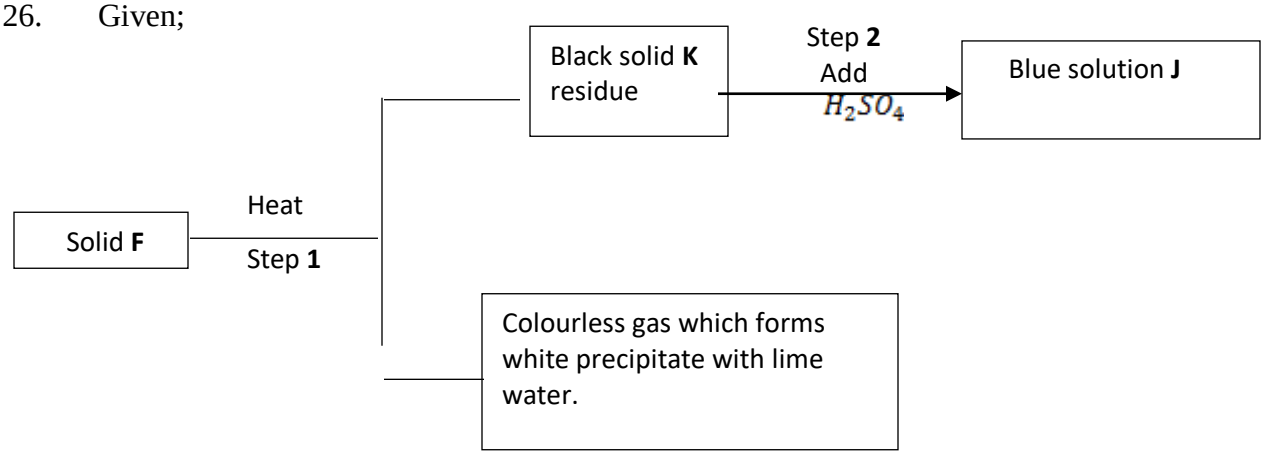
26. Given;



(a) Identify;

Solid **F** - …….

(1 mark)

Solid **J** - ……

(1 mark)

(b) Write equation for step **1**. **(1 mark)**

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27. Use dot (•) and cross (**X**) to show the bonding in Lithium oxide. **(2 mark)**

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28. Excess magnesium ribbon was burnt in air to form a white solid mixture. Write two equations to show the formation of the white solid mixture. **(2 marks)**

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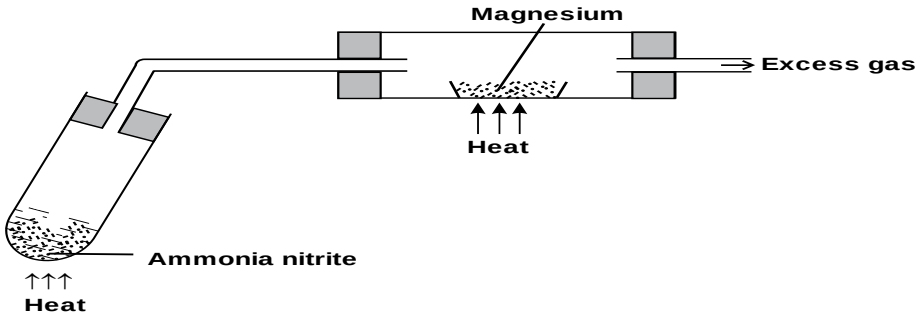
29. The set-up below shows how gas A was prepared and reacted with heated magnesium



a) ***Give*** a reason why it is not advisable to heat magnesium before heating ammonium nitrite. (1mk)

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b) i) ***Identify*** gas A ..... (1mk)

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ii) ***Write*** a chemical equation for the reaction between gas ***A*** and magnesium (1mk)

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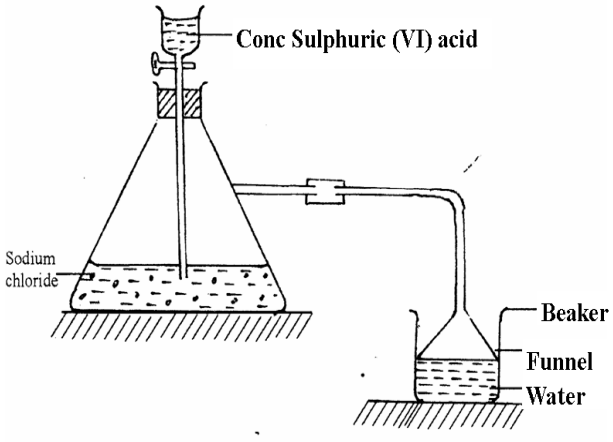
30. Study the set-up below and answer questions that follow.



i) Name the gas that is produced when concentrated sulphuric (VI) acid reacts with the sodium chloride **(1 mark)**

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ii) Why is it necessary to use a funnel in the beaker? **(1 mark)**

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iii) How does the gas affect the P^H of the water in the beaker? **(1 mark)**

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