Name …… **Index No……..../……..**

School……Candidate's sign……

Date……

233/1

CHEMISTRY THEORY

PAPER 1

JULY/2013

2 Hours

LARI DISTRICT JOINT MOCK - 2013

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

INSTRUCTIONS

1. Write your name and index number in the spaces provided.
2. Sign and write the date of examination in the spaces provided.
3. Answer ALL questions in the spaces provided
4. Mathematical tables and electronic calculators may be used.
5. All working MUST be shown clearly where necessary.

FOR EXAMINERS USE ONLY

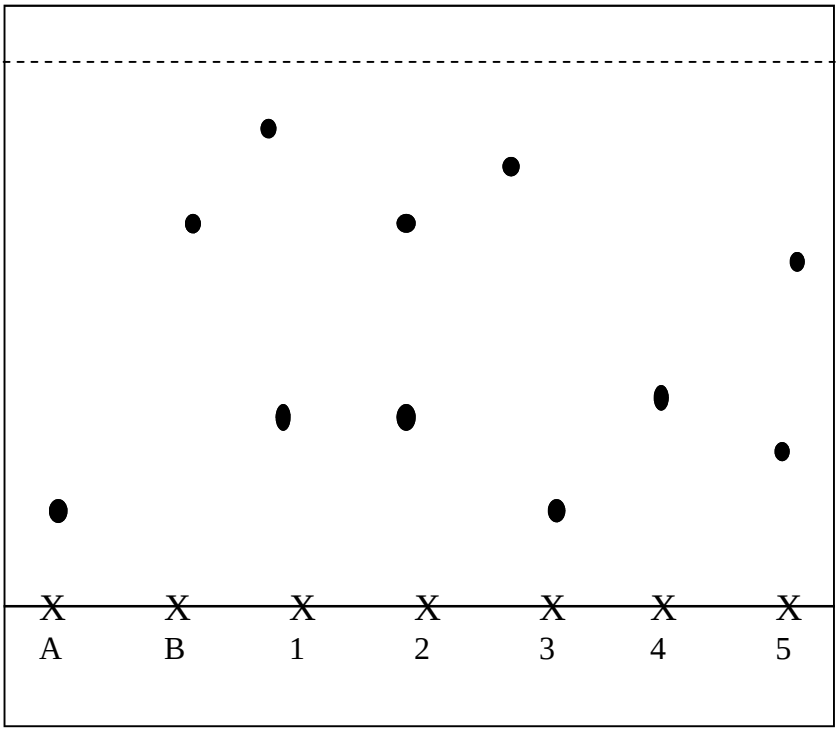
questions	Maximum score	Candidate's score
1-28	80	

This paper consists of 15 printed pages.
Candidates should check the questions to ensure that all pages are printed as indicated and no question(s) are missing

1. (a) Give any two differences between a luminous and a non-luminous flame. (2mks)

(b) Which of the two flames is best used for lighting? Give a reason. (2mks)

2. During the Olympics, urine samples of five short-distance runners were taken and tested for the presence of two illegal steroids by paper chromatography. Methanol was used as the solvent. A chromatogram from the test appeared as shown below. Study the chromatogram and answer the questions that follow.



KEY

SPOT A—STEROID A

SPOT B— STEROID B

SPOT 1— Athlete 1

SPOT 2— Athlete 2

SPOT 3— Athlete 3

SPOT 4— Athlete 4

SPOT 5— Athlete 5

(a) Which of the two steroids is most likely to be more-soluble in methanol. Give a reason.(1mk)

(b) Identify the athletes that tested positive for the illegal steroids. (2mks)

3. (I) Although carbon dioxide does not support combustion magnesium burns in it. Explain. (2mks)

(II) Write a balanced chemical equation for that reaction. (1mk)

4. Briefly explain the following:
(a) Alkaline earth metals are generally less reactive than-alkali metals. (2mks)

(b) Though sodium and aluminum are in the same period and are both metals, aluminium is a better conductor of electricity. (2mks)

5. Sulphur (IV) oxide gas can be prepared in the laboratory either by action of concentrated sulphuric acid on copper turnings or by the reaction between dilute hydrochloric acid and sodium sulphite.

