

NAME:

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SCHOOL:.....

SIGN.....

233/2

CHEMISTRY

PAPER 2

THEORY

JULY / AUGUST 2010

2 HOURS

JOINT INTER SCHOOLS EVALUATION TESTS (JISSET) Kenya Certificate of Secondary Education 2010

233 / 2
CHEMISTRY
PAPER 2

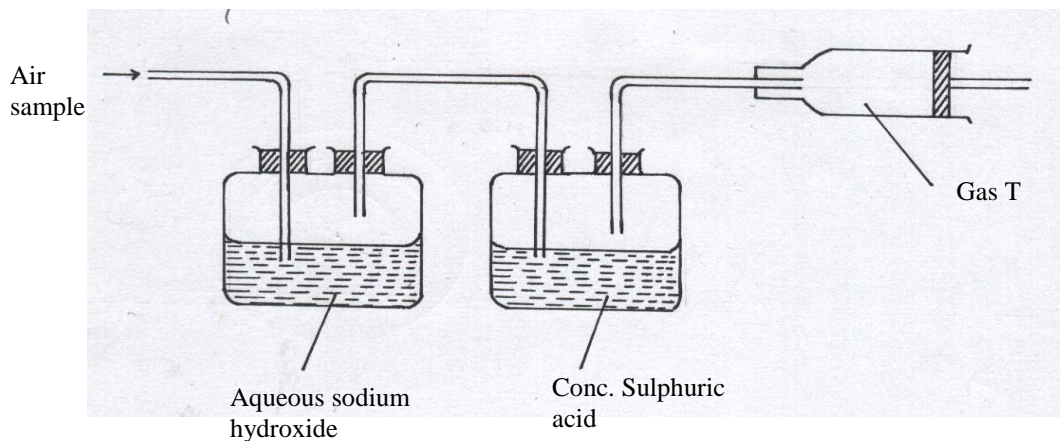
INSTRUCTIONS TO CANDIDATES

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

For Examiner's Use Only

Questions	Maximum scores	Candidate scores
1	15	
2	11	
3	12	
4	12	
5	13	
6	10	
7	07	
TOTAL	80	

1. In order to find out the proportion by volume of one of the main constituents of air, the following set up was established



a) (i) Name two constituents of gas **T** (1mk)

.....

(ii) Suggest a reason for passing air through:

I Aqueous sodium hydroxide (1mk)

.....

II Concentrated sulphuric acid (1mk)

.....

b) The volume of the gas collected in the syringe was 60cm^3 . This was passed repeatedly over hot copper powder in the combustion tube until no further change of volume took place. When cooled to the original temperature, the volume was reduced to 47.4cm^3

(i) What observation was made in the combustion tube? (1mk)

.....

(ii) Which constituent of air was removed by copper powder? (1mk)

.....

(iii) Calculate the percentage of the gas in (ii) above in the sample of air

(2 mks)

c) The remaining gas in the syringe was repeatedly passed over hot Magnesium metal in the second combustion tube

(i) Name the main component in 47.4cm³ of the remaining gas (1mk)

.....
.....

(ii) Write an equation for the reaction in the second combustion tube (1mk)

(iii) Name two of the gases still in the syringe at the end of the experiment.

Give a reason for your answer (2 mks)

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.....
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d) Iron roofing sheets are coated with Zinc as a sacrificial metal

(i) What is meant by the term “sacrificial” (1mk)

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.....

(ii) Give the name given to the process by which iron sheets are coated with Zinc (1mk)

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.....

(iii) Write the equation of the reaction in which Iron rusts (1mk)

(iv) Zinc is higher than Iron in the reactivity series yet it does not corrode as fast as Iron. Explain (1mk)

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.....

2. a) A research carried out by the Nairobi River Cleaning Committee confirmed established findings that the river water usually contained Mg^{2+} and Ca^{2+} ions. Explain how the river water acquires these ions (2mks)

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b) What is the effect of these ions on water used for washing clothes (2mks)

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.....

c) The above ions may be removed by boiling or addition of sodium carbonate in a permutit. Write equations to show how these ions are removed from water by:

(i) Boiling (1mk)

(ii) Addition of sodium Carbonate (1mk)

d) A sample of boiled water forms lather when a large amount of soap is used. It forms a white precipitate when tested with Lead nitrate solution but forms no precipitate with Barium Nitrate solution.

(i) State the type of hardness that may be present (1mk)

.....
.....

(ii) Which salt may have caused the hardness in (i) above? (1mk)

.....

