Name ..... **Index No.** .....

School ..... **Candidate's Sign** .....

Date .....

233/1
CHEMISTRY
PAPER 1
JULY/AUGUST 2013
TIME: 2HOURS

KIKUYU DISTRICT INTERSCHOOLS EVALUATION

KENYA CERTIFICATE OF SECONDARY EDUCATION

233/1
CHEMISTRY
PAPER 1

INSTRUCTION TO THE CANDIDATES:-

- Write your **NAME** and **INDEX NUMBER** in the spaces provided.
- Answer **ALL** the questions in the spaces provided.
- Mathematical Tables and Eelectronic Calculators may be used.
- All working **MUST** be clearly shown where necessary.
- This paper consists of **12** printed pages
- Candidates should **check** to ascertain that **ALL** pages are **PRINTED** as indicated and that no questions are missing.

FOR EXAMINERS USE ONLY

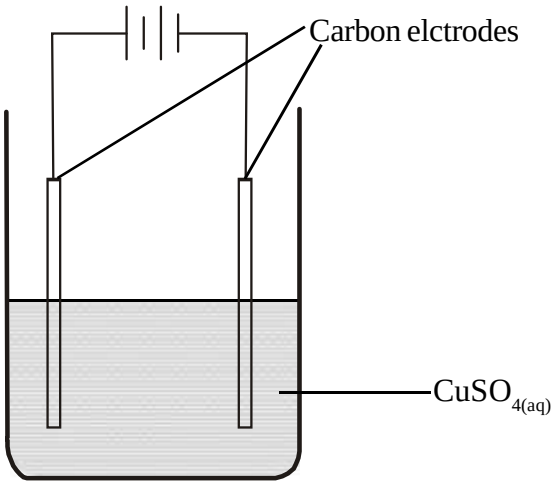
Question	Maximum Score	Candidate's score
1 - 29	80	

1. (a) An isotope Q has mass number of 34 and 18 neutrons.

(i) Draw the atomic structure of Q. (2 marks)

(ii) Write down the electronic configuration of the ion of Q. (1 mark)

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



(a) State any **two** observations made during the experiment. (2 marks)

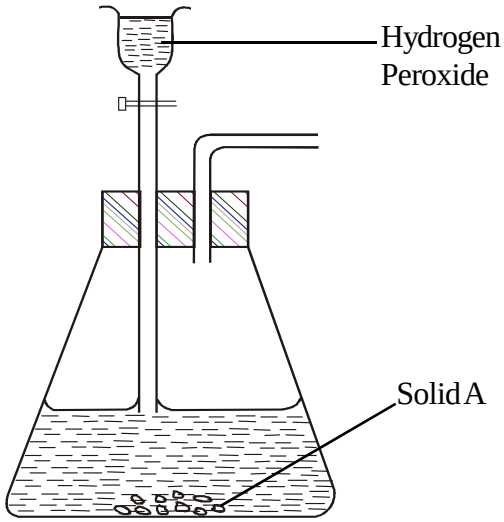
_____

_____

(b) What is the likely pH of the resultant solution at the end of experiment? (1 mark)

_____

3. The set - up below was used to prepare a sample of oxygen gas. Study it and answer questions that follow.

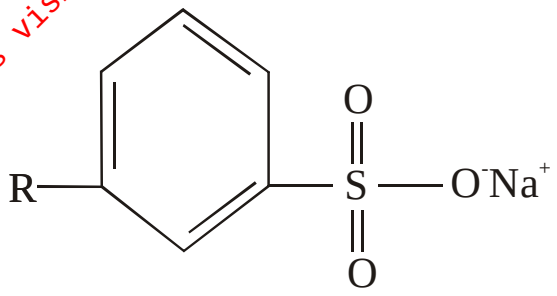


(a) Complete the above diagram to show how oxygen is collected. (2 marks)

(b) Identify solid A. (1 mark)