(i) Write equations for both of the reactions. (2mks)

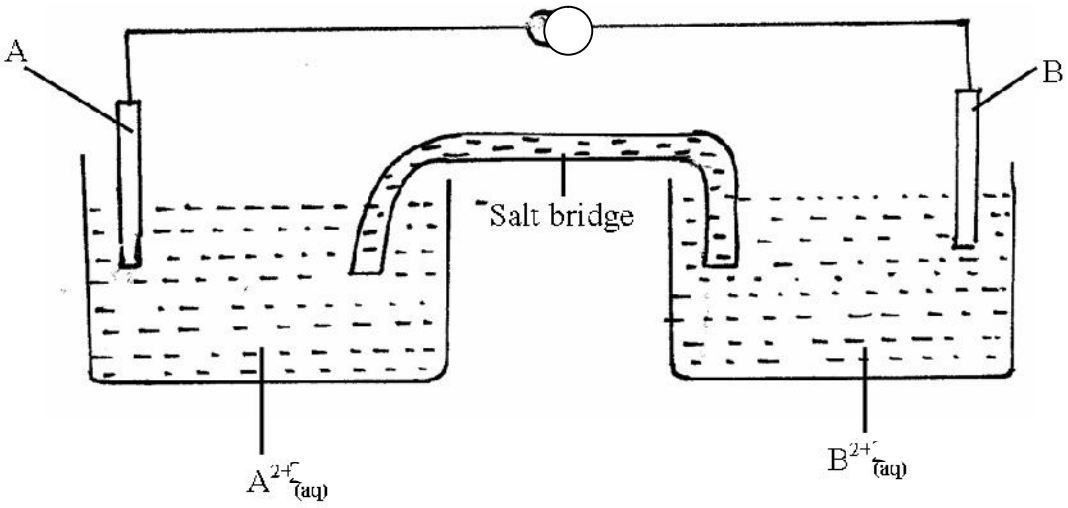
(ii) How is the gas dried after preparation? (1mk)

(iii) Give the reason why Sulphur (IV) oxide gas is collected by downward delivery after preparation. (1mk)

6. a) Name the organic compound formed when $CH_3CH_2\underset{\underset{OH}{|}}{C}HCH_3$ is heated with concentrated sulphuric (VI) acid at 180°C. (1mk)

b) What type of reaction takes place in (a) above? (1mk)

7. Study the electrochemical cell below and use it to answer the questions that follow



Given that the above cell is for the reaction below

$$Cu^{2+}_{(aq)} + Mg_{(s)} \longrightarrow Mg^{2+}_{(aq)} + Cu_{(s)}$$

a) Identify:

A_____ ½mk

A^{2+}_____ ½mk

B_____ ½mk

B^{2+}_____ ½mk

b) Identify a suitable compound for the salt bridge (1mk)

8. Substances J, K, L and M have the following properties.

Substance	M.P.	Solubility in water	Electrical conductivity	
			Solid state	Liquid state
J	Low	Soluble	Does not	Does not
K	High	Soluble	Does not	Conducts
L	High	Soluble	Conducts	Conducts
M	High	Insoluble	Does not	Does not

(i) Select the letter which represents a substance which is suitable for making kettle handles. (1mk)

(ii) Which letter represents a substance which is likely to be sodium chloride? (1mk)

