MANG'U HIGH SCHOOL

233/2
CHEMISTRY
PAPER 2
PRE MOCK
MARCH
TIME: 2 HOURS

NAME: _____

ADM NO: _____ CLASS: _____

Kenya Certificate of Secondary Education
Pre Mock Examination
Chemistry
Paper 2
2 Hours

- Answer **ALL** the questions in the spaces provided.

This paper consists of **11 printed pages.**
Make sure that all the pages are printed and that no page is missing

1. a) An element S has an atomic number of 38 and belongs to period 5.

i) What name is given to the group to which the element belongs? (1mk)

ii) Write the electronic configuration of the element (1mk)

b) The table below gives information about some ions of certain elements. Study it and answer the questions that follow.

Ion	Ionic Configuration	Ionic radius (nm)	Atomic radii (nm)
Q^{2-}	2:8	0.136	0.072
T^{3+}	2:8	0.050	0.143
W^{+}	2:8	0.095	0.186
X^{+}	2	0.066	0.152

i) Name the nature of the oxide formed when T^{3+} forms an oxide (1mk)

ii) Identify the ion of the most electronegative element (1mk)

iii) Compare the reactivity of elements forming ions W^{+} and X^{+} (1mk)

iv) I. Draw a 'dot' and 'cross' diagram illustrating on the compound formed when T^{3+} combines with Q^{2-} (1mk)

II. Name the type of structure formed (1mk)

(vi) Name the charge carries would be present in:-

I. Chloride formed by W^+ (1mk)

II. Element of X^+ (1mk)

(c) Two elements R and S belong to group VII of the periodic table with atomic numbers 17 and 53 respectively.

(i) State the electronic configuration of the ion R (1mk)

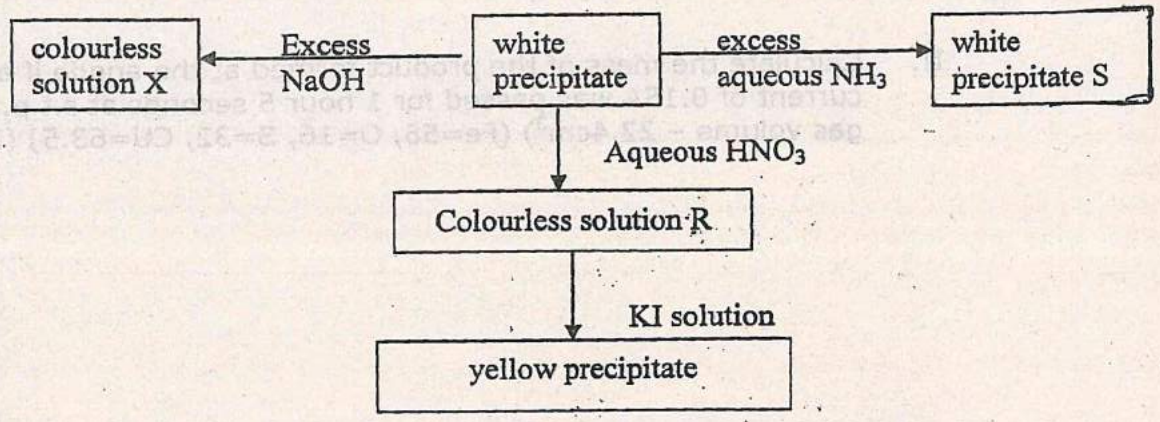
(ii) S is a solid while R is a gas. Explain (1mk)

2. (a) If chlorine gas is passed over heated iron fillings and the product dissolved in water, a yellow solution is formed.

(i) What would be observed if aqueous ammonia is added to the yellow solution (1mk)

(ii) Write the ionic equation for the reaction above in (i) (1mk)

(b) Study the reaction scheme below and answer the questions that follow.



(i) Write the ionic equations for the formation of

I. Colourless solution X (1mk)

II. Yellow precipitate (1mk)

(ii) What observations are made when white precipitate S is heated strongly (1mk)

(iii) Hydrogen sulphide gas was passed through colourless solution R. Write the equation for the reactions that took place (1mk)

(c) (i) A student was required to prepare a sample of copper metal using crystals of copper II sulphate and iron fillings. Describe how the student would obtain copper metal (3mks)

(ii) The solution obtained in (i) above was electrolysed using inert electrodes.

