Name: …… **Index No.** ……

School: …… **Candidate's Sign.** ……

Date: ……

233/1
CHEMISTRY
PAPER 1
JULY/AUGUST 2011
TIME: 2 HOURS

RACHUONYO SOUTH DISTRICT JOINT EVALUATION TEST

Kenya Certificate of Secondary Education (K.C.S.E.)

Chemistry
Paper 1

INSTRUCTIONS TO THE CANDIDATES:-

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

Question	Maximum score	Candidate's score
1-30	80	

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

1. A mixture contains sodium chloride, ammonium chloride, and silver chloride. Explain how you can obtain pure samples of each salt. (3mks)

……

……

……

……

2. Elements **Q,S,T,U,R** and **P** belong to the same period in the periodic table. The ions formed by the atoms of the elements are given below: Q^{2+}, U^{-}, T^{2-}, R^{3+}, P^{+} and S^{3-} .

(a) Arrange the elements in order of increasing atomic size. (2mks)

……

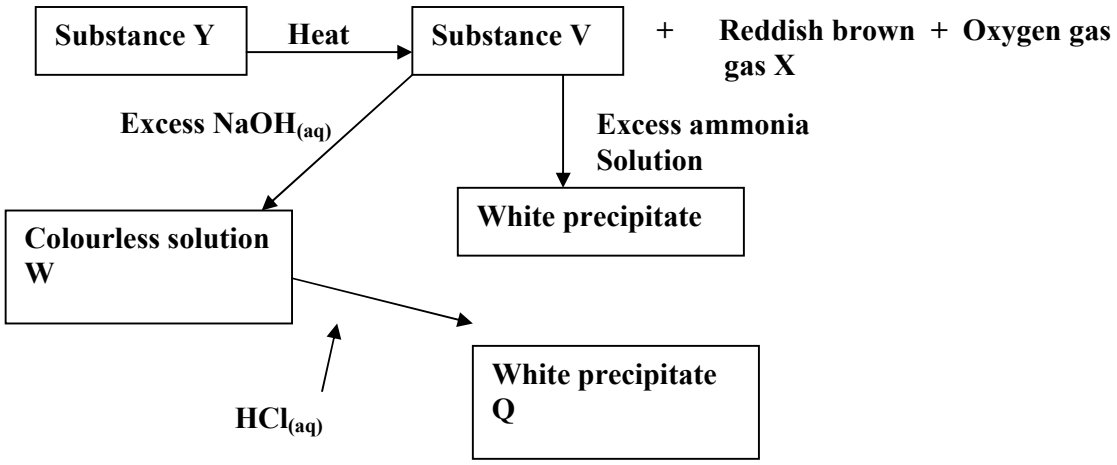
……

(b) Suggest a reason why elements **P** and **Q** cannot react with each other to form a compound. (1mk)

……

……

3. Study the reaction scheme below and answer the questions that follow.



(a) Suggest the possible anions in **Y** and **V** (2mks)

Y……

V……

(b) Predict the name of gas X. (1mk)

……

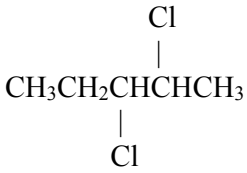
……

4. (a) Draw the structure of the following compounds:

(i) 2 – Methyprop-i-ene…… (½ mk)

(ii) Hexan – 2- ol …… (½ mk)

(b) A compound **W** react with chlorine to form another compound Y whose structural formula is as follows:



(i) Give the name and structural formula of Compound **W** (1mk)

……

……

(ii) What type of reaction leads tot the formation of compound **Y** from compound **W**. (1mk)

……

……

5. The table below shows the PH values of some solutions.

Solution	J	K	L	M	N
pH	6	13	2	10	7

(a) Which solution is likely to be:

(i) Potassium hydroxide (½ mk)

……

(ii) Lemon juice (½ mk)

……

(b) Explain why a solution of hydrogen chloride gas in methyl benzene was identified as **N**. (1mk)

……

……

(c) Compare the electrical conductivity of solutions **J** and **L** (1mk)

……

……

6. When a solid sample of sulphur is heated in a test tube, it changes into a liquid which flows easily. On further heating , the liquid darkens and does not flow easily. Explain these observations. (3mks)

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7. $50cm^3$ of oxygen gas diffuse 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) (3mks)

……

……

……

……

8. When 5g of ammonium nitrate were dissolved in 250cm^3 of water a drop in temperature of 1.5^{o}C was observed. Determine the molar enthalpy of solution of this salt. (N=14,H= 1,O=16 specific heat capacity of solution = 4.2 J g^{-1}K^{-1} density f water 1 g/cm^3) (3mks)

