

NAME:

INDEX NO:

SCHOOL:

CANDIDATE'S SIGN:

DATE:

233/2

CHEMISTRY

PAPER 2

(THEORY)

JULY/AUGUST - 2014

TIME: 2 HOURS

MERU COUNTY JOINT EVALUATION EXAM - 2014

Kenya Certificate of Secondary Examination K.C.S.E

233/2

CHEMISTRY

PAPER 2

(THEORY)

JULY/AUGUST - 2014

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided above.
- Sign and write the date of examination in the spaces provided above.
- Answer all the questions in the spaces provided.
- KNEC Mathematical tables and silent non-programmable electronic calculators may be used.
- All working MUST be clearly shown where necessary.
- Candidates should answer all questions in ENGLISH

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1	12	
2	13	
3	11	
4	10	
5	12	
6	10	
7	12	
TOTAL SCORE	80	

*This paper consists of 12 printed pages.
Candidates must check to ascertain that all pages are printed as indicated
and that no question(s) is/are missing.*

- (a) The grid below is part of the periodic table. Study it and answer the questions that follow. The letters do not represent the actual symbols of the elements.

A					D	E		G	
B	C						G	H	I

- (i) Identify the element that is most electronegative. (1mk)

(ii) Which of the metals is the most reactive? Explain (1½mks)

- (iii) What name is given to the chemical family to which element C belongs? (1mk)

- (iv) Explain why:

- I Ionic radius of H is larger than that of B. (1mk)

- II Atomic radius of B is greater than that of A. (1mk)

- (v) Which of the elements in the table does not have the ability to form an ionic or covalent bond? Explain. (1½ mks)

- (vi) Give the formula of the compound formed when C and G reacts. (1mk)

2. The table below shows properties of the substances P, Q, R, S and T. Study it and answer the questions that follow.

Substance	B.P($^{\circ}$ C)	M.P($^{\circ}$ C)	Electrical Conductivity	
			Solid state	Molten state
P	2595	1085	Conducts	Conducts
Q	413	801	Does not conduct	Conducts
R	80	5	Does not conduct	Does not conduct
S	-84	-115	Does not conduct	Does not conduct
T	4827	3550	Does not conduct	Does not conduct

- (i) With a reason, state which substance is likely to be:

I A metal

(1mk)

.....

.....

II A liquid at room temperature and pressure.

(1mk)

.....

.....

- (ii) Identify, with a reason, the substance that is likely to have a simple molecular structure.

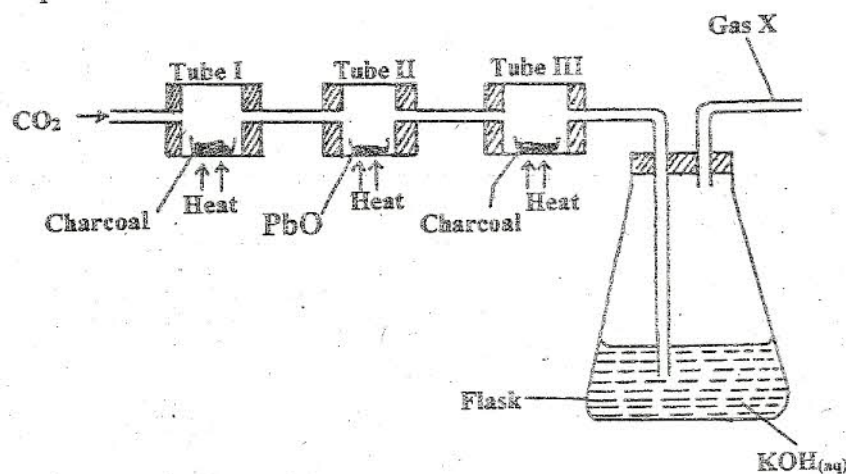
(2mks)

.....

.....

.....

2. Study the set-up below then answer the questions that follow.



- (i) Name gas X

(1mk)

.....

(ii) Write down the chemical equations for the reactions taking place in.

(I) Tube I

(1mk)

(II) Flask

(1mk)

(iii) State the observation made in tube II

(1mk)

(iv) Write an equation for the reaction which could be used to generate Carbon (IV) Oxide for the above set-up.

