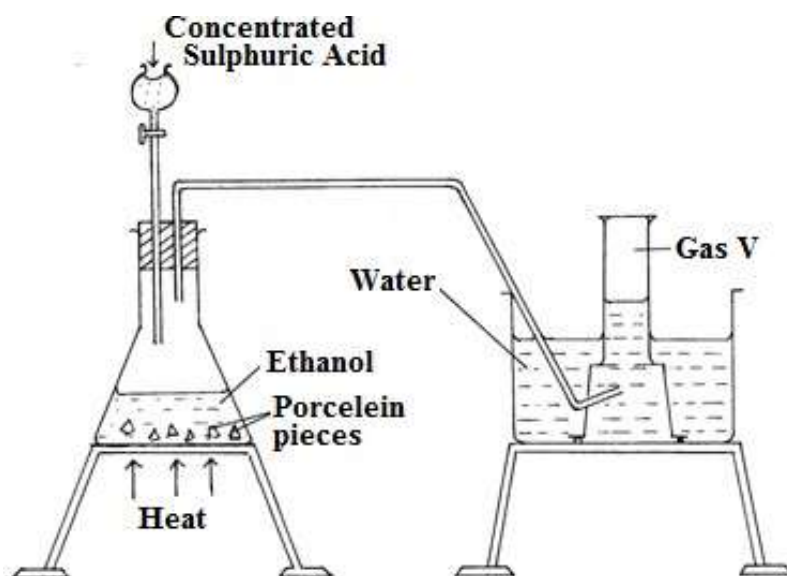


FORM FOUR CLUSTER KCSE MODEL14

CHEMISTRY PAPER 2 QUESTIONS

1. a) The set up below was used to prepare and collect gas V. Study it and answer the questions that follow.



- i) Identify gas V
.....
- ii) Give one property of gas V that makes it possible to be collected as shown in the set up
.....
- b) Gas V undergoes addition polymerization to form polymer V1
- i) Write the structural formula of V1 (showing 2 molecules of V) and give its name Structure
.....
Name
- ii) State one disadvantage of continued use of polymer V1
.....
.....
- c) Crude oil is a mixture of hydrocarbons
- i) Name the process used to separate the various components of crude oil.
.....
.....
- ii) On what two properties does the separation of the above components depend?
.....
.....
- iii) To what homologous series do most components of crude oil belong?
.....
2. Study the information given in the table below and answer the questions that follow. The letters do not represent the actual symbols of the elements.

Element	Atomic number	Boiling point °C
V	12	1110
W	18	-186
X	14	2360
Y	13	2470
Z	20	1140

a) Select two elements which are good conductors of electricity.

Give a reason

.....

b) Which elements belong to:

i) Period 3

ii) The same group

.....

c) Write:

i) The formula of the sulphate of Y

.....

ii) The equation for the reaction between element V and oxygen gas.

.....

d) Which element: i) Is in gaseous state at room temperature?

Explain. (room temperature is 25°C)

.....

ii) Could be used to fill ordinary electric bulbs. Give a reason

.....

e) i) What type of bond is likely to be formed when element Z combine with chlorine.

.....

ii) Name the structure of the oxide of X.

.....

f) Aqueous solution of the chloride of element V was electrolyzed using graphite electrodes. Name the products formed at the:

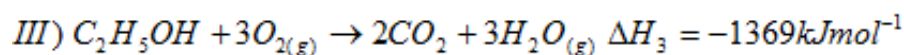
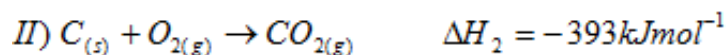
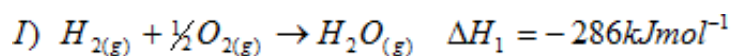
i) Anode

ii) Cathode

3. a) Define latent heat of fusion of a substance

.....

b) Given the thermochemical equations for the combustion of ethanol, carbon and hydrogen



i) Give the two possible names of the enthalpy change represented by ΔH_2

.....

Draw an energy level diagram for the reaction represented by equation III.

Calculate the enthalpy of formation of ethanol ΔH_f

.....

