

NAME:.....INDEXDATE.....

SCHOOL:.....SIGNATURE.....

233/2
CHEMISTRY
PAPER 2
JULY / AUGUST, 2010
2 HOURS

KISUMU NORTH AND EAST DISTRICTS JOINT TEST Kenya Certificate of Secondary Education 2010

233/2
CHEMISTRY
PAPER2
JULY / AUGUST 2010

INSTRUCTIONS TO CANDIDATES

- ❖ *Answer all questions in the spaces provided.*
- ❖ *Mathematical tables and electronic calculators may be used.*
- ❖ *All workings must be shown where necessary*

For Examiner's Use Only

Questions	Maximum Score	Candidates Score
1	10	
2	12	
3	13	
4	11	
5	10	
6	12	
7	12	
TOTAL	80	

1. The grid below represents part of the periodic table. Study it and answer the questions that follow. The letters do not represent the actual symbols of elements.

				U				
A						E	R	
B							W	
C							X	

- (a) (i) An element V has atomic number 7. Indicate the position of V on the grid (1 mk)

- (ii) Explain why the atomic radius of E is bigger than that of R (2 mks)

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- (iii) Elements R, W and X belong to the same group. Which of the elements is the most reactive? Explain your answer (2 mks)

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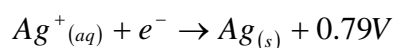
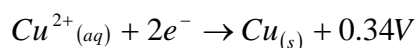
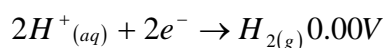
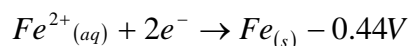
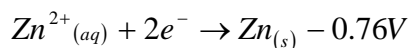
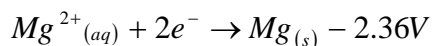
- (b) (i) Give the most reactive metal and state why. (2 mks)

.....

- (ii) Write the formula of the compound formed when B reacts with E (1 mk)

- (c) An element Z consists of isotopes of masses 10 and 2 with percentage composition 18.7% and 81.3% respectively. Determine the relative atomic mass of Z (2 mks)

2. The following are standard electrode potentials for some half cells.



(a) (i) Give two metals which if used together in a cell would produce the largest e.m.f. (1 mk)

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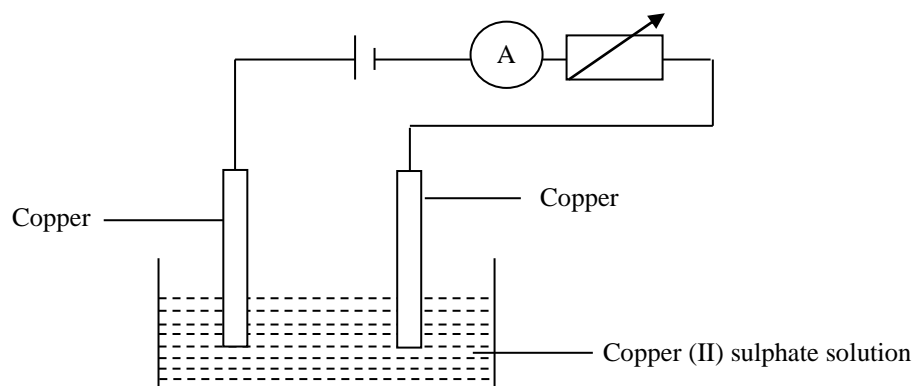
(ii) Explain the negative and positive signs in values of electrode potential. (2 mks)

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(iii) Calculate the voltage produced when Zinc and Copper electrodes are used to make a cell (2 mks)

(b) A current of 0.5A is passed through a cell which contains Copper cathode and Copper anode placed in Copper (II) sulphate solution as shown below.



(i) Identify the cathode on the diagram (1 mk)

(ii) Using half equation write the reaction at the cathode (1 mk)

(iii) During the experiment, the blue colour of the electrolyte does not change.

Explain

(2 mks)

.....

.....

.....

