Name: …… **Index No.** ……

School: …… **Candidate's Sign.** ……

Date: ……

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

NYAMIRA DISTRICT JOINT EVALUATION TEST

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

Chemistry
Paper 2

INSTRUCTIONS TO THE CANDIDATES:

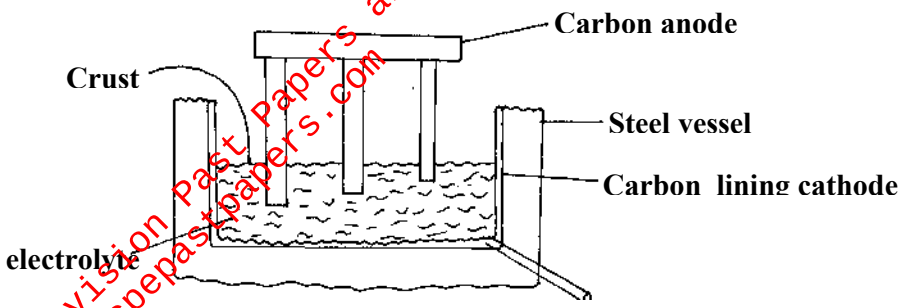
- Write your **name** and **index number** in the spaces provided above
- **Sign** and write the **date** of examination in the spaces provided.
- Answer ***all*** the questions in the spaces provided.
- All working **must** be clearly shown where necessary.
- Mathematical tables and electronic calculators can be used.

For Examiners Use Only

Question	Maximum score	Candidate's score
1	11	
2	13	
3	09	
4	14	
5	10	
6	13	
7	10	
Total	**80**	

This paper consists of 8 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

1. The diagram below shows method used to extract aluminium by the electrolysis of molten bauxite.



(i) Give equation for the reaction occurring at the two electrode.

Anode_____ (1mk)

Cathode_____ (1mk)

(ii) In this process the anode rod have to be replaced from time to time. Explain. (1mk)

……

……

(iii) The working temperature in this cell is below the normal melting point of the purified ore. Explain the significance of this situation and how it is achieved. (2mks)

……

……

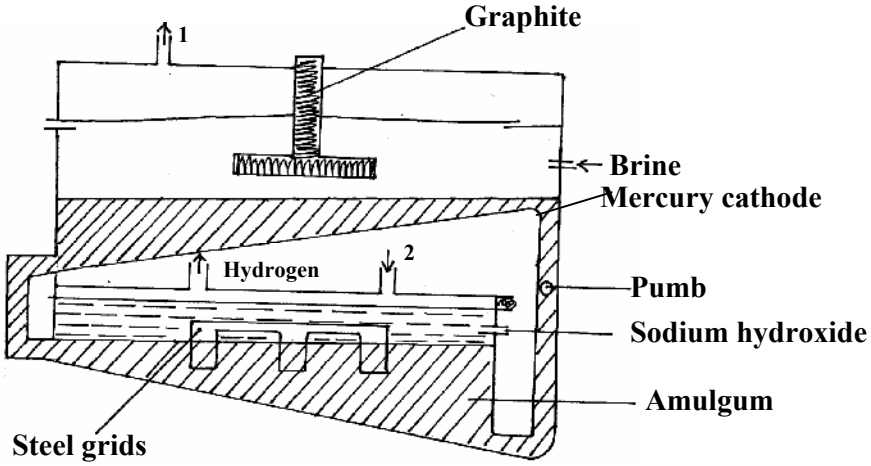
(iv) State **four** industrial uses of Aluminium (2mks)

……

……

(v) A current of 100 ampere flows a through the electrolyte of this cell for 15hrs calculate the volume of the gaseous product produce in this cell at 15^{o}C and 800mmHg (***molar gas volume of s.t.p 22.4dm^{3}***)

2 (a) The diagram below represents a mercury cell that can be used in the industrial manufacture of sodium hydroxide. Study it and answer questions that follow.



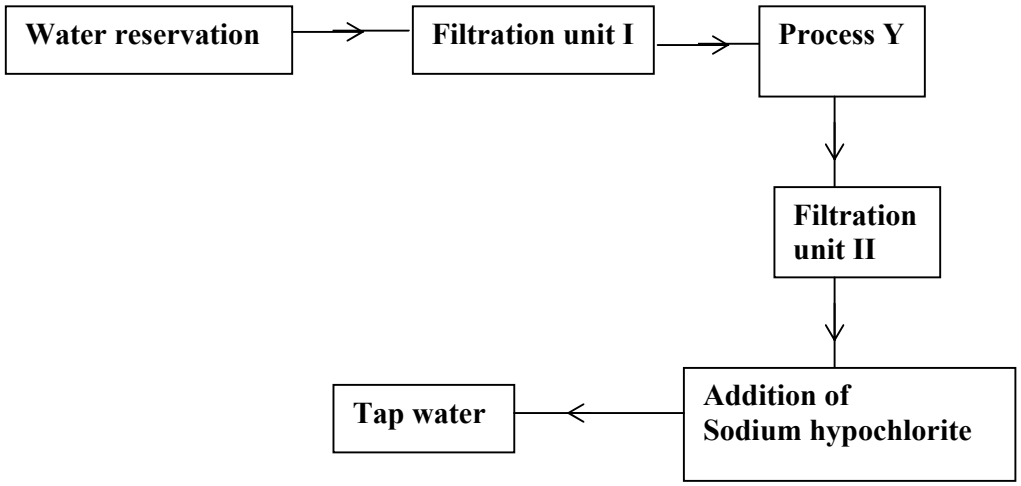
(I)***Name***
(i) The raw material introduced at 2. (1mk)
……
(ii) Another substance that can be used in the cell instead of graphite (1mk)
……