I. Name the product at cathode (1mk)

II. Calculate the mass of the product formed at the anode if a current of 0.15A was passed for 1 hour 5 seconds at s.t.p. (molar gas volume – 22.4cm^3) (Fe=56, O=16, S=32, CU=63.5) (3mks)

3. The table below gives reduction potentials obtained when half cells for the following metals; J, K, L, M and N were connected to a copper half cell as reference electrode.

metals	reduction potentials (volts)
J -	-1.10
K	-0.47
L	0.00
M	+0.45
N	+1.16

(i) What is metal L likely to be (1mk)

Give a reason (1mk)

(ii) Which metal cannot be displaced from its salt by any other metal in the table (1mk)

(b) If metal K and M were used as electrodes to form an electrochemical cell

(i) Draw a well labeled diagram of this cell and the direction of the electrons flow (3mks)

(ii) Write the reaction of the cell (1mk)

(iii) Calculate the e.m.f. of the cell (1mk)

(d) During electrolysis of dilute $CUSO_4$ solution, 0.5 amperes was passed for 3 hours

(i) Write the reactions that took place at the cathode and at the anode (2mks)

I. Cathode

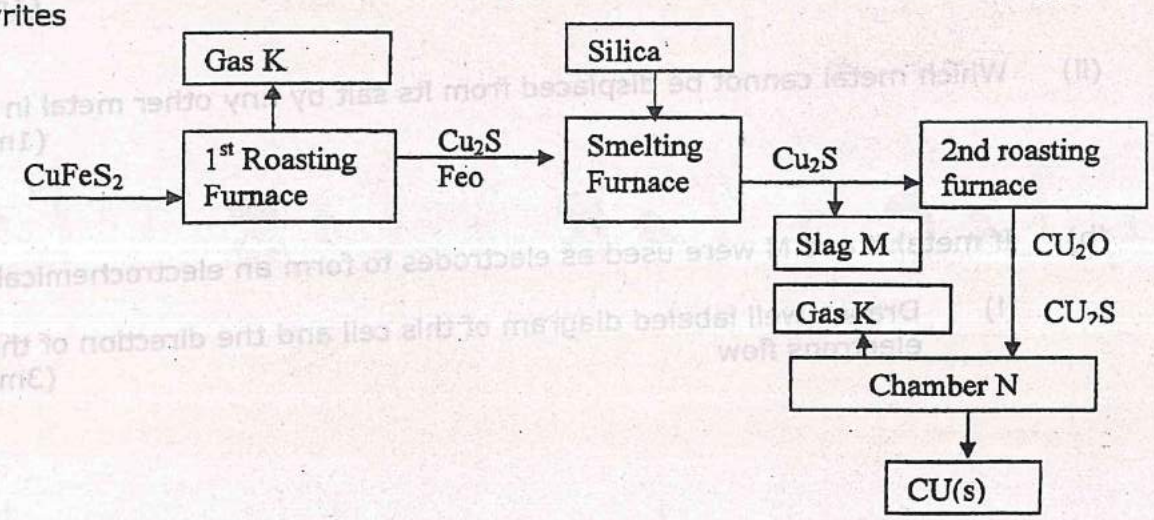
II. Anode

(II) Calculate the amount of the solid deposited at the cathode and the amount of Gas liberated at the anode at s.t.p.

I. solid (2mks)

II. gas (2mks)

4. The flow chart below outlines some of the process involved in extraction of copper from pyrites



(a) (i) Name gas K (1mk)

(ii) Write an equation for reaction taking place in the 1st roasting furnace. (1mk)

(iii) Name the slag M (1mk)