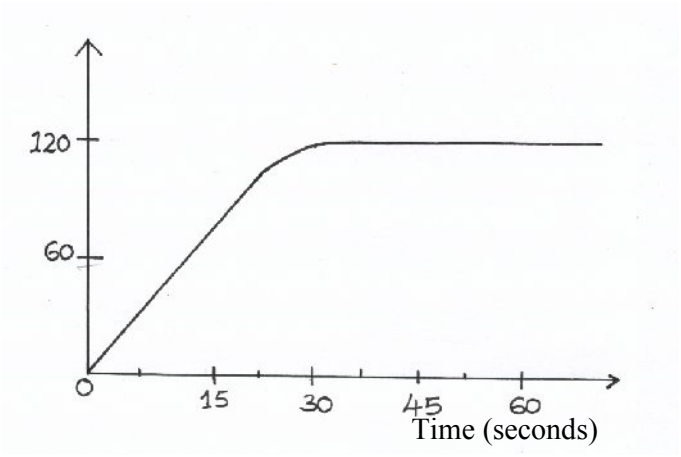
9. (a) Using dots (•) and cross (x) show the bonding in hydroxonium ion H_3O^+. (2mks)

(b) Flourine has very low melting and boiling points and yet its atoms are joined by covalent bonding. Explain. (1mk)

……

……

10. 6.5 g of zinc granules were reacted with 25cm^3 of 4M hydrochloric acid. The graph below shows the results:



(a) Explain the shape of the curve. (1mk)

……

……

(b) How long did it take for the reaction to be complete? (1mk)

……

……

(c) Calculate the average rate of reaction. (1mk)

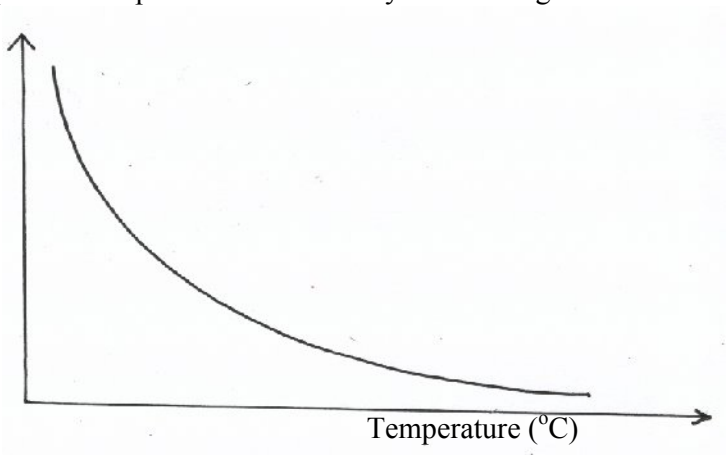
11. When a current of 0.5 amperes was passed for 32 minutes and 10 seconds through the fused chloride of metal P, 0.44g of P was deposited. Determine the charge on the ion of metal P (if 1faraday=96500 R.A.M of P = 88) (3mks)

12. Iron is extracted from its ore, heamatiie in the blast furnace. The main reaction during extraction is

$$Fe_2O_{3(s)} + 3\ CO_{(g)} \longrightarrow 2Fe_{(s)} + 3\ CO_{2(g)}$$

Calculate the mass of iron which will be produced from 320 tonnes of haematite.
(Fe= 56 O=16) (2mks)

13. The graph below represents the solubility curve of a gas in water.



(a) State and explain the conclusion that can be drawn from this curve about the solubility of the gas. (1mk)

……

……

(b)The solubility of potassium chlorate at 80°C is 40g/100g of water. What mass of potassium chlorate will saturate 65g of water at 80°C. (2mks)

14. Below is a radioactive decay series starting from $^{210}_{82}Pb$ and ending at $^{210}_{82}Pb$

$$^{210}_{82}Pb \xrightarrow{\text{Step I}} {}^{214}_{83}Bi \xrightarrow{\text{Step II}} {}^{210}_{81}Po \xrightarrow{\text{Step III}} {}^{206}_{82}Pb$$

(a) Identify the particles emitted at step I and Step II (1mk)