(1mk)

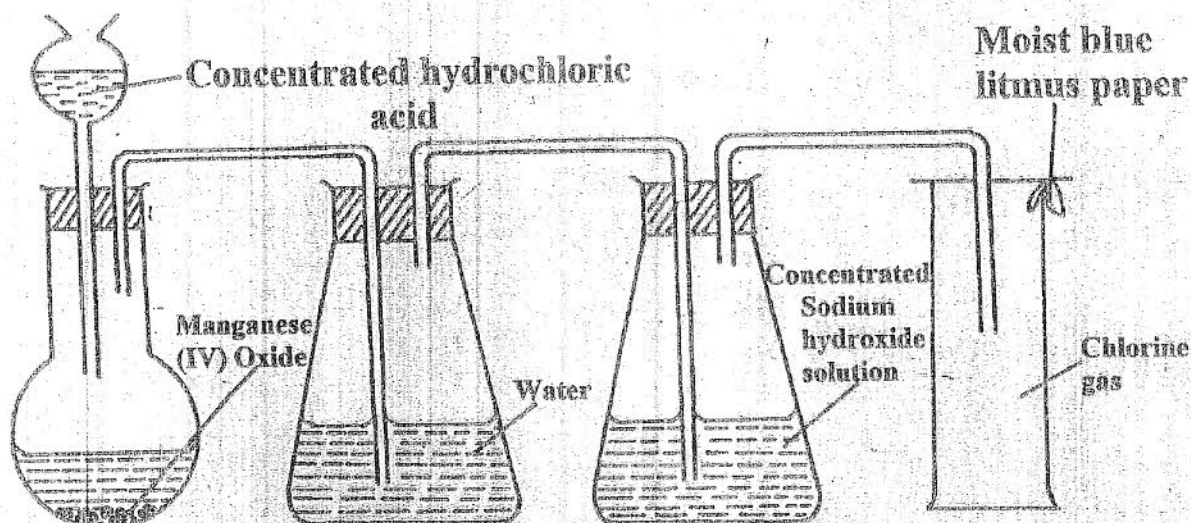
(v) Name the reagents used to generate gas x in the laboratory.

(1mk)

(vi) Complete the diagram to show how gas x can be collected.

(1mk)

(b) The diagram below represents a set-up for the preparation of Chlorine gas. Study it and answer the questions that follow.



(i) What condition is necessary for the reaction to proceed?

(1mk)

(ii) Name the compound formed when

I Dry hydrogen chloride gas reacts with hot iron fillings.

(1mk)

II Dry chlorine gas reacts with hot iron fillings.

(1mk)

(iii) 68g of hot iron reacted completely with chlorine gas. Calculate the volume of

Chlorine gas used. (Molar gas volume is 24dm^3 , Fe = 56)

(3mks)

3. (a) Define the term solubility.

(1mk)

(b) The data below shows the amount of Sodium Nitrate that just dissolved in water to form 50g of saturated solution of Sodium Nitrate at different temperatures.