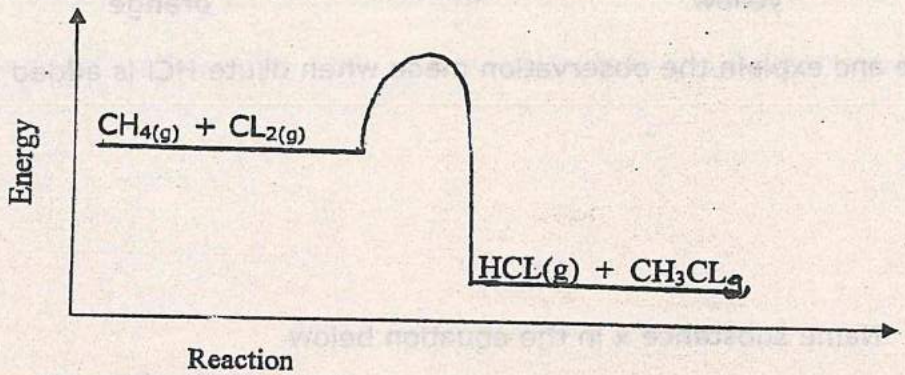
(iv) What name is given to the reaction taking place in chamber N? (1mk)

Write the reaction (1mk)

(b) Copper obtained above is not pure. Draw a well labeled diagram to show the set up you would use to refine the copper. (3mks)

(c) Given that the mass of copper obtained from the above extraction was 210kg. Determine percentage purity of the copper pyrite if 810kg of it was fed to the 1st roasting furnace (4mks)
(CU=64, Fe=56, S=32)

5. Below is an energy level diagram for the reaction



(a) State one condition required for this reaction to occur. (1mk)

(b) Show the activation energy and enthalpy change on the energy level diagram above. (2mks)

(c) Give the following bond energies

C-C	_____	347 Kj/Mol
C-H	_____	413 Kj/Mol
CL-CL	_____	242Kj/Mol
H-CL	_____	431 Kj/Mol

(c) Calculate the enthalpy change of the reaction above (3mks)

d) What is the effect of increasing pressure on the reaction rate of the above reaction. Explain (2mks)

e) Study the reversible reaction below

$$2CrO_4^{2-}{}_{(aq)} + 2H^+{}_{aq)} \rightleftharpoons Cr_2O_7^{2-}{}_{(aq)} + H_2O_{(l)}$$

yellow — orange

State and explain the observation made when dilute HCl is added to the reaction (3mks)

(a) Name substance x in the equation below

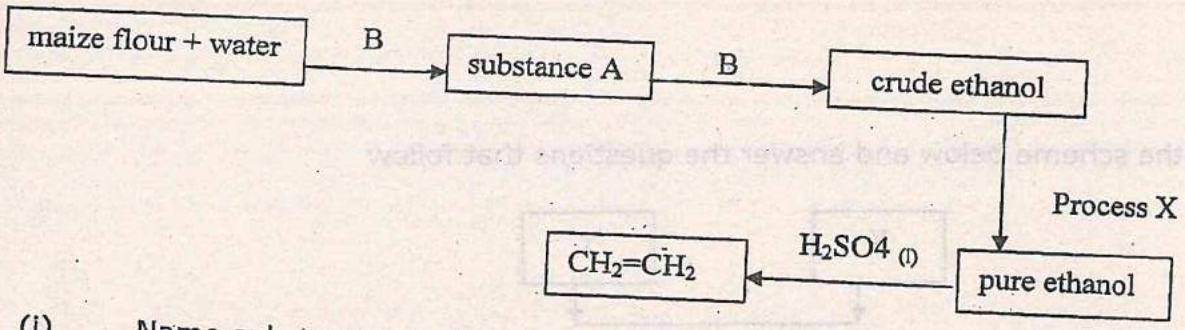
$$C_{10}H_{22} \longrightarrow X + C_2H_4$$

X _____ (1mk)

(b) What is the name of the process (1mk)

(c) Name and write the formula of 3 isomers of hexane (2mks)

(d) Study the flow chart below and answer the questions that follow.