II. *Give*
(i) **Two** uses of sodium hydroxide
……
……
(ii) **Two** reasons why mercury is recycled. (2mks)
……
……
III. Write an equation for the reaction in which sodium hydroxide was produced. (1mk)

(b) If the mass of hydrogen gas produced was 50litres start. Calculate the mss of solution hydroxide that was formed. H= 1.0, NO = 23.0 O = 16.0 (2mks)
……
……
……

3. A student was supplied with a colourless liquid supposed to be water.
a) (i) Describe one chemical test that could have been used to that the liquid was water. (2mks)
……
……
(ii) How could it have been shown that it was pure water? (1mk)
……
……

b.) The flow chart below shows the various stages of water treatment.



(i) Which substance are likely to be removed in filtration unit 1? (1mk)
……

……

(ii) What is the name of Process Y ? (1mk)

……

……

(iii) What is the purpose of

I) Process Y ? (1mk)

……

……

II) Addition of solution hypochlorite? (1mk)

……..

……

c) It was confirmed that magnesium sulphate was in the tap water.

(i) What type of hardness was k present in the water. (1mk)

……

……

(ii) Explain how the hardness can be removed. (2mks)

……

……

4. The gird given below represents 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
				B					
	C		**D**			**E**			
	F								

(i) What name is given to the group of elements to which C and F being? (1mk)

……

……

(ii) Which letter represents the element that is the least reactive? (1mk)

……

……

(iii) What type of bond is formed when B and E react? Explain (2mks)

……..

……

(iv) Write formula of the compound formed where elements D and oxygen gas react. (1mk)

(v) On the grid indicate the a tick (√) the position of element G which is in the third period of the periodic table and forms G^{3-} ions. (1mk)

(b) Study the information in the table below and answer the questions that follow. (The letter do not represents that actual symbols of the substance.

Substance	Melting point °C	Boiling point °C	Solubility in water	Density at room. Temp/g/cm^3
H	-117	78.5	Very soluble	0.8
J	-78	-33	Very soluble	0.77x 1^{-3}
K	-23	77	Insoluble	1.6
L	-219	-183	Slightly Soluable	1.33 x 10^{-3}

(i) Which substance would dissolve in water and could be separated from the solution by fractional distillation. (1mk)

……

……

(ii) Which substances is a liquid at room temperature and when mixed with water two layers would be formed? (1mk)

……

……

II which letter represents a substances that is a gas at room temperature and which can be collected by.

(i) Over water? (1mk)

……

……

(ii) By downward displacement of air? Density of air at room temperature = 1.29 x 10^{-3} g/C (1mk)

……

……

5. In what homologous series do the following compounds belong?

(i) CH_3CCH (1mk)

……

……

(ii) $CH_3CH_2OOCCH_3$ (1mk)

……

……

b) Raw rubber is heated with sulphur in the manufacture of natural rubber.

(i) What name is given to the process? (1mk)

……

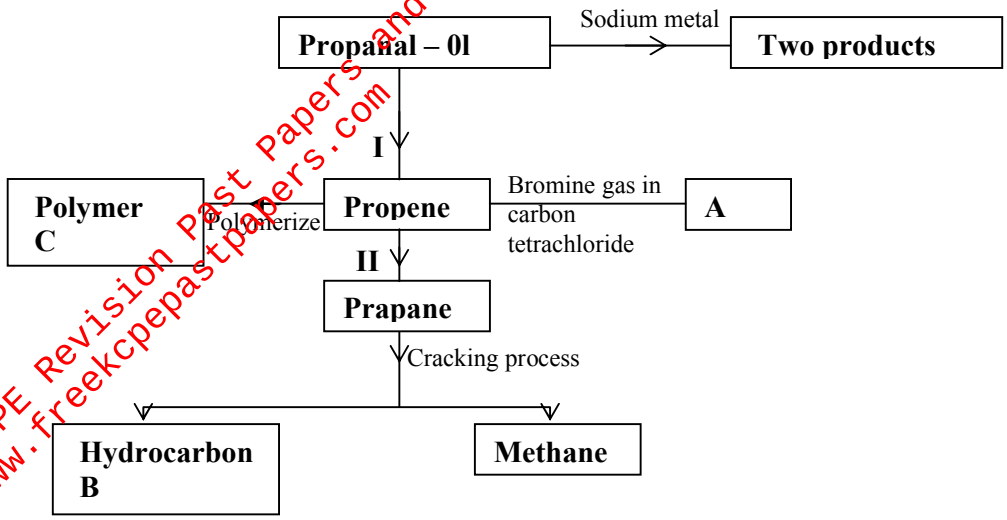
……

(ii) Why is the process necessary. (1mk)

……

……

c).