_____

4. The structure below represent it cleansing agent.



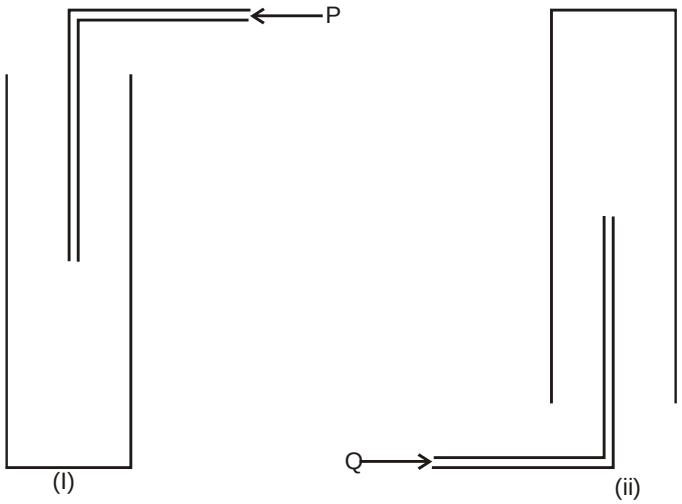
(i) Which type of cleansing agent does the structure above represent. (1 mark)

_____

(ii) Why is it an environmental pollutant. (1 mark)

_____

5. The diagram below shows how two gases, P and Q were collected.



(a) Name the two methods used. (1 mark)

(i) _____

(ii) _____

(b) State properties of P and Q that enable them to be collected through the methods shown. (2 marks)

_____

_____

6. Esther performed an experiment to determine the solubility of potassium chlorate in water at 30^0C. She obtained the following results.

Mass of dish ⟶ 15.86g

Mass of dish + saturated solution of 30^0C ⟶ 26.86g

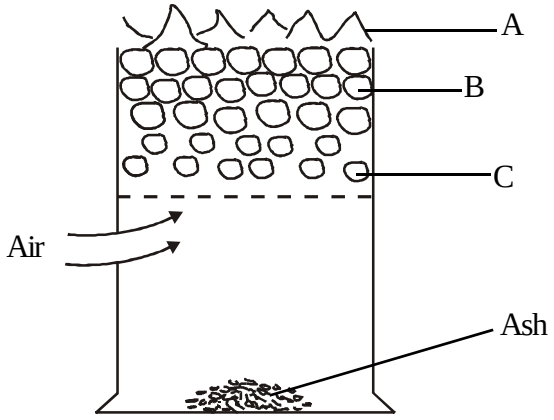
Mass of dish + solid potassium chlorate after evaporation to dryness ⟶ 16.86g

(a) Calculate the mass of potassium chlorate contained in 60g of water at 30^0C. (2 marks)

.

(b) What is the solubility of $KClO_3$ at 30^0C? (1 mark)

7. The diagram below represents a charcoal jiko burning.



(a) Write the equation for the reactions that occur in regions A and B. (2 marks)

(b) Explain why it is not advisable to leave a burning jiko overnight in your sleeping room with no ventilation. (1 mark)

_____

8. Study the reaction equation given below.

$$H_{2(g)} + Br_{2(g)} \rightleftharpoons 2HBr_{(g)} \qquad \Delta H = -74.4KJ$$

(a) Draw an energy level diagram showing the catalysed and uncatalysed reaction. (2 marks)

(c) State the effects on formation of hydrogen bromide if pressure was increased in equation above. Explain. (1 mark)

_____

9. Some average bond energies are given below.

Bond	Energy in KJmol-1
C -C	348
C - H	414
Cl - Cl	243
C - Ci	432
H - CI	340

Calculate the energy change for the reaction below.