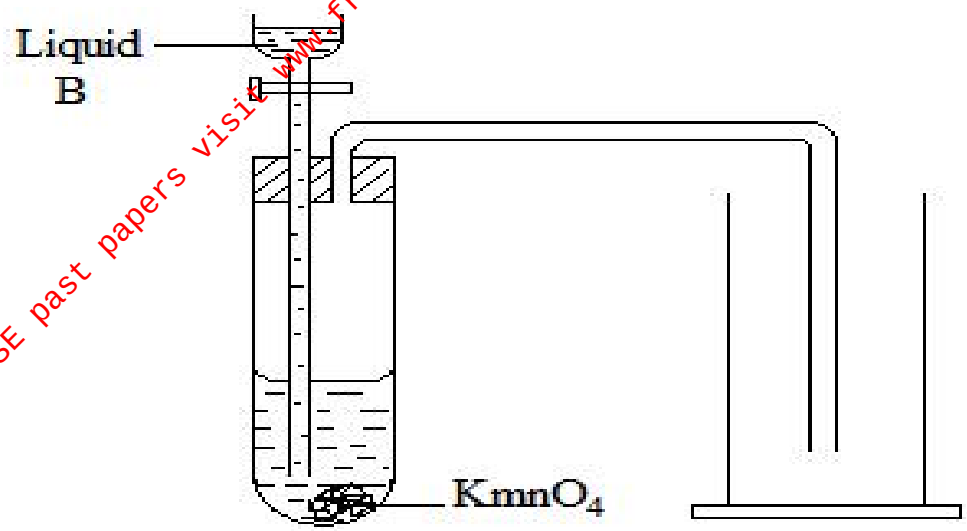
(iii) Name the **structure** and **bond type** likely to be in J.

a). structure. ½mk

b) Bond type. ½mk

9. A current of 0.4 A was passed through lead (II) nitrate solution for 30 minutes. Determine the mass of lead deposited. (Pb = 207 1F = 96500C) (3mks)

10. The set up below shows how chlorine is prepared.



a) Identify the liquid B. (1mk)

b) What is the role of $KMnO_4$ in this reaction? (1mk)

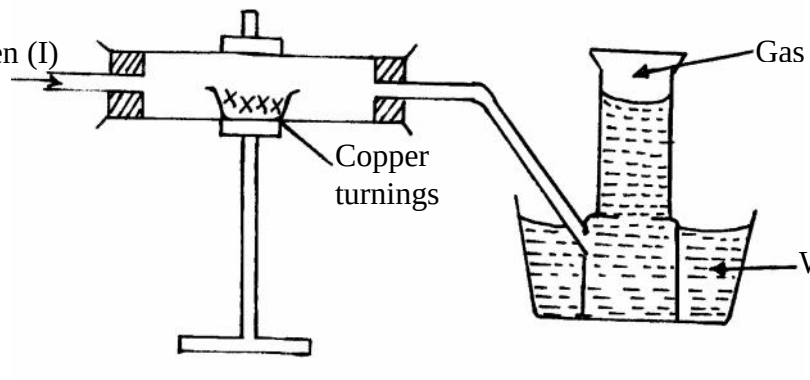
c) Give one industrial use of chlorine. (1mk)

11. Determine the oxidation state of lead (Pb) in PbO_2 and hence cation in the compound. (2mks)

12. Draw the atomic structure of an element **Y** whose atom is represented below as; (2mks)

$$^{3}_{1}Y$$

13. The diagram below was used to investigate the reaction between nitrogen (I) oxide and copper turnings to produce gas Y.



Use it to answer the questions which follow.

a) Identify what is missing in the set-up. (1mk)

b) Write an equation of the reaction taking place in the combustion tube. (1mk)

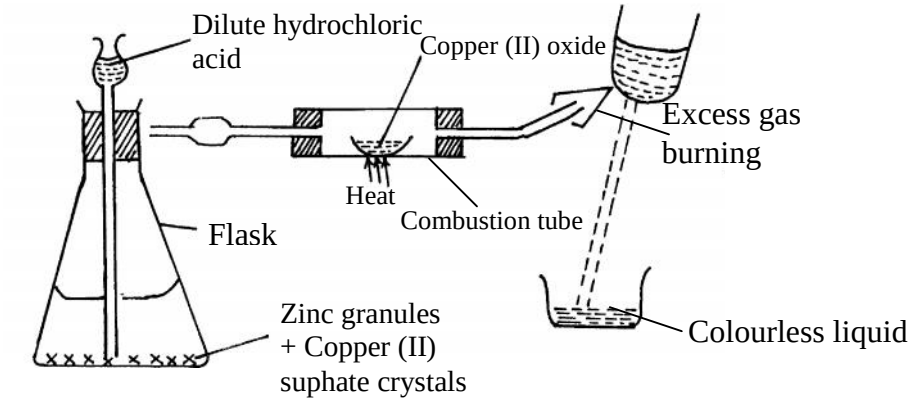
c) State one use of gas Y formed in the gas jar. (1mk)