(c) In an electrolysis of a molten metal halide, a current of 1.25A was passed for 20 minutes

(i) Calculate the quantity of electricity used

(1 mk)

(ii) Determine the mass of the metal deposited given that the metal is divalent

[R.A.M of metal M = 207; IF = 96,500c]

(2 mks)

3. In an experiment to investigate the solubilities of solid X and Y, the following results were obtained.

Temperature (°C)	0	10	20	30	40	50
Solubility of solid X (g/100g of water)	8	13	24	38	61	98
Solubility of solid Y (g/100g of water)	28	32	35	38	42	46

(a) On the grid provided, plot a graph of solubility of X and y against temperature on the axis

(4 mk)

(b) From your graph determine

(i) The solubility of X at room temperature (25°C) (1 mk)

(ii) The temperature at which the solubility of X is 45g/100g of water. (1 mk)

(c) If a solution of X contains 35g of solid in 100g of water is cooled from 40°C, determine

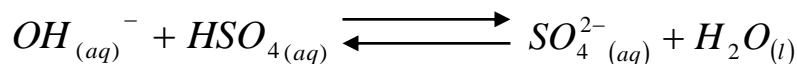
(i) The temperature at which crystals will first form (1 mk)

(ii) The mass of crystals deposited if the solution is cooled to 5°C. (1 mk)

(d) Comment on solubilities of X and Y in water (2 mks)

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.....

(e) (i) Identify the species that each act as a base in the equation given below



(1mk)

.....

(ii) Distinguish between a weak and strong alkali (2 mks)

.....
.....

4. Lead (II) oxide reacts with both Nitric (V) acid and Potassium hydroxide solution

(a) What property of Lead (II) oxide is shown by these reactions? (1 mk)

.....

(b) Write an equation for the reaction between:

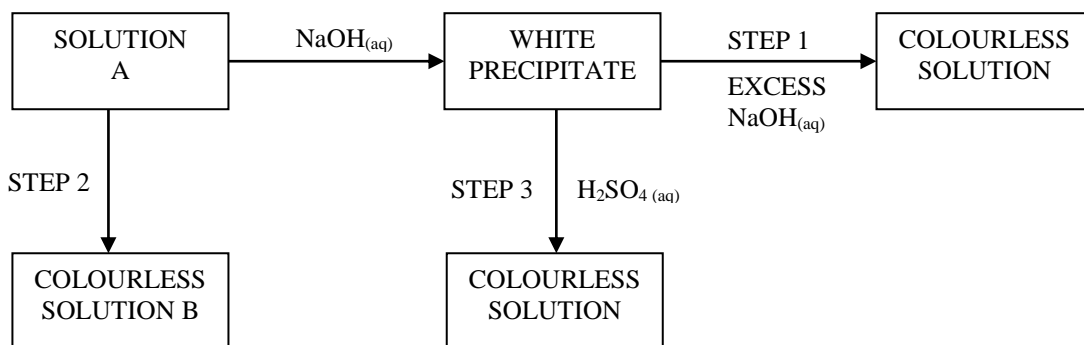
I. Lead (II) oxide and Potassium hydroxide (1 mk)

.....

II. Lead (II) oxide and Nitric (V) acid (1 mk)

.....

(c) The flow chart below shows a reaction scheme starting with solution A



(i) Name the type of reaction taking place in step 3 (1 mk)

.....

(ii) Identify the cation present in solution A (1 mk)

.....

(iii) Write the formula of the complex ion present in solution B (1 mk)

.....

(d) (i) A solution of Hydrogen chloride gas in Carbon tetrachloride does not provide bubbles when marble chips are placed in it, while a solution of the same gas in water provides bubbles. Explain (2 mks)