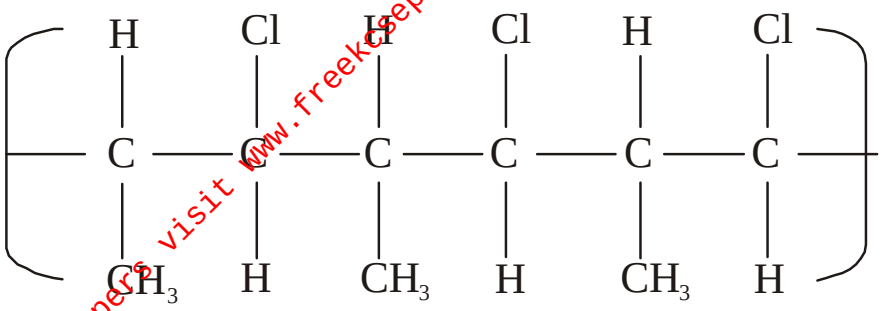
$$C_2H_6 + Cl_{2(g)} \longrightarrow CH_3CH_2Cl_{2(g)} + HCl_{(aq)}$$ (3 marks)

10. (a) When magnesium is heated in a stream of Nitrogen, a white solid is formed. Write the equation for the reaction.

(b) When the white solid obtained in (a) above, is reacted with water, a colourless gas which turns a moist red litmus paper blue is produced. Identify the colourless gas. (1 mark)

_____

11. The structure given below is for a certain polymer.



(a) Draw the structure of the monomer. (1 mark)

(b) Give that the molecular mass of the polymer is 4590, calculate the number of monomers present in the polymer. (2 marks)

12. The data below gives the electronic configuration of some selected atoms and ions.

Atom/ion	A^{2+}	B	C^{2-}	D^{2+}	E	F^{-}	G^{+}	H
Electronic configuration	2	2.4	2.8	2.8.8	2.8	2.8.8	0	2.8.2

(a) Select an atom that is a noble gas. (1 mark)

_____

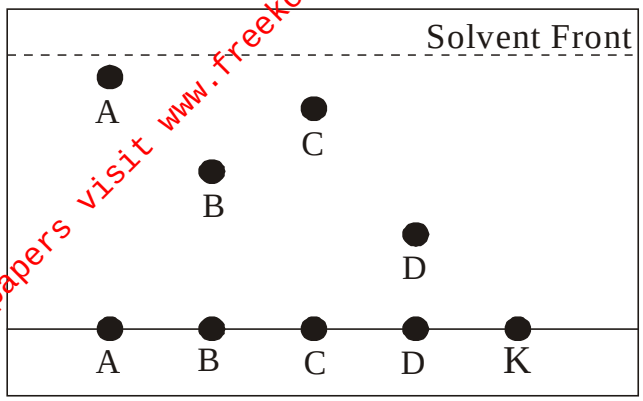
(b) What is the atomic number of C and A. (1 mark)

(c) Select an element that belong to group 2 and period four. (1 mark)

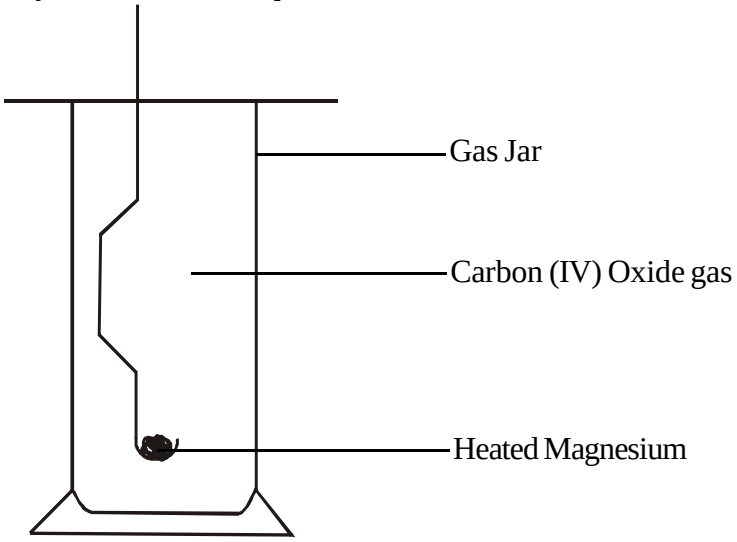
_____

(d) Write the formula of the compound formed when D and F react. (1 mark)

13. The diagram below represents a paper chromatogram of pure A, B, C and D. K is a mixture that contains A and D only. Indicate on the diagram the chromatogram of K. (1 mark)



14. The diagram below represents a heated magnesium metal lowered inside a gas jar of carbon (IV) Oxide. Study it and answer the questions that follow.