(iii) Which method can be used to soften this water (1mk)

.....
.....

e) Distinguish between a deliquescent and a hygroscopic substance (1mk)

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.....

3. Study the information in the table and answer the questions that follow.

ELEMENT	ATOMIC NO.	ELECTRONIC ARRANGEMENT	BOILING POINT °C
I	3		1617
J	13		2740
K	17		-34
L	18		-187
M	19		1033

a. Select elements which belong to the same group (1mk)

.....
.....

b. Which element(s) is gaseous at room temperature (25°C) Explain your answer (1½mk)

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

c. Write the :-

(i) Formula of the carbonate of the element J (1mk)

(ii) Equation for the reaction between the most reactive metal and the most reactive non-Metal (1mk)

.....
.....

d. Draw a dot (.) and cross (x) diagram for the compound formed between elements I and K (2mks)

e. (i) Complete the table in 3(d) above by filling in the electronic arrangements of all the elements (2½mks)

(ii) Identify the chemical family to which element I belongs (1mk)

.....

f. Which element forms basic oxides (1mk)

.....

g. List any two uses of element L (1mk)

.....

4. The following table gives some information about the physical properties of substances S, T, U, and V. Use the information to answer the questions that follow

Substance	M.P(°C)	Hardness	Electrical conductivity in solid state	Electrical conductivity in molten state
S	High	Hard/brittle	Good	Good
T	High	Hard/brittle	Poor	Poor
U	High	Hard/brittle	Poor	Good
V	Low	Soft	Poor	Poor

a. Which of these substances exists as a:

i. Giant covalent structure (1mk)

.....

ii. Giant metallic structure (1mk)

.....

(iii) Giant ionic structure (1mk)

.....

b. (i) Why is the melting point of V low (2mks)

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(ii) Why is U a good electrical conductor when in molten state and poor when in solid state? (2mks)

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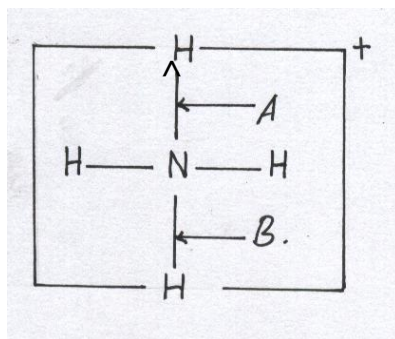
c. (i) Which substance would you recommend for making the cooking pan? Explain (2 mks)

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.....

(ii) Name the substance that can be used in the laboratory as an electrolyte (1mk)

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.....

(iii) Study the structure below and answer the questions that follow



Name the bond represented by (2mks)

A.....

B.....

5 In an experiment to determine the percentage of impurity in Sodium carbonate, 1.8g of impure Sodium carbonate was reacted with excess 2M Hydrochloric acid. 340cm³ of dry Carbon (IV) oxide gas was collected during the experiment at room temperature and pressure.

(Na=23, O=16, C=12; Molar gas volume at r.t.p=24dm³)

a) Why was excess 2M Hydrochloric acid used in the experiment? (1mk)

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b) Write an equation for the reaction that produced Carbon (IV) oxide (1mk)

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c) Calculate

i. The number of moles of Carbon (IV) oxide produced (2mks)

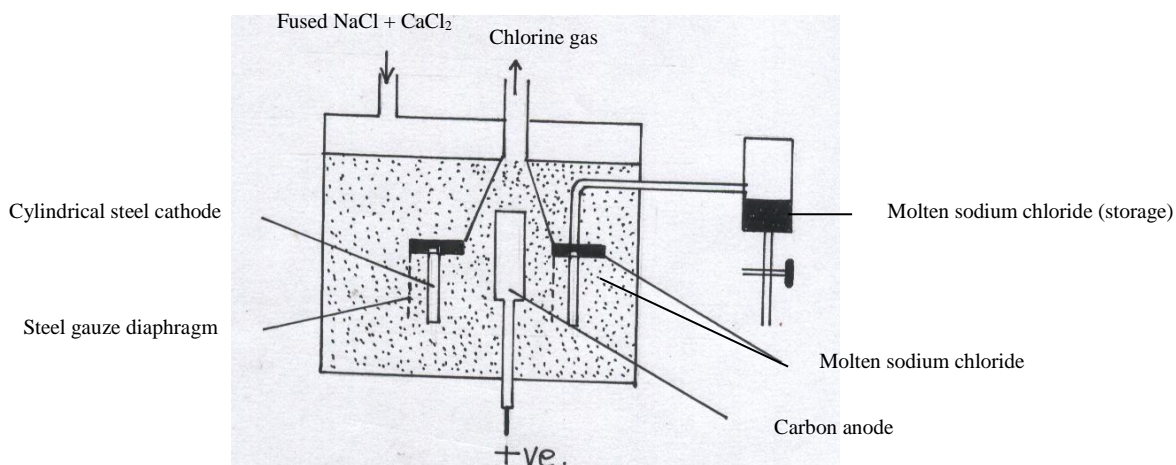
ii. The number of moles of Sodium carbonate that reacted with the acid (2mks)

