NAME.....**INDEX**

NO:.....

SCHOOL.....**SIGNATURE**.....**DATE**.....

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233/2

CHEMISTRY

PAPER TWO

JULY/AUGUST

2 Hours

KISUMU EAST AND NORTH DISTRICT JOINT EVALUATION TEST

Kenya Certificate of Secondary Education (K.C.S.E) 2012

CHEMISTRY

THEORY

PAPER TWO

JULY/AUGUST

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**

QUESTION	MAXIMUM SCORE	STUDENT SCORE
1	13	
2	13	
3	11	
4	11	
5	12	
6	11	
7	09	
TOTAL	**80**	

1. The table below gives standard electrode potential for, metals represented by the letters D,E,F and G. Study it and answer the questions that follow.

Metal	Standard electrode Potential(volts)
D	-0.13
E	+0.85
F	+0.34
G	-0.76

a) Which metal can be displaced from a solution of its salt by all the other metals in the table? Give a reason. (2mks)

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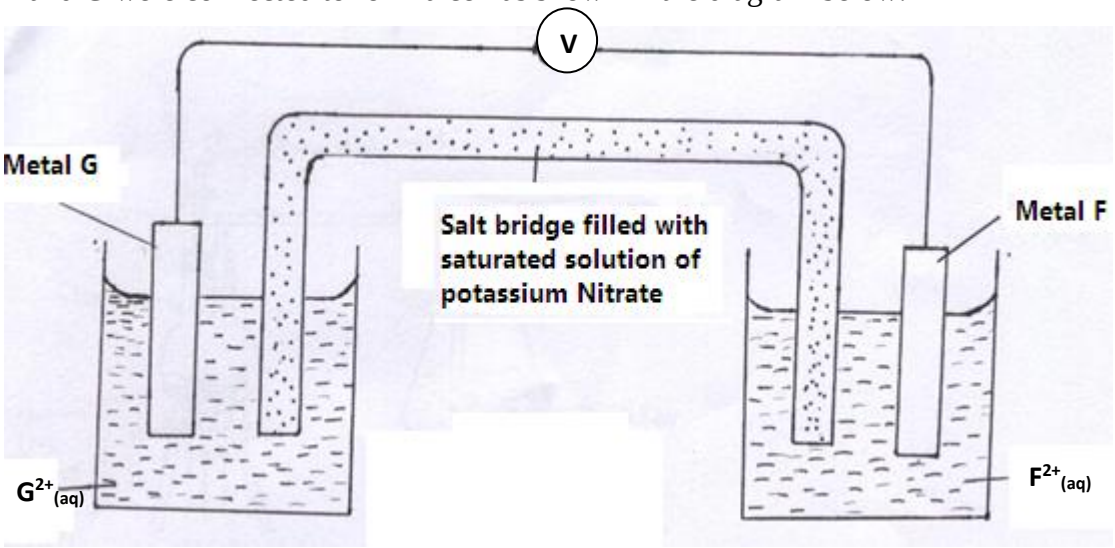
b) Metals F and G were connected to form a cell as shown in the diagram below.



i) Write the equation for the reactions that occur at the electrodes.

F (1mk)

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G (1mk)

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ii) On the diagram, indicate with an arrow the direction in which electrons would flow. (1mk)

iii) What is the function of the salt bridge? (1mk)

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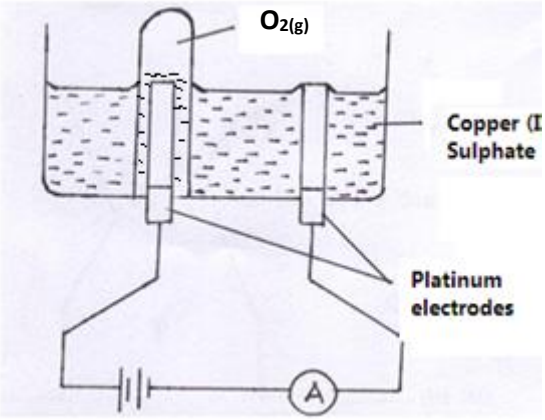
c) The diagram below represents a set- up that can be used to electrolyse aqueous copper(II) sulphate.