(i) Write an equation for the reaction between propan – l- ol and sodium metal. (1mk)

(ii) Name process I and II (2mks)

I ……

II……

(iii) Identify the products A and B (2mks)

A……

B……

(iv) Name catalyst used in product II (1mk)

……

……

(v) Draw the structural fromular of the repeating unit to the polymer C (1mk)

d) State **two** industrial use of methane. (2mks)

……..

……

e)State and explain the observations when sodium metal is put unto a boiling tube containing propan–l-ol (3mks)

……..

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……..

……

6. The solubility of salt x at various temperature is as storm in the data given below.

Temperature ^oC	Solubility in $g/100gH_2O_{(l)}$
0	10
2	15
40	26
60	40
80	63
100	100

(ii) Using a suitable scale draw a solubility curve of salt **x** on the grid provided below (4mks)

Clear graph

(i) A solution containing 20g of salt X in 100g of water was cooled from 50^oC

(i) At what temperature will crystals of salt **x** first form? (1mk)

(ii) Determine the mass of X that crystallizes if the solution is cooled to 12°C

(iii)Describe how 30g dry salt x can be obtained from a saturated solution of x at 65°C

……

……

……

(b) Use the information below on solubility to answer questions that follow.

Salt	Solubility	g/100g of water 20°C
$KClO_3$	55	12
Na_2CO_3	80	31

A mixture containing 30g Potassium chloride and 30g of sodium carbonate in 100g of water at 80°C was cooled to 20°C. Some crystals were formed.

(i) Which of the **two** salts crystallized out? (1mk)

……

……

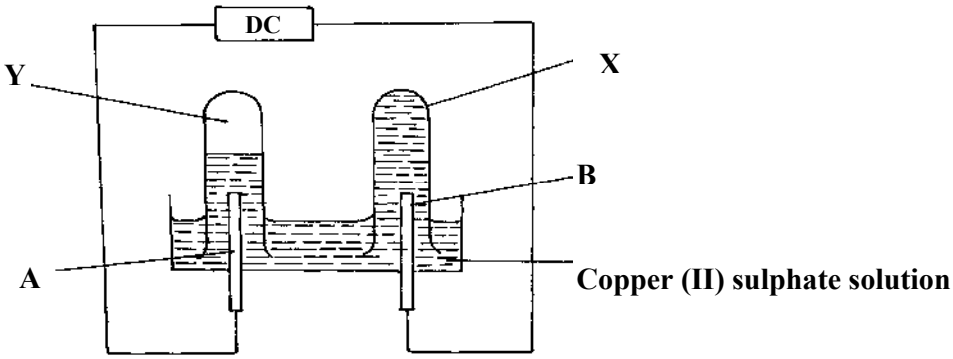
(ii) Name the method that can be used to obtain the crystals. (1mk)

……

(iii) State the salt that would be unsaturated at 20°C (1mk)

……

7. (a) Use the diagram below and answer the questions that follow.



a) The above experiment was performed using carbon electrode and another electrode

(i) Identify electrode **B** (1mk)

……

……

(ii) Name the colourless gas observed in test tube Y (1mk)

……

……

(iii) Explain why no gas was observed in list tube X (2mks)

……

……

(b). Use the data in the table below where appropriate to answer the questions which follow.

Standard electrode potential			**Eθ volts**
$Fe^{3+} + e$	⟶	Fe^{3+}	+ 0.71
$Cl_{2(g)} + 2e$	⟶	$2Cl^-_{(aq)}$	+ 0.71
$2BrO^-_{Rn} + 12H^+ + 10e^-$	⟶	$Br_2 + 6H_2O_{(l)}$	+ 0.71
$O_{3(s)} + 2H^+_{(aq)} + 2e^-$	⟶	$O_{2(g)} + HlO_{(l)}$	+ 0.71
$F_2O_{(g)} + 2H + 4e$	⟶	$2\ Fo_4 - + H_2r$	+ 0.71

Each of the above can be reversed under suitable conditions

(a) (i) identify the strongest reducing agent (1mk)

……

……

(ii) Oxidizing agent

……

……

(b) Identify all the species in the tables which can be oxidized to acidic solution by $Br_3^{0-}{}_{(aq)}$ (1mk)

……

……

(c) the set we below in wells representation study it and use it to answer questions which follow

Pt|| $Fe^{2+}_{(aq)}$ | $Fe^{3+}_{(aq)}$ || Br $O_3{}^-{}_4$ | $Br2_{(aq)}$ | Pt

(i) Deduce the e.mf of this Cell (2mks)

……

……

(ii) Write a half – equation for the reaction occurring at the negative electrode when current is taken from this cell (1mk)

(iii) State and explain the effect on the e.m.f of cell if the concentration of Fe^{3+} ions is increased. (2mks)

……

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