iii. The mass of Sodium carbonate that reacted with the acid (2mks)

iv. The percentage of impurities in the sample of Sodium carbonate (2mks)

d) An oxide of Nitrogen contains 28.4% Nitrogen. It's density at S.T.P is 4.11 gdm^{-3} . Determine the molecular formula (N=14, O=16 and molar gas volume = 22.4 dm^3 at s.t.p) (3mks)

6. The following diagram represents a downs cell used to manufacture sodium metal from molten Sodium chloride



a) (i) Explain why sodium chloride is mixed with calcium chloride in this process. (1mk)

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(ii) State two properties of sodium metal that make it possible for it to be collected as shown in the diagram. (2mks)

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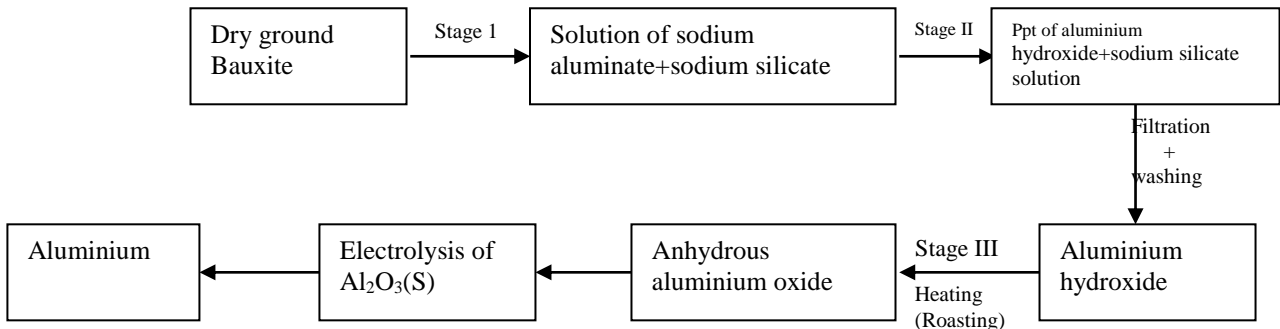
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b) Write ionic equations for the reaction which take place at (2mks)

I Cathode

II Anode

c).Study the flow chart below and answer the questions that follow:



(i) Explain how stage I is carried out. (1mk)

.....

.....

.....

(ii) Explain why it is necessary to heat Aluminium Oxide before electrolysis is carried out. (1mk)

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(iii).Suggest a reason as to why carbon is not used for reduction of Aluminium oxide. (1mk)

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(iv).What properties of Aluminium and the alloy make them suitable for the use indicated. (2mks)

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7. a) Give the names of the following compounds.

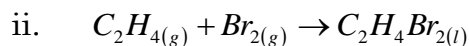
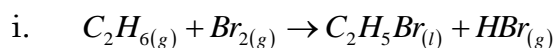
(i) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ (1mk)

(ii) $\text{CH}_3\text{-COO-CH}_2\text{-CH}_3$ (1mk)

b).One of the two formulae in (a) above represents a sweet smelling compound. Give the names of the two organic compounds that can be used to prepare this compound in the laboratory. (2mks)

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c), Ethane and Ethene react with Bromine according to the following equations given below:

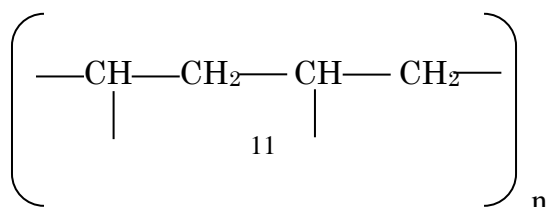


Name the type of bromination reaction taking place in

(i)..... (1mk)

(ii)..... (1mk)

d) A certain polymer has the following structure





What is meant by polymerization?

(1mk)

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.....

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