When a sample of ethanol was burnt, the heat produced raised the temperature of 500cm³ of water by 22.5°C (specific heat capacity of water = 4.2Jg⁻¹ °C⁻¹, density of water = 1gcm⁻³)
 Calculate

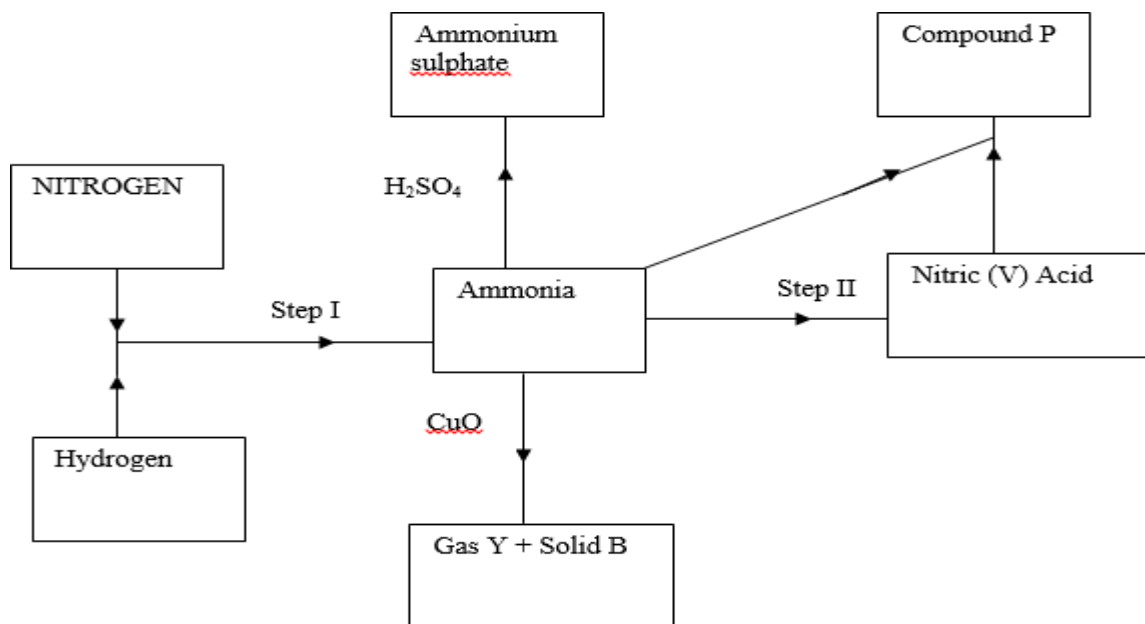
I) Heat change for the reaction

.....

II) Mass of ethanol that was burnt (C= 12, H=1, O= 16)

.....

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



a) State one source of each of the following

i) Hydrogen gas

.....

ii) Nitrogen gas

.....

b) State two other conditions apart from the use of a catalyst that would favour the reaction in step I (2mks)

.....

.....

c) Name the catalysts used in:

Step I

Step II

.....

d) Name:

i) Solid B

.....

ii) Compound P

.....

e) Write the equation for the reaction which occurred during the formation of gas Y and solid B.

.....

.....

f) Ammonium sulphate is a fertilizer produced by passing ammonia through concentrated sulphuric (VI) acid. Calculate the mass of sulphuric (VI) acid in kg required to produce 15kg of the fertilizer (S=32, O=16, N = 14, H=1)

5. a) Explain the meaning of the following terms:

i) Reduction

.....
 ii) Oxidation number

..... iii) Determine the oxidation number of chlorine in the ion.



b) The standard electrode potentials ($E^\ominus$) of elements D and G are -2.38V and -2.87volts respectively

i) Draw a labeled diagram of the cell formed when the two are connected

ii) Determine the e.m.f of the cell formed above. (2mks)

c) During electrolysis of aqueous copper (II) Sulphate using carbon electrodes, a current of 2.0A was passed for 3hours.

i) Find the mass of copper metal deposited at the cathode (Cu =64 ; 1F=9650⁰c)

ii) State and explain the observation made in the resulting solution.