Step I……

Step II……

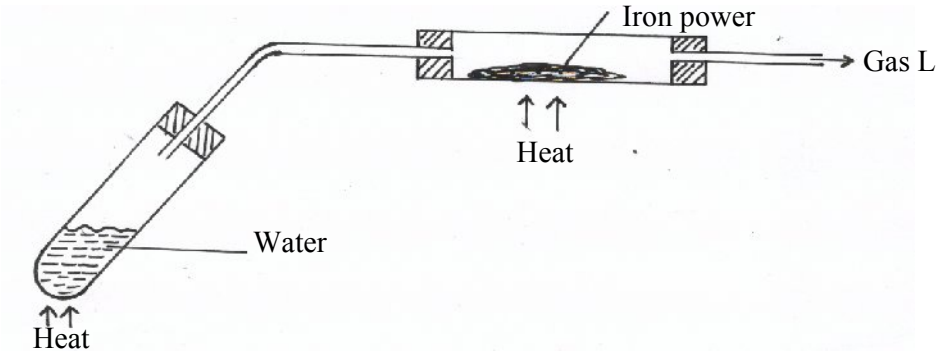
(b) Write the nuclear equation for the reaction which takes place in step (II) (1mk)

(c) State **one** application of radioactivity. (1mk)

……

15. $25cm^3$ of 0.1m sulphuric (VI) acid required $20cm^3$ of sodium carbonate solution for complete nuetralisation. Calculate the concentration of sodium carbonate in moles per litre. (3mks)

16. The following set up was used to react steam with Iron Powder.



(a) The water was heated before heating the iron powder. Explain why this was necessary. (1mk)

……

……

(b) Write an equation for the reaction that took place between steam and iron powder. (1mk)

(c) State how gas **L** would be collected without using water. (1mk)

……

……

17. Starting with Lead (II) Oxide, describe how you would prepare a solid sample of Lead (II) chloride. (3mks)

……

……

……

18. Painting, oiling, galvanizing or tin-plating are methods of preventing rusting.
(a) Explain how these methods are similar in the way they prevent rusting. (1mk)

……

……

(b) Explain why galvanized iron objects are better protected even when scratched. (1mk)

……

……

19. Nelly's lungs can hold 2500cm^3 of air at 37^{o}C and 1 atmosphere. What would be the pressure if this air was put in a bottle of capacity 500cm^3 at 27^{o}C? (3mks)

20. Sulphuric acid is manufactured in large scale by the contact process. The basic reaction in the contact process is catalytic oxidation of sulphur(IV) oxide.

(a) Name the catalyst used. (1mk)

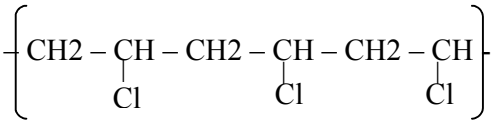
……

(b) Write an equation for the basic reaction. (1mk)

(c) State **one** large scale use of sulphuric (VI) acid (1mk)

……

21. Study the structure below and answer the questions that follow.



(a) Name the polymer represented by the structure.

……

(b) Draw the structure of the monomer and name it.

Structure Name

22. Given that:

$Q^{2+}_{(aq)} + 2e^- \longrightarrow Q_{(s)}$ $E^\theta = -0.13V$

$Ag^+_{(aq)} + e^- \longrightarrow Ag_{(s)}$ $E^\theta = +0.80V$

(a) State and explain whether silver nitrate can be stored in a container made of Q (2mks)

……

……

23. When anhydrous calcium chloride is exposed to the atmosphere it forms a solution.

$CaCl_2 \xrightarrow{H_2O_{(l)}} CaCl_{2\,(aq)}$

(a) Name the process that takes place. (1mk)

……

(b) State **one** use of the process displayed by anhydrous calcium chloride. (1mk)

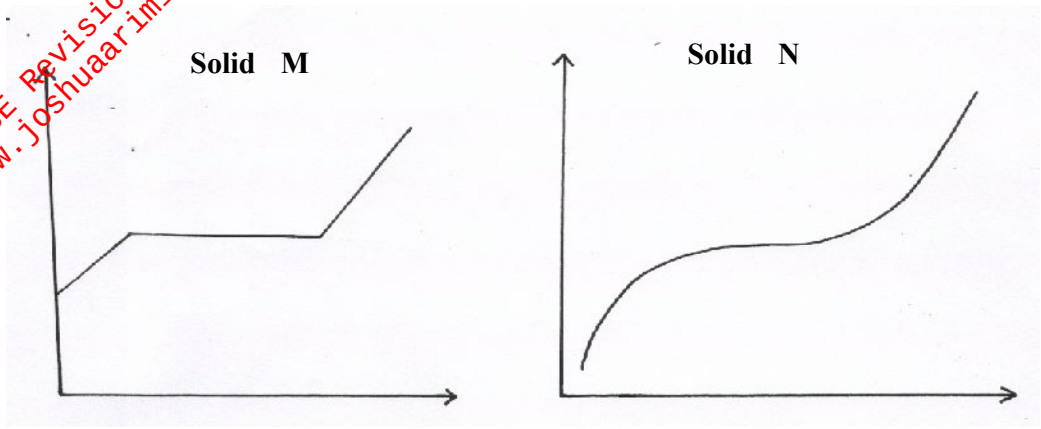
……

24. When solid magnesium carbonate was added to a solution of hydrogen chloride in methylbenzene, there was no apparent reaction. On addition of water to that resulting mixture, there was vigorous effervescence. Explain these observation. (2mks)