(i) Name substances A, B and process X (3mks)

A _____

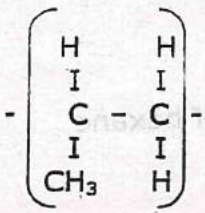
B _____

Process X _____

(ii) Name the type of reaction that occurs when ethanol is converted to $CH_2=CH_2$ (1mk)

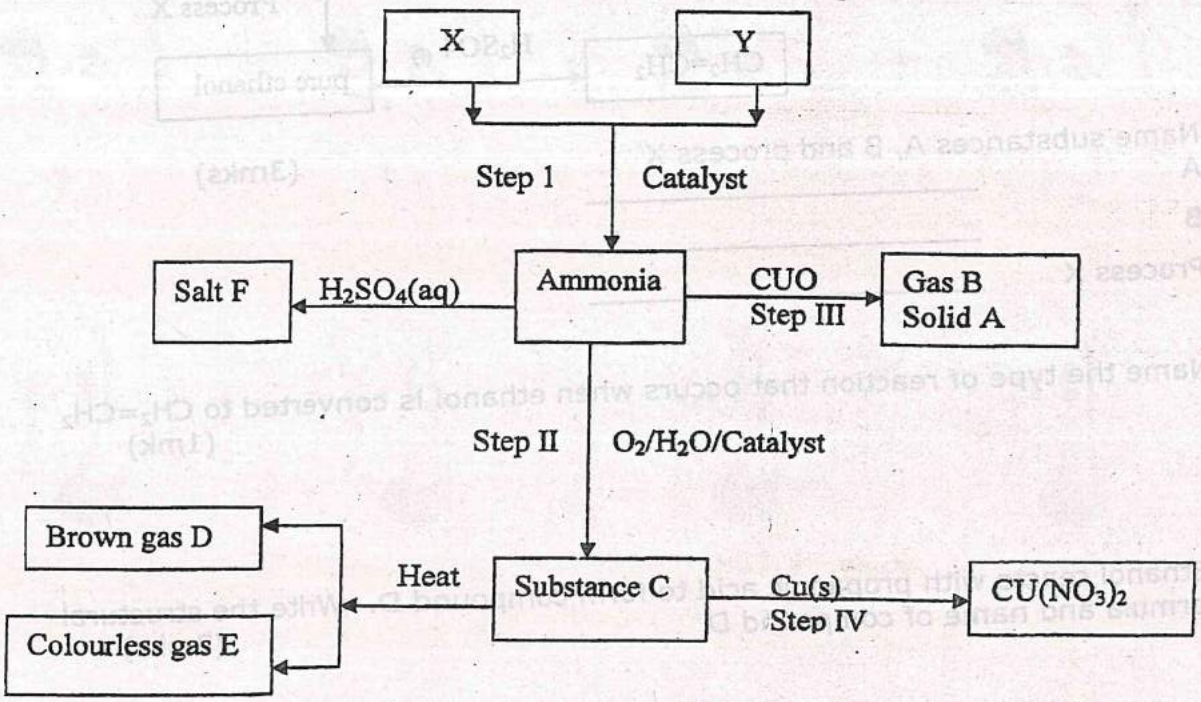
(iii) Ethanol reacts with propanoic acid to form compound D. Write the structural formula and name of compound D (2mks)

(e) Alkenes can polymerise



Deduce and name the structural formula of the monomer for the structure of the polymer shown above (2mks)

7. Study the scheme below and answer the questions that follow



(a) Identify the catalyst used in step I (1mk)

(b) Describe the chemical test of gas E (1mk)

(c) Name the optimum conditions for the production of ammonia gas (2mks)

(d) Identify X and Y and their sources (2mks)

X _____ Source _____

Y _____ Source _____

(e) Write a chemical equation of the reaction between substance c and copper metal (1mk)

MANG'U HIGH SCHOOL

NAME: _____

ADM. NO. _____ CLASS: _____

K.C.P.E MARKS: _____

233/3

CHEMISTRY

FORM 4

PRE MOCK

1. You are provided with:
   - 2.0g of substance A, labeled solid A.
   - Solution B, 0.05M hydrochloric acid
   - Methyl orange indicator

   You are required to determine the:
   - Solubility of substance A in water
   - Relative formula mass of substance A

PROCEDURE 1

(i) Place 200cm^3 of tap water in a 250ml beaker and keep it for use in step (vi)

(ii) Place all of substance A in a dry boiling tube

(iii) Using a burette, measure 10.0cm^3 of distilled water and add it to the substance A in the boiling tube.

(iv) While stirring the mixture in the boiling tube with a thermometer, warm the mixture using a Bunsen burner, until the temperature rises to 65^{0}C. Stop warming the mixture

(v) Allow it to cool while stirring with the thermometer.