14. A hydrocarbon has a molecular mass 54. (C=12, H=1). It has four carbon atoms.

a) Name the homologous series to which the hydrocarbon belongs. (1mk)

b) Draw and name two isomers of the hydrocarbon. (2mks)

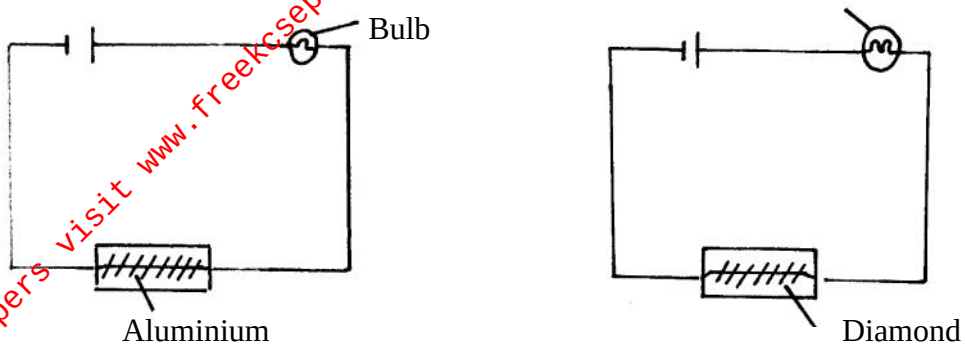
15. Study the set up below and use it to answer the questions that follow



a) Write the equation for the reaction in the flask. (1mk)

b) State and explain the observation made in the combustion tube. (2mks)

16. The following set ups were used by Form Two students to investigate electrical conductivities of two substances. Study and use them to answer the questions that follow.



a) Explain the difference in observation made in set ups I and II above. (2mks)

b) State one use of diamond. (1mk)

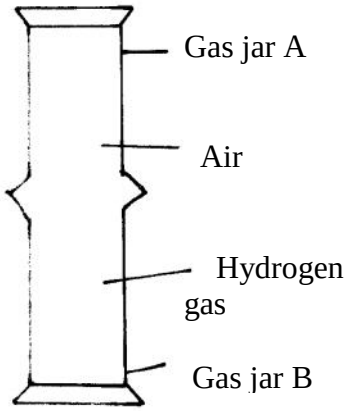
17. When iron and steam are heated in a closed container, a dynamic equilibrium is reached.

$$3Fe_{(s)} + 4H_2O_{(g)} \rightleftharpoons Fe_3O_{4(s)} + 4H_{2(g)}$$

a) Define the dynamic equilibrium. (1mk)

b) What is the effect on equilibrium if magnesium is added? (1mk)

18. A gas jar B was full of dry hydrogen gas while gas jar A was full of air.



a) What will happen after introducing a burning splint in gas jar A after some time? (1mk)

b) What conclusion can you make about the density of hydrogen gas? (1mk)

19. If $25cm^3$ of 0.1M H_2SO_4 solution neutralized a solution containing 1.06g sodium carbonate in $250cm^3$ of solution, calculate the molarity and the volume of the sodium carbonate solution used. (3mks)

20. Use the table below to answer the questions that follow. The letters do not represent the actual symbols of the elements.