i) Describe how oxygen gas is produced during electrolysis. (2mks)

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ii) Explain why copper electrodes are not suitable for this electrolysis. (2mks)

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d) In an experiment to electroplate a copper spoon with silver; a current of 0.5A was passed for 18 minutes. Calculate the amount of silver deposited on the spoon.[IF=96,500 coloumbs Ag=108] (3mks)

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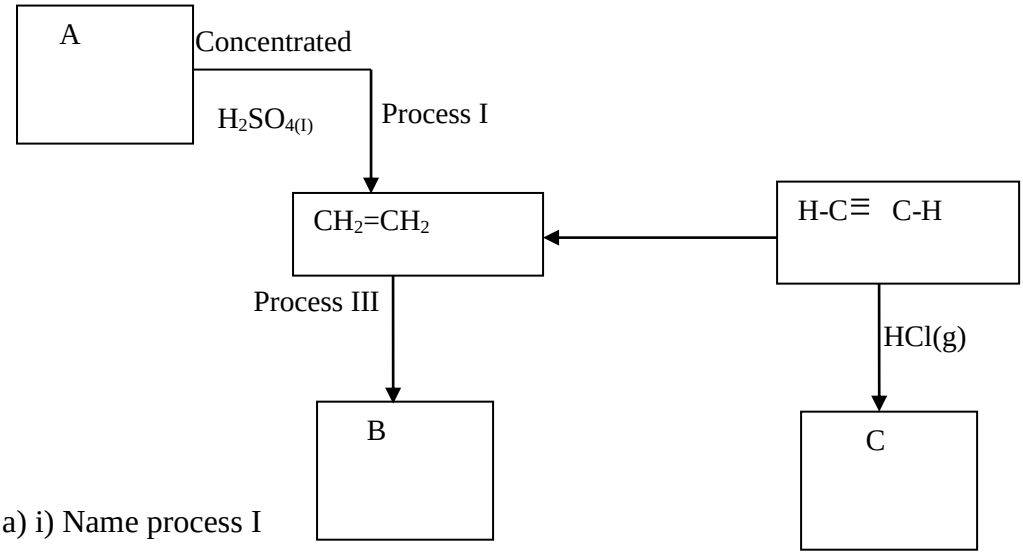
2. Study the flow chart below and answer the questions that follow.



a) i) Name process I (1mk)

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ii) Give the conditions necessary for process I to occur. (1mk)

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iii) Name compound C. (1mk)

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iv) Name the reagent A. (1mk)

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b) Study the table below and answer the questions that follow.

Compound	Melting points(K)	Boiling point(K)
$C_2H_4O_2$	289.6	391
C_3H_6	88	225.3
C_3H_8O	146	370.2
C_5H_{12}	143	309.2
C_6H_{14}	177.7	341.7

i) Which of the compounds is a solid at 283.0K. Explain (1mk)

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ii) The compound C_3H_8O is an alkanol. How does its solubility in water differ from the solubility of C_5H_{12}? Explain. (2mks)

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c) Complete combustion of one mole of a hydrocarbon produced four moles of Carbon (IV) Oxide and four moles of water only .

i) Write the formula of the hydrocarbon. (1mk)

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ii) Write the equation for the combustion reaction. (1mk)

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d) An organic compound T contains 50% Oxygen;12.5% Hydrogen and 37.5% Carbon.