(vi) When the temperature drops to 60^{0}C, start the stop watch/clock, place the boiling tube in the beaker with tap water prepared in step (i) above

(vii) Continue stirring and record the temperature of the mixture after two minutes, then thereafter record the temperature of the mixture after every one minute interval and complete table 1. Retain the mixture with the thermometer inside for use in procedure II below.

Table 1

Time (Minutes)	0	2	3	4	5	6	7	8	9	10
Temperature (^{0}C)	60									

On the grid provided, plot a graph of temperature (Vertical-axis) against time. (3mks)

a) Using the graph, determine the temperature (Ts) when 2.0g substance A dissolves completely in 10.0cm3 of distilled water (1mk)

.....

b) Calculate the solubility of substance A in grams per 100g water at temperature, Ts. (2mks)

.....

.....

PROCEDURE II

Using a funnel, transfer all the mixture obtained from procedure I into a 250ml volumetric flask. Rinse the boiling tube and the thermometer with about $20cm^3$ of distilled water and add the rinses into the volumetric flask. Repeat the rinsing two more times. Add about $100cm^3$ of distilled water to the volumetric flask. Shake until all the solid dissolves. Add more distilled water to the mark. Label this as solution A. Fill the burette with solution A. Using a pipette and pipette filler, place $25.0cm^3$ of solution B, into a 250ml conical flask. Add three (3) drops of the indicator provided and titrate using solution A. Record your readings in table 2 below. Repeat the titration two more times and complete the table.

Table 2

	I	II	III
Final Burette Reading			
Initial Burette Reading			
Volume of solution A (cm^3) used			

a) Calculate the: (4mks)

i) Average volume of solution A used. (3mk)

.....

.....

ii) Number of moles of hydrochloric acid, solution B used (1mk)

.....

b) Given that two moles of acid react with one mole of substance A
Calculate:

i) Number of moles substance A tested (1mk)

.....

ii) Concentration of solution A in moles per litre (1mk)

.....

.....

iii) Concentration of solution A in g per litre (1mk)

.....

.....

iv) Relative formula mass of substance A (1mk)

.....

.....

2. You are provided with solid E. Carry out the following tests and write your observations and inferences in the space provided.

a) Place about one-half of solid E in a dry test tube. Heat it strongly and test any gas produced using hydrochloric acid, solution B on a glass rod.

Observation	Inferences
(2mks)	(1mk)

b) Place the rest of solid E in a boiling tube. Add about $10cm^3$ of distilled water. Shake well and use $2cm^3$ portions for each of the tests below.

i) To one portion, add aqueous ammonia dropwise until in excess.

Observation	Inferences
(1mk)	(1mk)

ii) To a second portion, add about $1cm^3$ of hydrochloric acid, solution B

Observation	Inferences
(1mk)	(2mks)

iii) To a third portion, add two drops of aqueous lead (II) nitrate and heat the mixture to boiling

Observation	Inferences
(1mk)	(1mk)

3. You are provided with liquid L. Carry out the tests below. Record your observations and inferences in the spaces provided.

a) Place three or four drops of liquid L on a watch glass. Ignite the liquid using a burning splint.

Observation	Inferences
(1mk)	(1mk)

b) To about $1cm^3$ of liquid L in a test tube, add about $1cm^3$ of distilled water and shake.

Observation	Inferences
(1mk)	(1mk)

c) To about $1cm^3$ of liquid L in a test tube, add a small amount of solid sodium carbonate.

Observation	Inferences
(1mk)	(1mk)

d) To about $2cm^3$ of liquid L in a test tube, add about $1cm^3$ of acidified $K_2Cr_2O_7$ solution. Warm the mixture gently and all it to stand for about one minute.