(i) State **two** observations that can be made during and after the experiment. (2 marks)

_____

_____

(ii) State **one** precaution to be taken during the above experiment. (1 mark)

_____

15. When calcium carbonate was added to a solution of dry hydrogen chloride in methyl benzene there was no observable reaction explain. (2 marks)

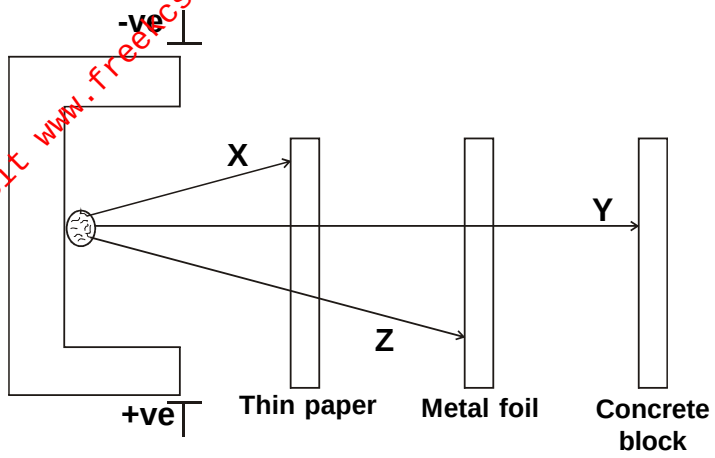
_____

_____

_____

_____

16. Below is a diagram of the deflection and penetrating powers of three radiations from a radioactive source.



(i) Name the radiations labelled X, Y and Z.

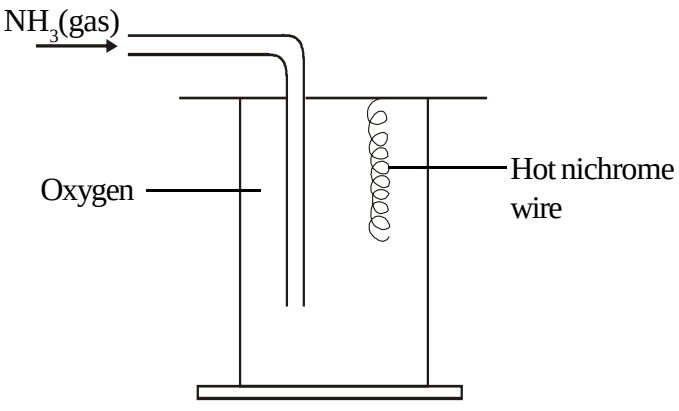
X _____ (1 mark)

Y _____ (1 mark)

Z _____ (1 mark)

17. A current of 0.4 A was passed through Lead (II) Nitrate solution for 30 minutes. Determine the mass of Lead deposited. (Pd = 207 IF = 96500C) (3 marks)

18. The apparatus below was set up to show the reaction between ammonia and oxygen.



(i) Write an equation for the reaction that takes place in the gas jar. (1 mark)

(ii) What is the use of hot nichrome wire in the experiment? (1 mark)

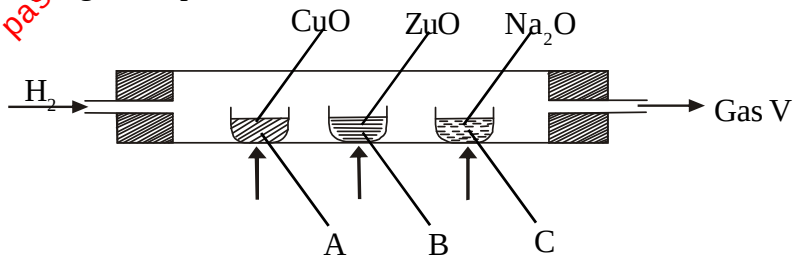
_____

(iii) State **two** uses of ammonia. (1 mark)