The organic compound has a relative molecular mass of 32.

i) Determine the molecular formula of the compound T. (3mks)

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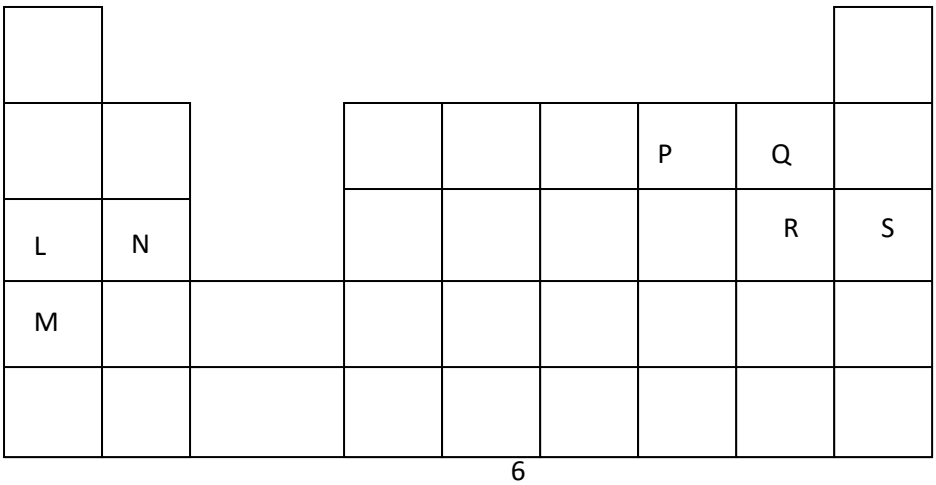
ii) Draw the structural formula of the compound T. (1mk)

3. The grid below is part of the periodic table. Use it to answer the questions that follow;[the letters are not the actual symbols of the elements].



a) i) Indicate on the grid the position of an element represented by letter T whose atomic number is 14. (1mk)

ii) Select

I. The element in period three which has the largest atomic radius. Give reason for your answer. (2mks)

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II. A letter which represents a monoatomic gas. (1mk)

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iii) Write an equation to show the action of heat on the nitrate of element M. (1mk)

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b) How does the reactivity of Q with sodium ,compare with that of R with sodium. Explain.(2mks)

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c) When 1.5g of L were reacted with water 600cm^3 of gas was produced. Determine the relative atomic mass of L ***[Molar gas Volume=24,000cm^3.)*** (3mks)

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d) Give ***one*** use of element S. (1mk)

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4. Butane is a gas at room temperature and pressure. It is used to melt bitumen to apply on roads.

a) i) Write an equation for the complete combustion of butane. (1mk)

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ii) Define the term standard enthalpy change of combustion. (1mk)

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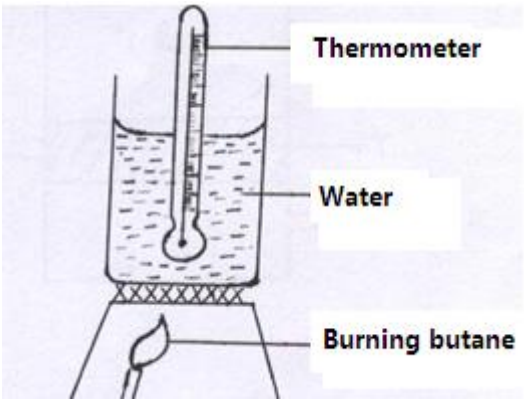
b) The set-up below was used to determine the enthalpy change for combustion of butane.



The volume of water was $200cm^3$ and temperature rose from 22^0c to 70^0c when one gram of butane was burnt.

i) Calculate the energy produced in kilo joules [specific heat capacity=4.2kjkg^{-1}k^{-1},density of water =1g/cm^3] (2mks)

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ii) Calculate the Molar enthalpy change of combustion of butane.[C=12;H=1] (2mks)

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iii) Find the heating value of butane. (1mk)

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c) Given the following data;

$\Delta H_c(C)$ =-393KJ/Mol

$\Delta H_c(H_2)$=-386KJ/Mol

$\Delta H_c(C_4H_{10})$=-2320KJ/Mol

i) Draw an energy cycle diagram. Using the above information. (2mks)

iii) Calculate the enthalpy of formation of butane from the energy cycle diagram. (2mks)