Observation	Inferences
(1mk)	(1mk)

e) To about $5cm^3$ of liquid L add about $5cm^3$ of ethanoic acid followed by a few drops of conc. H_2SO_4

f)

Observation	Inferences
(1mk)	(1mk)

MANGU HIGH SCHOOL

Name: _____

Class: _____ **Adm. No.:** _____ **KCPE Marks:** _____

232/1
PHYSICS
PAPER 1
MARCH
TIME: 2 HOURS

Instructions to candidates

- *This paper consists of TWO Sections: A and B.*
- *Answer ALL the questions in sections A and B in the spaces provided.*
- *ALL working MUST be clearly shown.*
- *Mathematical tables and electronic calculators may be used.*

For Examiner's Use Only

Section	Maximum Score	Candidate's Score
A	25	
B	55	
Total Score	80	

This paper consists of 9 printed pages. Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing

Turn Over

SECTION A (25 MARKS)

1. The masses of equal volumes of a certain liquid and water was found to be M_L and M_w respectively. Given that the density of water is $1/g/cm^3$ express the density of liquid in terms of M_L and M_w (2mks)

2. Fig 1 shows a screw used to fix pieces of wood. Explain how a metre rule can be used to find the pitch of the screw. (2mks)

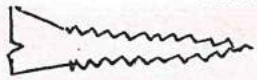
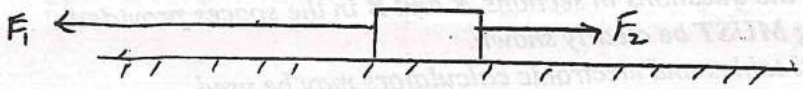


Fig I

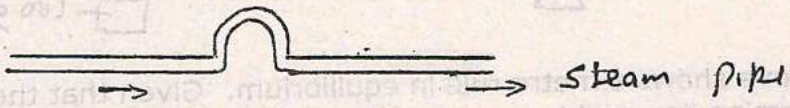
3. The figure below shows an object being acted on by two forces F_1 and F_2



Draw a force F_3 that has same effect on the body as the two forces (2mks)

4. The reading on a mercury barometer at a place is 700mm. What will be the pressure in N/M^2 if density of mercury is $13600kg/m^3$ (3mks)

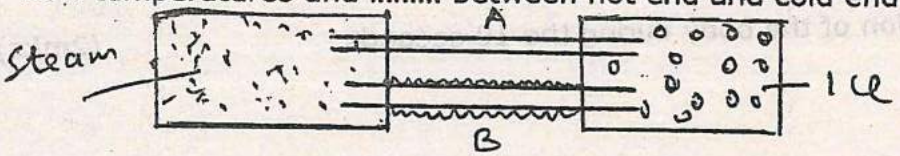
5. Steam pipes are constructed with bond at some point of the pipe



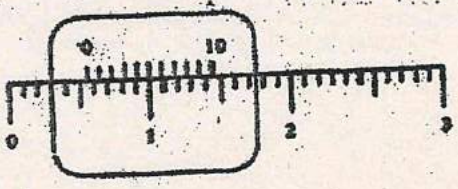
State the use of the bond

6. State special features in a clinical thermometer and explain how these features makes it measure temperature conveniently (4mks)

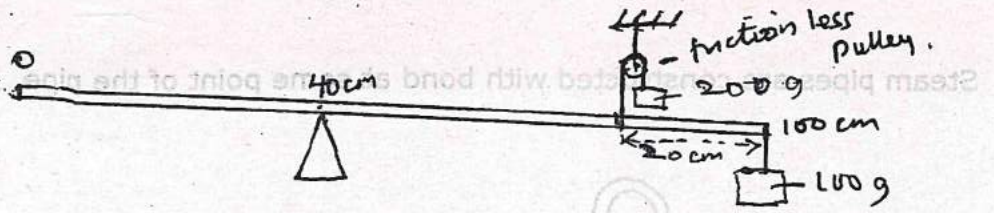
7. Two metal rods of same material, same length and same cross-sectional area are used to transfer heat from steam to ice as shown below.
Metal A is not lagged but B is lagged. Sketch two graphs in same axis to show how temperatures and ..... between hot end and cold end for the two metals (2mks)



8. What is the reading on vernier calipers shown below (1mk)



9.



The set up above shows a metre rule in equilibrium. Given that the rule is uniform, determine its weight (3mks)

10. A spiral spring of spring constant 20N/M is composed by 10cm. Its released to push a mass of 20g horizontally find the speed at which the mass start moving. (3mks)

11. The figure below shows a graph of velocity against time for a moving body

Describe the motion of the body during the 10 seconds (2mks)