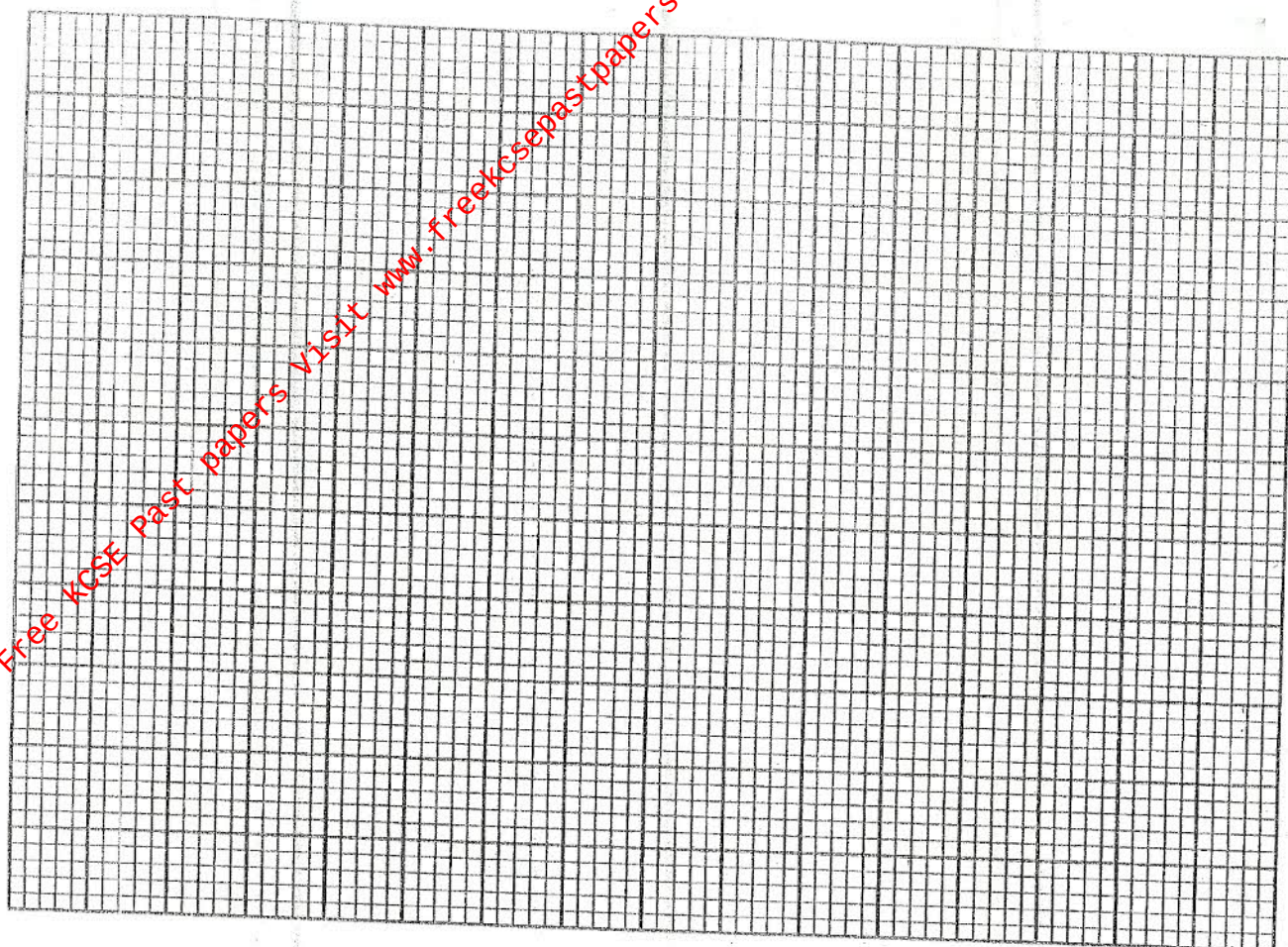
Temperature ($^{\circ}\text{C}$)	10	18	26	34	42
Mass in g of NaNO_3 in 50g of water	10.0	14.5	20.0	26.5	34.0
Solubility of NaNO_3					

(i) Complete the table for the solubility of NaNO_3

(2mks)

(ii) On the grid provided, plot a graph of solubility of Sodium Nitrate against temperature.

(3mks)



(iii) Using the graph ;

I Determine the solubility of Sodium Nitrate at 16°C . (1mk)

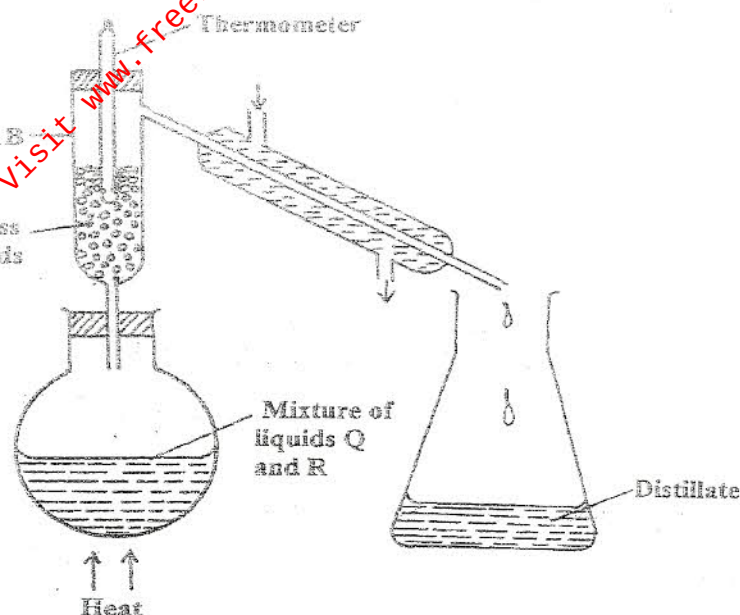
.....
.....