5. 1g of magnesium ribbon was reacted with hydrochloric acid at room temperature in order to investigate how the rate of reaction varies with time. The results obtained were recorded as shown below. (1mk)

Time(seconds)	0	20	40	60	80	100	120	140	160	180
Volume of gas produced(cm^3)	0	10	20	26	32	35	38	39	40	40

a) i) Briefly explain why magnesium ribbon is normally cleaned with sand paper before being put into the acid. (1mk)

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ii) Give a balanced chemical equation for this reaction. (1mk)

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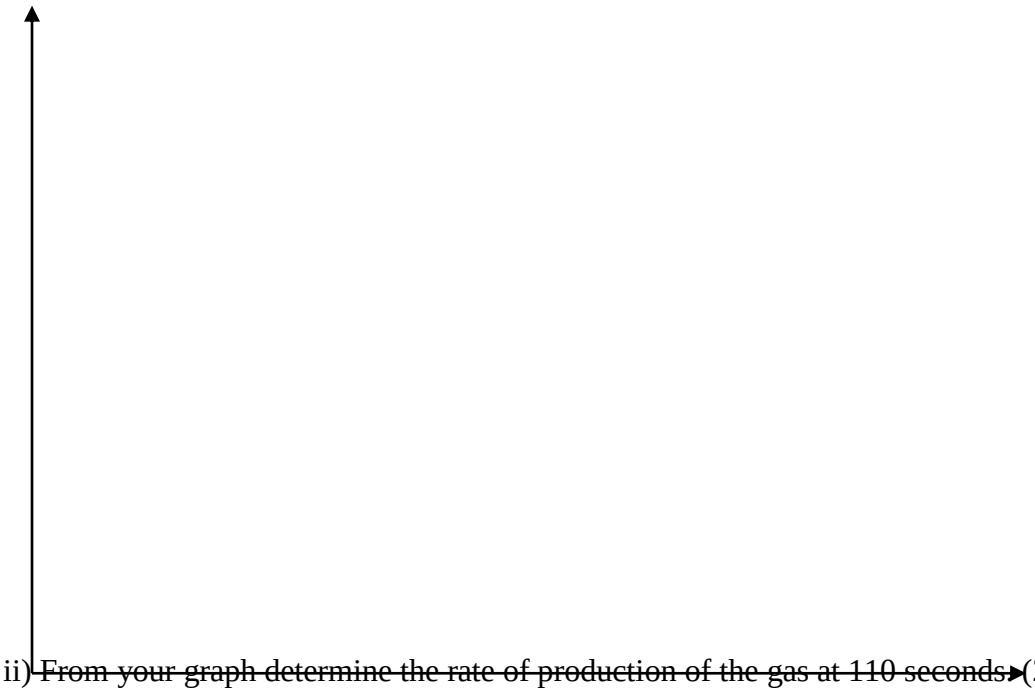
b) i) On the grid provided, plot a graph of volume of gas produced against the time taken. Label the graph C. (3mks)



ii) From your graph determine the rate of production of the gas at 110 seconds. (2mks)

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c) On the same axis sketch the graph you would expect to obtain if:

i) The same mass of powdered magnesium was used instead of magnesium ribbon. Label the graph A. (1mk)

ii) If the temperature of the solution mixture was reduced from 25.0^0c to 15.0^0c. Label the graph B. (1mk)

d) Determine the mass of magnesium ribbon that remained unreacted in this experiment.

[Mg=24,Molar gas volume=24.0dm^3 at s.t.p] (3mks)