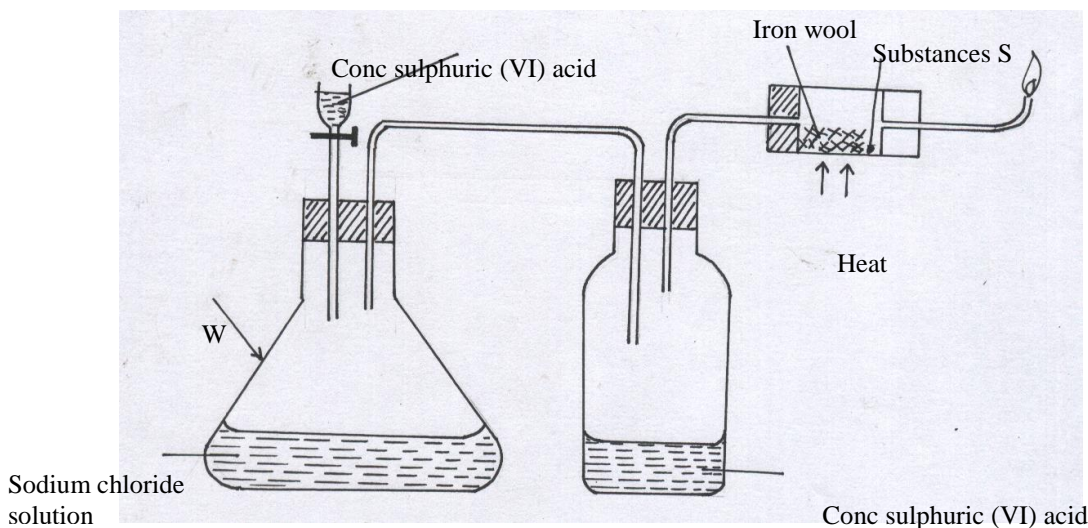
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(ii) Calculate the volume of 3M Hydrochloric acid that is needed to react completely with 0.4g of Calcium powder (Ca = 40) (3 mks)

5. (a) The setup below represents the arrangement used to prepare substance S by passing a stream of dry Hydrogen chloride gas over heated iron wool



(i) Correct any mistakes in the set up above (1 mk)

(ii) Write an equation for the reaction that involve:

I. Formation of substance S (1 mk)

.....

II. Reaction at point X (1 mk)

.....

(iii) What precaution should be taken when carrying out this experiment?

(1 mk)

.....

(b) 300cm³ of Hydrogen chloride gas were passed over 7.0g of heated Iron wool until there was no further change. The reaction vessel was allowed to cool at room temperature.

(i) Determine the mass of iron that remained at the end of the experiment

(Molar gas volume = 24,000cm³, Fe = 56)

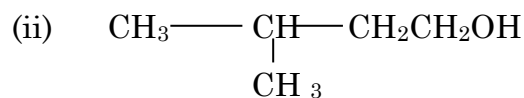
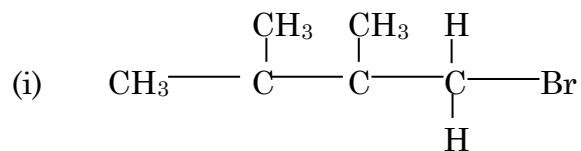
(3 mks)

(ii) Determine the volume of 2M Sulphuric (VI) acid that would be required to react with excess Iron (that remained unreacted in the above

experiment

(3 mks)

6. (a) Give the systematic names of the compounds having the structural formula given below. (2 mks)

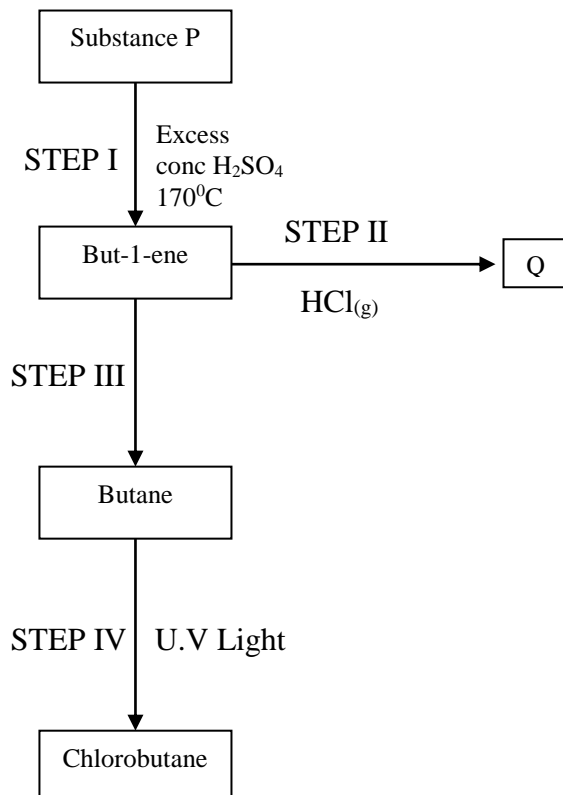


(b) Apart from its normal structure, draw two other isomers of Pentane (2 mks)