……

……

25. The graphs below represents the temperature-time curves for solids M and N



(a) What is the name given to the curves above? (1mk)

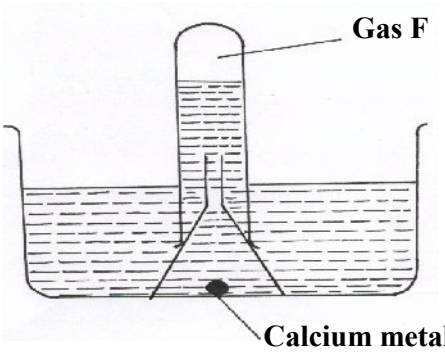
……

(b) Which of the **two** solids is an impure substance? Explain. (2mks)

……

……

26. The set-up below was used to collect gas F produced by the reaction between water and calcium metal.



(a) Name gas **F** (1mk)

……

(b) Give **one** laboratory use of the solution formed in the beaker. (1mk)

……

(c) After some time there was formation of a white precipitate formed at the top of the solution in the beaker. Explain this observation. (1mk)

……

27. (a) Name and give the chemical formula of the chief ore of copper. (1mk)

Name……..

Formula……..

(b) The main ore of copper is low grade. Describe how the main ore can be concentrated. (2mks)

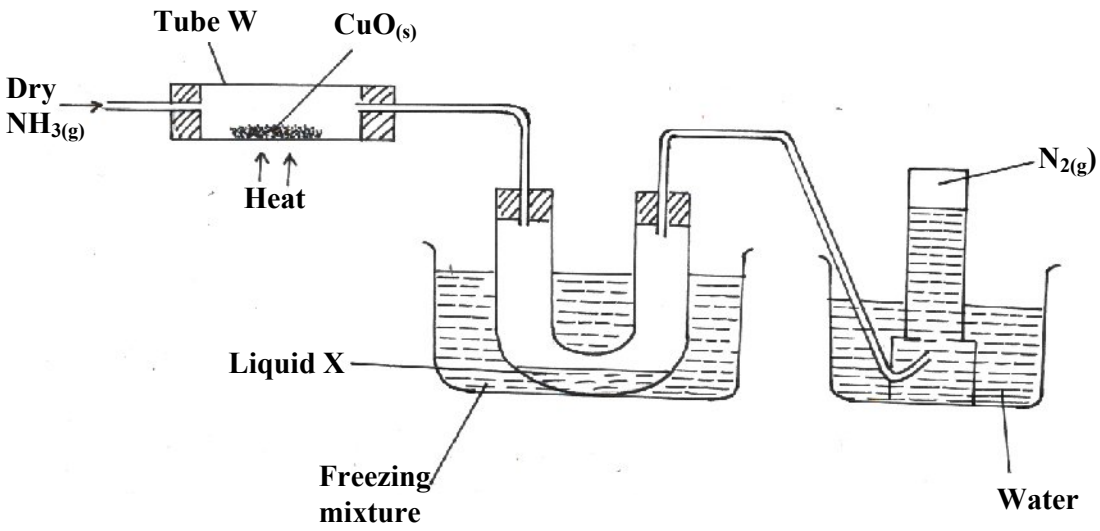
……

……

28. $40cm^3$ of carbon(II) oxide and 40 cm^3 of oxygen were sparked in a closed vessel.
(i) Write a chemical equation for the reaction that occurs. (1mk)

(ii) Determine the composition of the residual gases. (2mks)

29. The diagram below represents a set-up that can be used to obtain nitrogen gas in the laboratory.



Use the information on the diagram to answer the questions that follow.
(a) Name liquid X (1mk)

……

(b) What observations are made in the tube after heating for about 10 minutes? (1mk)

……

(c) Write an equation for the reaction that took place in tube W. (1mk)

30. Determine the relative atomic mass of the argon whose isotopic mixture is: (2mks)

$^{36}_{18}Ar$ (0.34%) $^{38}_{18}Ar$ (0.06%) $^{40}_{18}Ar$ (99.6%)