Name: …… **ADM. No. ……**

School: …… **Candidate's Sign. …….....**

Date: …….....

233/1
CHEMISTRY FORM 3
PAPER 1
OCTOBER 2017
TIME: 2 HOURS

KKIKUYU DISTRICT END OF YEAR EXAMS

Chemistry
Paper 1

INSTRUCTIONS TO CANDIDATES:-

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

Question	Maximum score	Candidate's score
1-28	80	

1. Graphite is used as a lubricant. Explain. (2mks)

2. Carbon IV oxide does not support combustion. However, burning magnesium continues to burn in it to form black specks and a white solid.
Write two equations for the reaction taking place. (2mks)

3. 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)

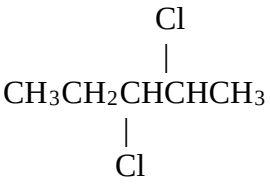
(b) Suggest a reason why elements **P** and **Q** cannot react with each other to form a compound. (1mk)

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

(i) 2 – Methylprop-I-ene…… (1mk)

(ii) Hexan– 2- ol ……..… (1mk)

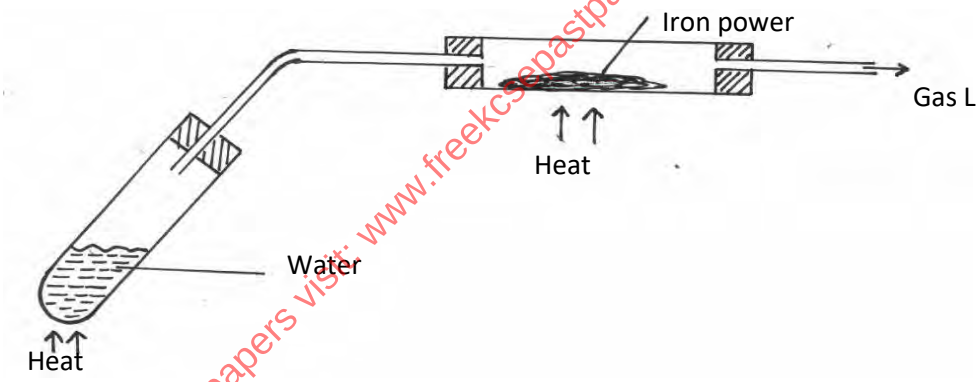
(b) A compound **W** react with chlorine to form another compound Y whose structural formula is as follows:



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

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

5. 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)

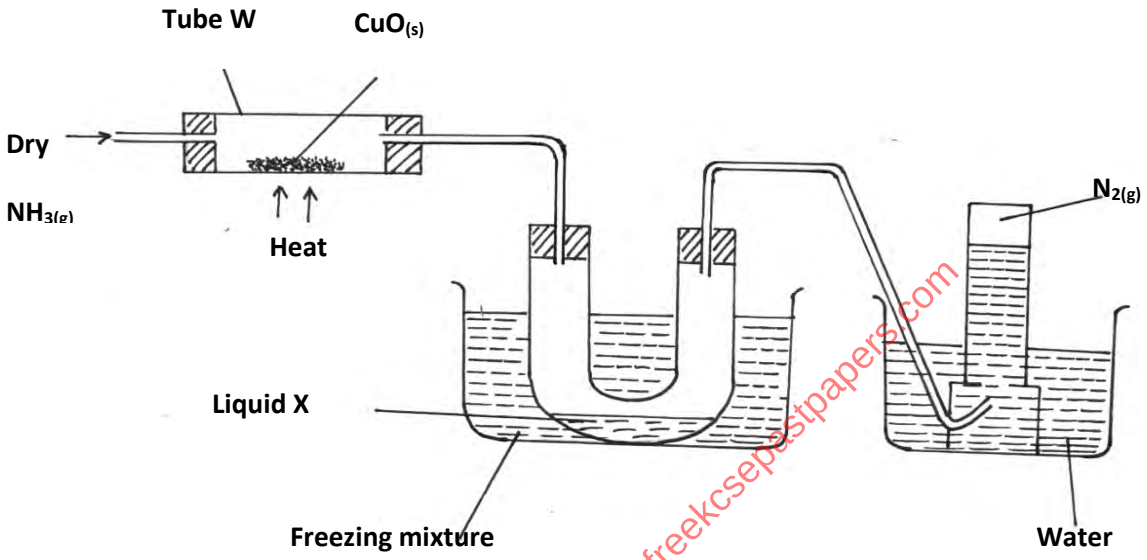
6. When anhydrous calcium chloride is exposed to the atmosphere it forms a solution.