(i)

(ii)

(c) Use the flow chart below to answer questions that follow



(i) Identify substances

(2 mks)

I. P

II. Q

(ii) Name the reagent and conditions necessary for Step III to occur (2 mks)

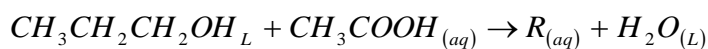
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(iii) Name the type of reaction taking place in step I and IV. (2 mks)

Step I

Step IV

(d) Propanol and Ethanoic acid react according to the following equation



Name:

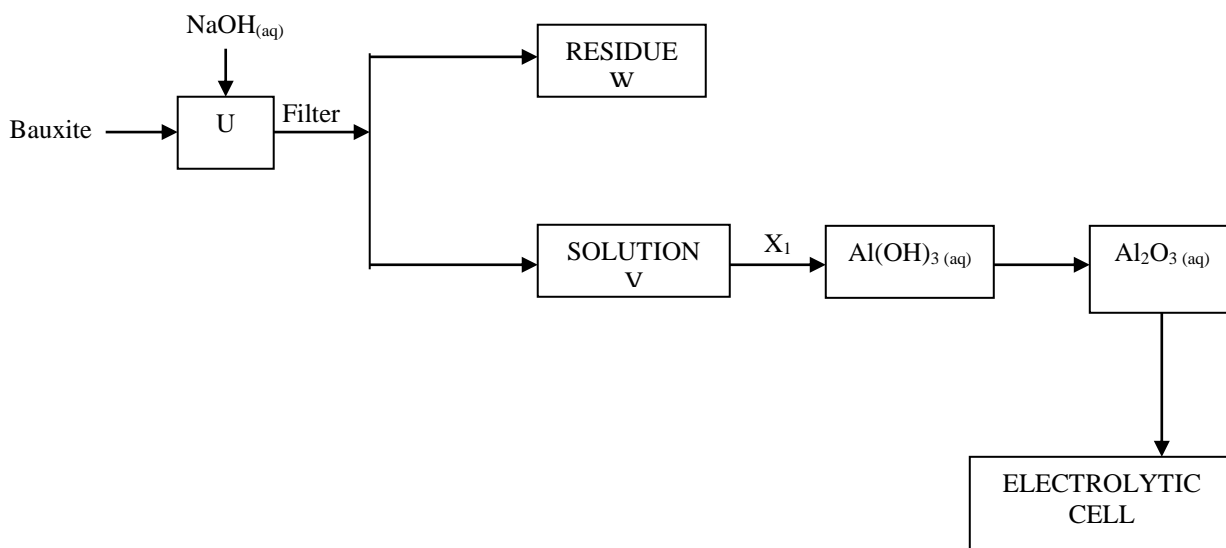
(i) Product R (2 mks)

.....

(ii) The type of reaction that produces R (1 mk)

.....

7. The flow chart below illustrates the major steps in the extraction of Aluminium from Bauxite. Study it and answer the questions that follow.



a) (i) Give the chemical formula of bauxite (1 mk)

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(ii) Write the equation for the reaction in chamber U (1 mk)

.....

(iii) Identify the main impurity in chamber W (1 mk)

.....

b) Name the process that takes place at X₁ and state how it is achieved. (2 mks)

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.....
.....
.....

c) State the role of cryolite (Na_3AlF_6) in the extraction of Aluminium (1 mk)

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.....

d) When 2.16g of aluminium foil were heated in a stream of chlorine gas, the mass of the product formed was 6.94g. Calculate;

(i) Maximum mass of the product formed if Chlorine gas was in excess.

[Al = 27, Cl = 35.5]

(3 mks)

(ii) Percentage yield of the product formed

(2 mks)

- e) Give one property which makes aluminium and its alloys suitable for making aircraft bodies (1 mk)

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