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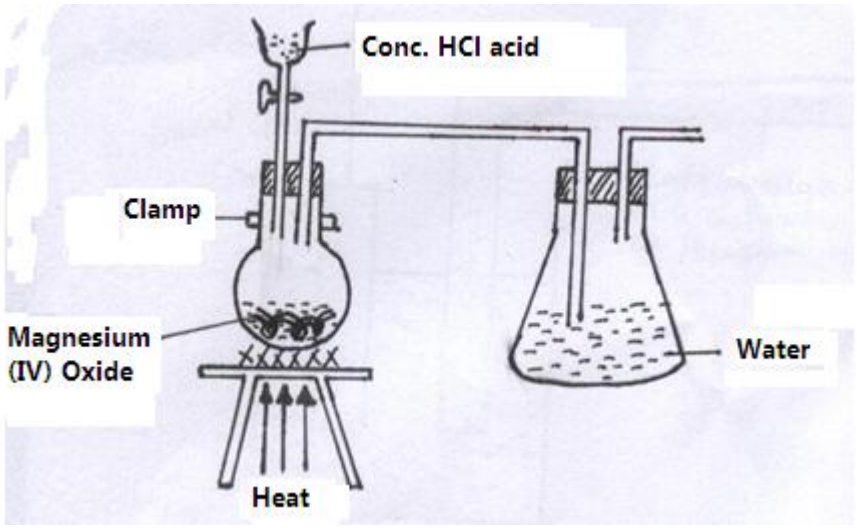
6. The set-up of apparatus below was used to prepare and collect dry chlorine gas.



a i) Complete the diagram to show how a dry sample of chlorine gas should be collected. (2mks)

ii) Write a balanced equation for the reaction above. (1mk)

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b. i) State the role of Manganese (iv) oxide in the above reaction. (1mk)

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ii) Chlorine can also be prepared by reacting concentrated hydrochloric acid with Potassium Manganate (vii). In this case no heating is required. Explain. (1mk)

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iii) Why is chlorine collected by the method you have shown in the diagram above.(1mk)

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c. i) Iron(II) chloride reacts with chlorine gas to form Iron(III) chloride. During this reaction 7.1g of Iron (II) Chloride were converted to 9.08g of Iron (III) Chloride. Calculate the volume of Chlorine gas used. (3mks)

[Fe=56;Cl=35.5;Molar gas volume=24,000cm^3]

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ii) ***State two*** commercial uses of Chlorine gas. (2mks)

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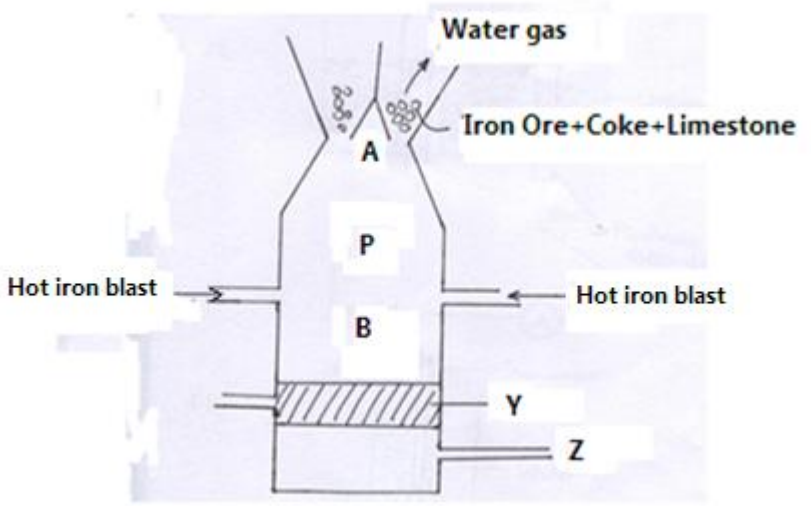
7. The diagram below shows a blast furnace used for extraction of iron.



a) Name an iron ore from which iron is extracted . (1mk)

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b) State how high temperatures in region B is maintained. (1mk)

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c) Name the reducing agent in the process above. (1mk)

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d) Identify;

I)

Y..... (½ mk)

II)

Z..... (½ mk)

e) Explain why it is desirable for compound Y to stay on top of Z. (1mk)

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f) Write an equation for formation of Z. (1mk)

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g) How many kilograms of Iron could be obtained from 240kg of Iron(III)Oxide. (2mks)

(Fe=56.0 O=16.0)

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h) ***State two*** aspects of the above process on environment. (1mk)

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