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

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

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

7. 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

8. (a) Calculate the percentage of nitrogen in the following fertilizers.

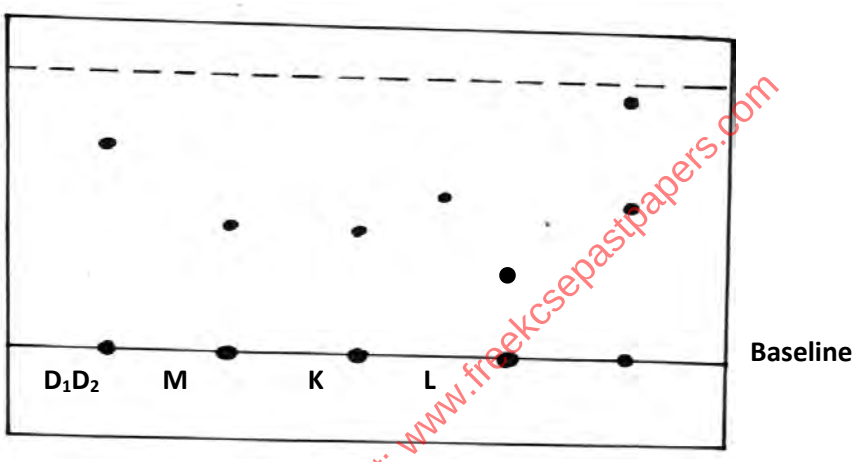
(N=14, H=1, O=16, S=32).

(i) $(NH_4)_2SO_4$(1mk)

(ii) NH_4NO_3(1mk)

(b) Which of the two fertilizers would you advice a farmer to use on his soil which is poor in nitrogen.(1mk)

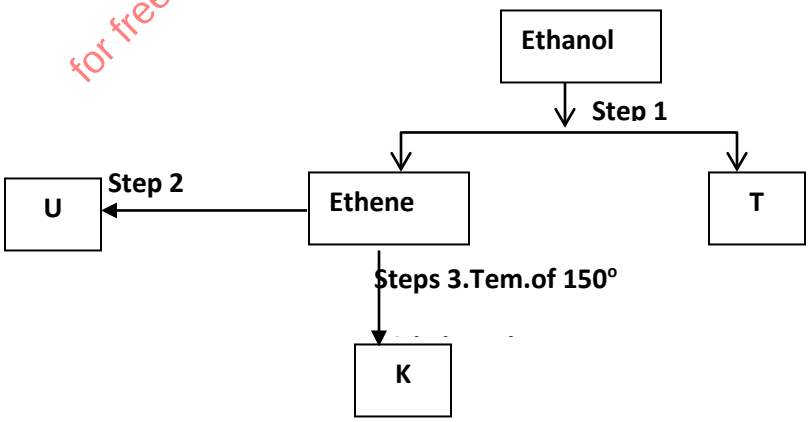
9. Samples of urine from three participants **M, K**, and **L** at a national police recruitment exercise were spotted onto a chromatography paper alongside two illegal drugs D_1 and D_2. A chromatogram was run using Ethanol. The figure below shows the chromatogram.



a) Identify the participant who had used an illegal drug. (1mk)

b) Which drug is less soluble in Ethanol. (1mk)

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



a) Identify substances:
K…….. (1mk)

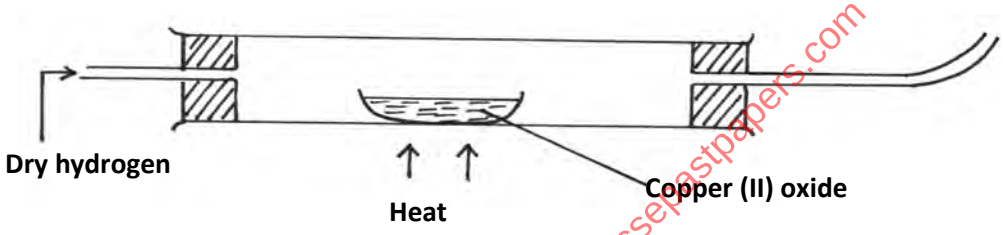
U……..…… (1mk)