_____

_____

19. Hydrogen gas was passed over heated oxides of metals as shown.



(i) State and explain the observation which can be made in dish A. (1 mark)

_____

(ii) Identify gas V formed. (1 mark)

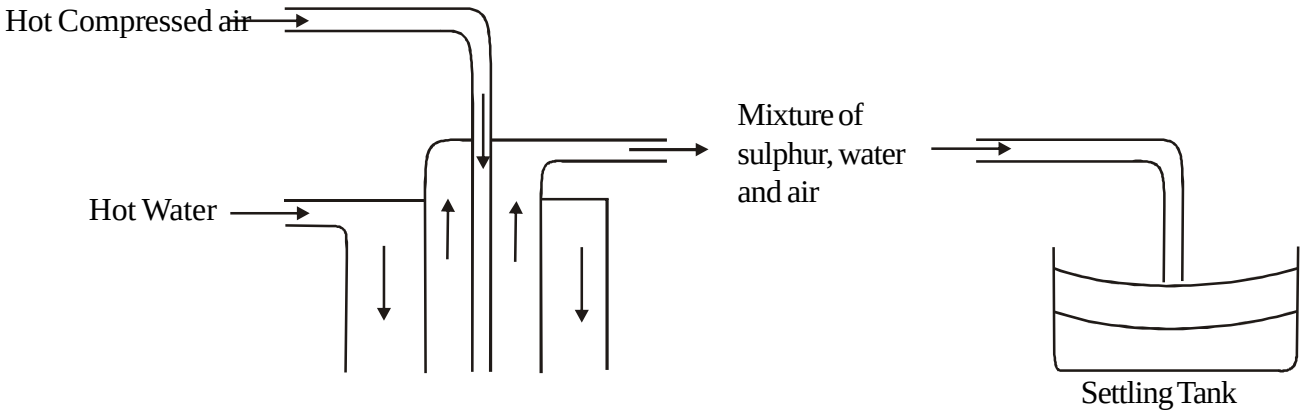
_____

(iii) Give **two** uses of hydrogen gas. (1 mark)

_____

_____

20. Use the diagram below to answer the questions that follow.



The water is normally used at temperature of at least 1550C.

(i) State the role of hot compressed air. (1 mark)

_____

(ii) Give reason why molten sulphur is conducted through the middle pipe. (1 mark)

_____

_____

(iii) The diagram shows a settling tank which has two layers. State why they are two layers. (1 mark)

_____

21. Use the following half cell standard electrode potentials to answer the questions that follow.

$J^{2+}_{(aq)} + 2e \longrightarrow J_{(s)}$

$K^{2+}_{(aq)} + 2e \longrightarrow K_{(s)}$

$L^{2+}_{(aq)} + 2e \longrightarrow L_{(s)}$

$M^{2+}_{(aq)} + 2e \longrightarrow M_{(s)}$

(a) State the two half cells which when combied gives the largest e.m.f. (1 mark)