Element	Atomic number
A	11
B	13
C	14
D	17
E	19

a) Write an equation for the reaction between element A and water. (1mk)

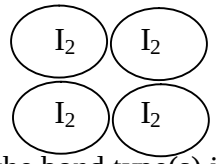
b) Describe how a solid mixture of the sulphate of element E and lead (II) sulphate can be separated into solid samples. (2mks)

21. a) Baking powder which is a mixture of an acid and hydrogen carbonate releases carbon (IV) oxide required to raise the dough only when water is added to the solid mixture. Explain the role of water. (2mks)

b) Given the formulae of the acid as HX and the hydrogen carbonate being $BHCO_3$, write an ionic equation of the reaction of the solutions in water. (1mk)

22. A carbonate was suspected to be an ore of iron. Describe how the presence of iron can be confirmed in the ore. (3mks)

23. The diagram below represents a piece of iodine solid.



a) Name the bond type(s) in the solid. (1mk)

b) Explain the observation made that iodine has a very low melting point. (1mk

24. Consider the reaction chain below.

$$^{214}_{83}Bi \xrightarrow{I} {}^{210}_{81}Tl \xrightarrow{II} {}^{210}_{82}Pb \xrightarrow{III} {}^{210}_{83}Bi \xrightarrow{IV} {}^{210}_{84}Pb \xrightarrow{V} {}^{206}_{82}P$$

a) Identify the particles emitted in

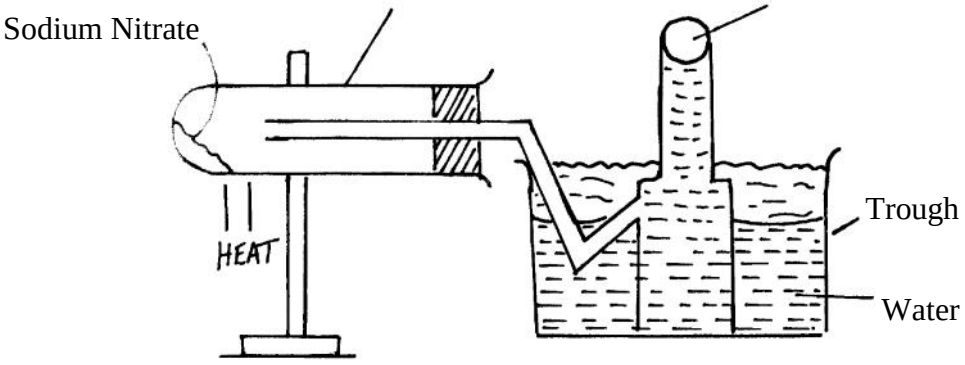
(i) I (½mk)

(ii) II (½mk)

b) Write the nuclear equation for the reaction that takes place in V. (1mk)

c) State one environmental effect of radioisotopes. (1mk)

25. The diagram below represents a setup used by a student to investigate the effect of heat on sodium nitrate. Use it to answer the questions that follow.



a) Write the chemical equation of the reaction in the boiling tube. (1mk)

b) State the property of the gas that makes it to be collected by the method shown. (1mk)

d) Predict the effect of water in the trough on the litmus paper after the experiment. (1mk)

26. Consider the equations below

i) $LO_{(s)} + CO_{(g)} \longrightarrow L_{(s)} + CO_{2\,(g)}$

ii) $2Li_{(s)} + F_{2\,(g)} \longrightarrow 2LiF_{(s)}$

iii) $J^{+}_{(l)} + e^{-} \longrightarrow J_{(s)}$

Which of the reactions are redox reactions? Explain (2mks)

27. A volume of $15cm^3$ of ethane gas (C_2H_4) was exploded with 50cm of oxygen. If both volumes were measured at the same temperature and pressure, calculate the volume of the resulting gaseous mixture.

(i) Write the equation of the reaction for the combustion of ethene. (1mk)

(ii) Calculate the volume of gaseous mixture. (2mks)

28. Some water samples A, B and C were tested with soap solution. The lathering produced was recorded as good or poor. The results are as in the table below.

Test	**Results**		
	A	**B**	**C**
1). Shaken with soap solution	Poor	Poor	Good
2). Na_2CO_3 added then shaken with soap solution	Good	Good	Good
3). Boiled then shaken with soap solution	Poor	Good	Good

a) Identify the anions present in sample of water A. (1mk)

b) Give an industrial advantage of hard water. (1mk)

c) State one structural difference between a soapy and soapless detergent. (1mk)