II Determine the concentration of Sodium Nitrate at 16°C (assume no change in density of water) ($\text{Na} = 23, \text{N} = 14, \text{O} = 16$). (3mks)

(iv) What is the relationship between solubility of Sodium Nitrate and change in temperature? (1mk)

.....
.....

4. (a) In an experiment to separate a mixture of two liquids, liquid Q (boiling point 78°C) and liquid R (boiling point 100°C), student set-up the apparatus as shown below.



- (i) Name apparatus B (1mk)

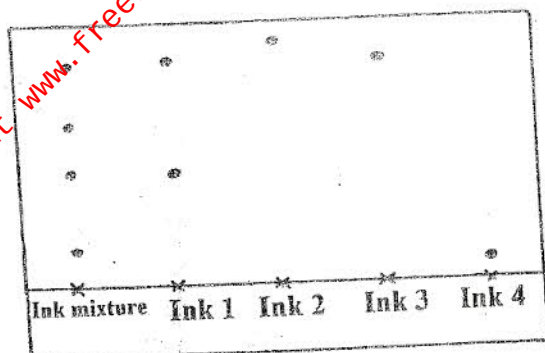
- (ii) Identify one mistake in the set-up above. (1mk)

- (iii) What is the role of the glass beads? (1mk)

- (iv) What method would the student use to test the purity of the distillate? (1mk)

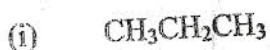
- (v) State two applications of the above method of separation of mixtures. (2mks)

- (b) In paper chromatography experiment, to identify the inks in a mixture, the chromatogram below was obtained.



- (i) Which inks are present in the mixture? (1mk)
-
-
- (ii) Label on the diagram the baseline and the solvent front. (1mk)
- (iii) Which of the inks was the most soluble? Explain. (1mk)
-
-
- (iv) Which of the inks in the mixture adheres most firmly to the surface of the paper? (1mk)

5. (a) Give the IUPAC names of the following. (1mk)



- (b) Ethene is used in making polythene bags in a process called polymerization. (1mk)
- (i) Name the type of polymer that is formed when ethene polymerise.
-
-

- (ii) Describe a simple chemical test that can be used to identify ethene gas in the laboratory. (1mk)

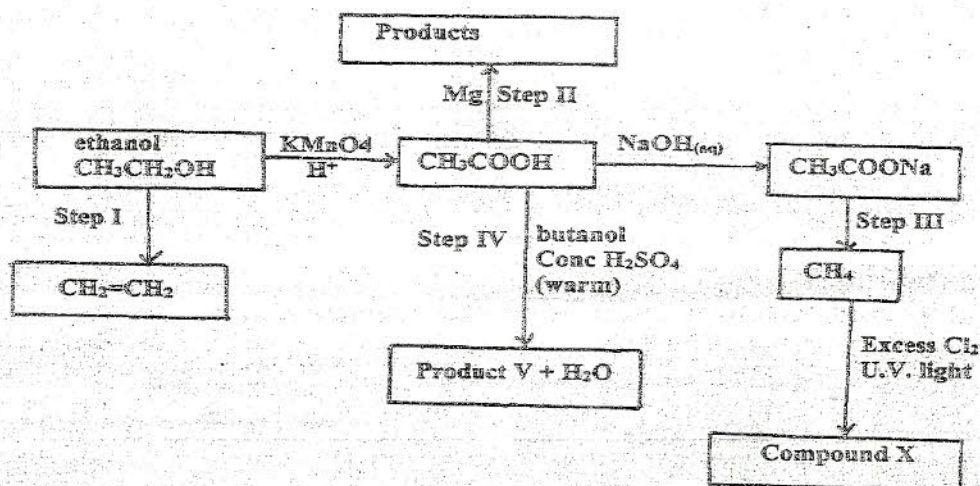
(c) Study the information in the table below and answer the questions that follow.