_____

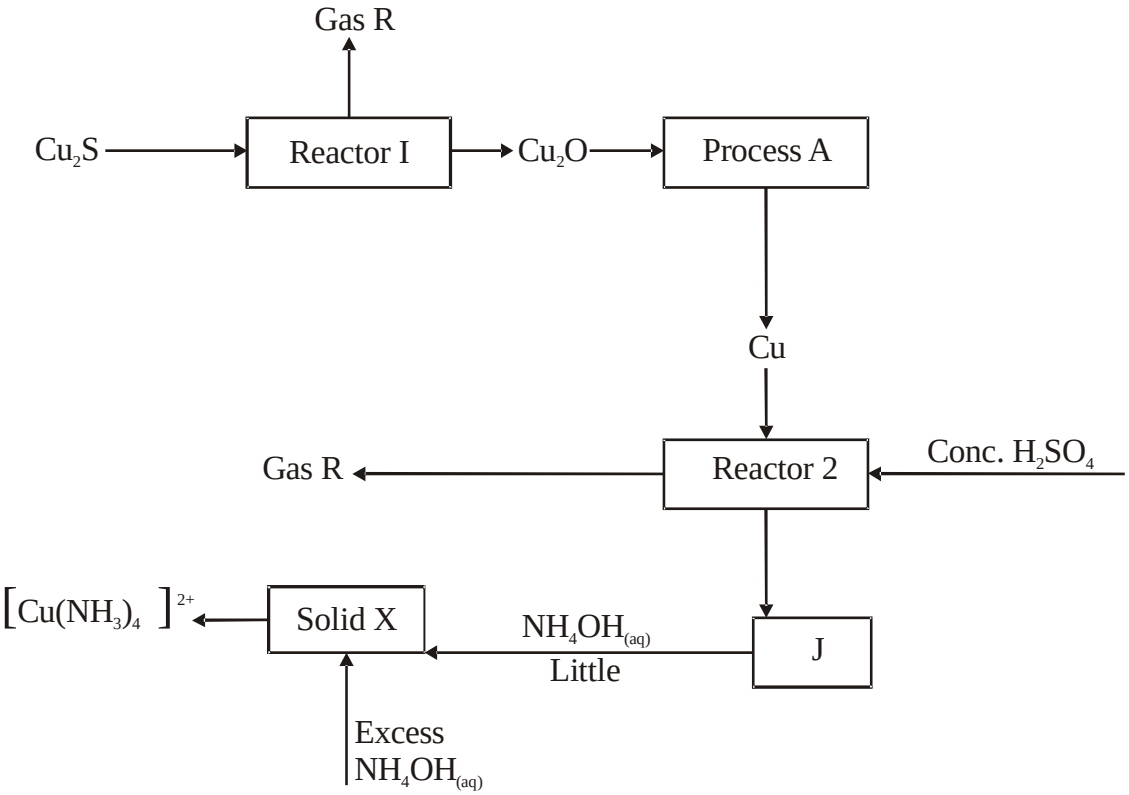
_____

(b) Calculate the e.m.f of the cell in (a) above. (1 mark)

(c) Give the cell notation in (b) above. (1 mark)

_____

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



(a) Identify

(i) Gas K. (1 mark)

_____

(ii) Substance I. (1 mark)

_____

(iii) State the observation made when little ammonium hydroxide then excess is added. (1 mark)

_____

23. (a) Both sodium and aluminium are metals in period 3, yet sodium has a much lower melting point than aluminium. Explain. (1 mark)

_____

(b) Explain why electrical conductivity of metals decrease with increase in temperature. (2 mark)

_____

_____

24. Three nitrates Q, R and S were each heated and the products formed were tabulated as shown below.

Nitrate	Products
Q	Metal Nitrate + Oxygen
R	Metal Oxide + Nitrogen (IV) Oxide + Oxygen
S	Nitrogen (I) Oxide + Water

(a) Identify

S _____ (1 mark)

R _____ (1 mark)

(b) What is the name given to elements in the same group as Q? (1 mark)

_____

25. X grams of anhydrous sodium carbonate was dissolved in water to make a 250cm^3 solution. 25cm3 of the solution neutralized 20cm3 of 0.25M nitric acid. Determine the value of X. (3 marks)

26. Explain the trend in the boiling points of group seven elements. (3 mark)

_____

_____

_____

27. (a) Two gases X and Y have a relative density of 1.98 and 2.90 respectively. They diffuse under the same conditions. If the relative molecular mass of Y is 64. Determine the relative molecular mass of X. (2 marks)

(b) Under the same conditions carbon (IV) Oxide, propane and nitrogen (I) oxide diffuse at the same rate. Explain. (1 mark)

_____

_____

28. Name the species acting as the base in the equation below and explain your answer.

$H_2O_{(aq)} + H_2O_{(l)} \rightleftharpoons H_3O^+_{(aq)} + OH^-_{(l)}$ (1 mark)

_____

29. (i) Is concentrated sulphuric acid weak or strong acid? (1 mark)

_____

(ii) Explain your answer in (i) above. (1 mark)

_____

_____