L……. (1mk)

b) State the conditions for the reaction in step 1 to occur. (2mks)

c) Give **one** disadvantages of continued used of substances such as U. (1mk)

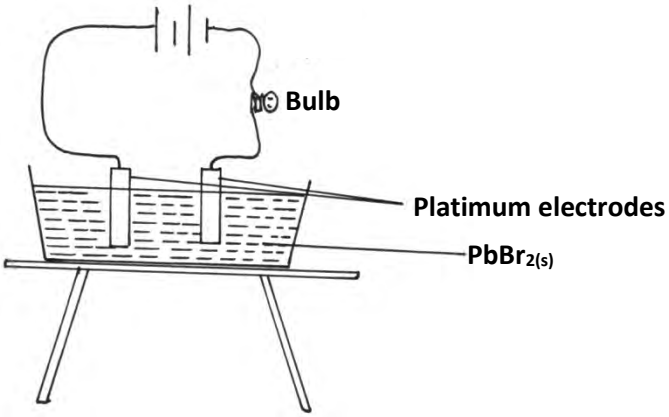
11. The Set up below shows an experiment where hydrogen gas was passed over heated copper (II) Oxide.



a) State and explain the observations made in the combustion tube during the experiment. (2mks)

b) Explain why heat is necessary in this experiment. (1mk)

12. In an experiment to investigate the conductivity of substances, a student used the set-up shown below.



The student noted that the bulb didn't light.

a) What had been Omitted in the set-up (1mk)

b) Explain why the bulb lights when the Omission was corrected. (2mks)

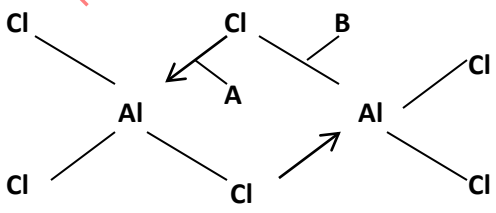
13. The table below gives some information about elements J,K,L,M which are in the same group of the periodic table. Use the formation to answer the question that follow.

Element	1st Ionization energy kJmol-1	Atomic radius (nm)
J	520	0.15
K	500	0.19
L	420	0.23
M	400	0.25

a) What is meant by ionisationenergy. (1mk)

b) Compare the atomic radius of K and M. (2mks)

14. Below is a structure of Aluminium Chloride.



a) Identify the bond labeled**A** and **B**

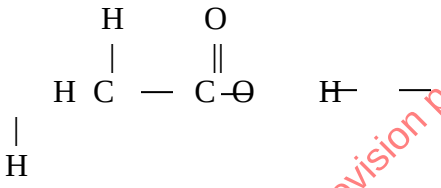
A…… (1mk)

B…… (1mk)

b) When Aluminium Chloride is dissolved in water resulting solution has a pH of 3 Explain. (2mks)

15. A hydrocarbon was found to contain 72% carbon, 6 % hydrogen and the rest is oxygen. If its molecularMass is 78, determine its molecular formular. (C=12, H=1) (3mks)

16. The structure below belongs to a member of alkanoic acid.



a) Give the name of the Structure. (1mk)

b) What is the total number of electrons used for bonding in a molecule of the structured named in 16(a) above. (1mk)

17. a) State the observation made at the end of the experiment when the mixture of iron powder and sulphur is heated in a test tube. (1mk)

b) State **one** agricultural used of Sulphur. (1mk)

18. Both Aluminium and Sodium have gaint metallic structure but aluminium have higher melting point

than sodium.. Explain. (2mks)

19. Study the information in the table below and answer the questions that follow. The letters do not represent the actual symbols of the elements.

Element	Atomic Number	Melting point (^{o}C)
L	11	97.8
M	13	660
R	19	63.7

(i) Write the formulae of carbonate R and M (1mk)

(ii) Describe how the carbonate of M can be obtained from a mixture of carbonate R and M.(2mks)

(iii) R is more reactive than L. Explain (1mk)

20. The grid below is part of the periodic table. Use it to answer the questions that follow. (The letters do not represent the actual symbols of elements.)