No of Carbon atoms	RMM of the hydrocarbon
2	28
	42
4	56

- (i) Write the general formula of the hydrocarbons in the table above. (1mk)
(C=12, H=1)

- (ii) Draw the structural formula of a hydrocarbon with 5 carbon atoms. (1mk)

(d) The scheme below shows a series of reactions starting with ethanol. Study it and answers the questions that follow.



- (i) Name the type of reaction in step I. (1mk)
- (ii) Give a reagent and a condition necessary for the reaction in step I to take place.
- Reagent (½ mk)
- Condition (½ mk)

(iii) Write the equation for the reaction which occurs in step II. (1mk)

(iv) Name the process represented by step IV (1mk)

(v) Draw the structural formula of compound X. (1mk)

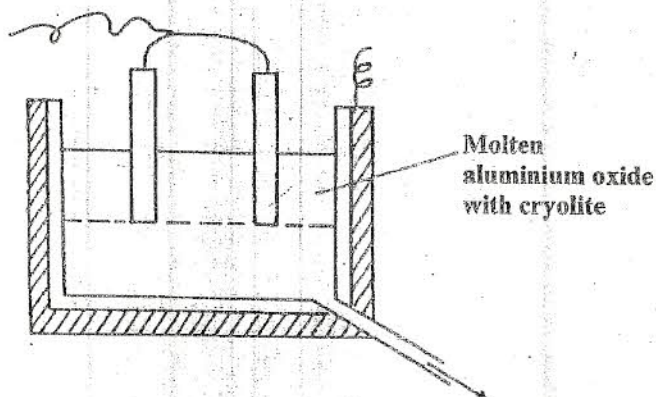
6. (a) Aluminium is the most abundant metal in the earth's crust and it is widely extracted for its range of uses.

(i) Name one major ore of aluminium. (1mk)

(ii) Name one main impurity found in the ore. (1mk)

(iii) Molten cryolite is added to aluminium oxide during extraction of aluminium. Explain. (1mk)

(b) Electrolysis of aluminium oxide is done as shown below.



(i) Label on the diagram the anode and cathode. (1mk)

(ii) Write the equations for the half reactions occurring at the cathode and the anode.

I Anode (1mk)

II Cathode

(1mk)

(ii) Name two uses of Aluminum

(1mk)

- (c) A current of 3 amperes was passed through fused aluminium oxide for 140 minutes. Calculate the mass of aluminium obtained at the electrode.

(Al = 27.0, 1 Faraday = 96500C)

(3mks)

7. I Excess Magnesium Carbonate was put in a beaker containing 80cm^3 of dilute Hydrochloric acid. The beaker was then placed on a balance and the total loss in mass recorded after every $2\frac{1}{2}$ minutes as shown in the table below.

Time in minutes	0	$2\frac{1}{2}$	5	$7\frac{1}{2}$	10	$12\frac{1}{2}$
Total loss in mass(g)	0	1.8	2.45	2.95	3.2	3.3

- (a) Why was there a loss in mass?

(1mk)

- (b) Calculate the average rate of loss in mass between:

- (i) 0 and $2\frac{1}{2}$ Minutes

(1mk)

- (ii) 10 and $12\frac{1}{2}$ Minutes

(1mk)

(iii) Explain the difference in the average rates of reaction in b (i) and (ii) above.

(2mks)

(c) Write the equation for the reaction which takes place in the beaker.

(1mk)

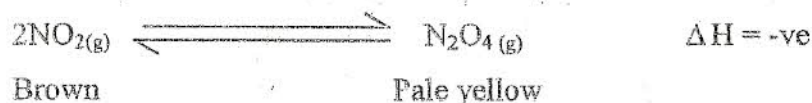
(d) State two ways in which the rate of the reaction above could be increased.

(2mks)

II (a) State Le chatelier's principle.

(1mk)

(b) At 25°C, NO₂ and N₂O₄ gases exists in equilibrium as shown in the equation below



State and explain the observation that would be made when;

(i) A syringe containing the mixture at 25°C is immersed in ice cold water.

(1 ½ mks)

(ii) The volume of the gaseous mixture in a syringe is reduced. (1½ mks)