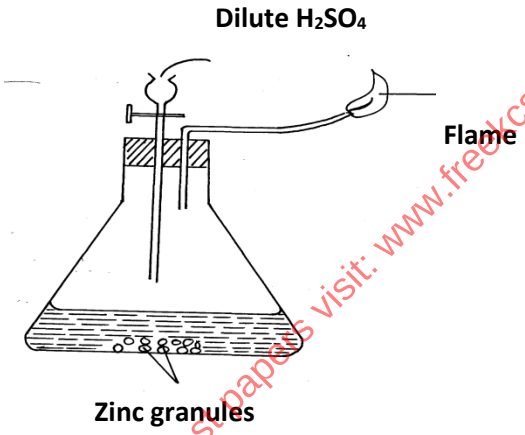
						R	**S**	
N	**Q**						**T**	**U**
P								

(a) Indicate in the grid the position of an element represented by letter V, whose atomic number is 14. (1mk)

(b) Select a letter which represents a monoatomic gas. (1mk)

(c) write an equation for the reaction between Q and T (1mk)

21. Below is a set-up of apparatus used to prepare hydrogen gas in the laboratory study it and answer the questions that follow.



(a) Write the chemical equation for the two reactions taking place in the above set up. (2 mks)

(b) State the chemical test for hydrogen gas. (1mk)

22. (a) What are alkali metals. (1mk)

(b) Explain why potassium atom is larger that n Sodium atom. (1mk)

23. A given volume of ozone (O_3) diffused from a certain apparatus in 96 seconds. Calculate the time taken by an equal volume of carbon(IV) oxide to diffuse under the same conditions.
(C=12,O=16) (3mks)

24. In a closed system an equilibrium exists between nitrogen(IV) oxide and dinitrogen tetraoxide as shown in the equation.

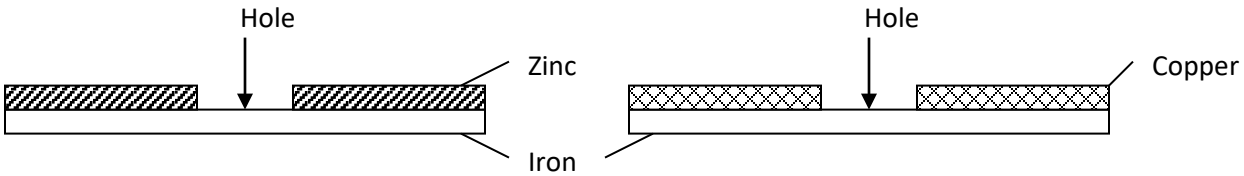
$N_2O_{4(g)} \rightleftharpoons 2NO_{2(g)}$ $\Delta H = +27.5kJ$

Pale yellow red brown.

(a) State and explain the observation made when a glass syringe containing the equilibrium mixture is immersed in ice-cold water. (2mks)

(b) If the piston of the syringe is pushed state the effect on the position of the equilibrium. (1mk)

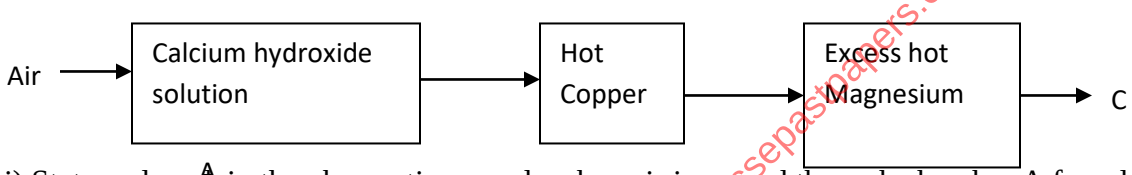
25. Below are cross-sections of two pieces coated with Zinc and Copper respectively.



Which piece would rust when the holes were filled with water and left for sometime? Explain .(2marks)

26. Starting with Zinc metal describe how you would obtain a sample of solid zinc carbonate. (3marks)

27. Air was passed through reagents as shown below.



i) State and explain the observations made when air is passed through chamber A for a long time. (2marks)

ii) Name one component in C. Explain (1mark)

28. i) The percentage of $^{69}_{31}X$ is 60% and $^{71}_{31}X$ is 40% for an isotopic element X. Calculate the relative atomic mass of X. (2marks)