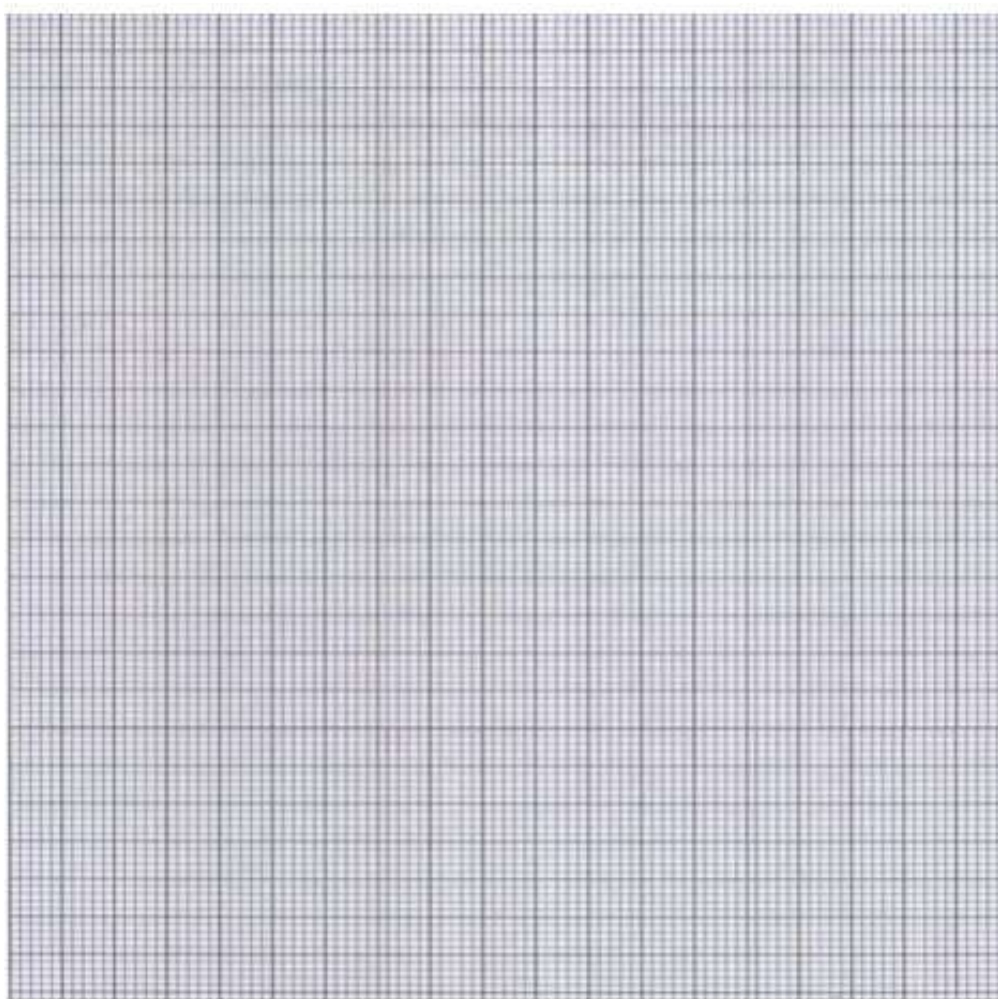
iii) State one application of electrolysis

6. In an experiment to study the rate of reaction between hydrochloric and magnesium powder, different volumes of 2M Hydrochloric acid were reacted with 0.6g of magnesium powder 25⁰c.

Volume of 2M HCl (cm ³)	0	10	20	30	40	50
Volume of gas (cm ³)	0	240	480	600	600	600

a) Write an equation for the reaction between magnesium and hydrochloric acid.

b) On the grid provided, plot a graph of the volume of gas produced (vertical axis) against the volume of acid added.



c) From the graph, determine; i) The volume of the gas produced if 16cm³ of 2M hydrochloric acid had been used.

ii) The volume of 2M hydrochloric acid which reacted completely with 0.6g of magnesium powder.

d) State and explain the effect on the rate of production of the gas if:

i) 1M hydrochloric acid was used instead of 2M hydrochloric acid.

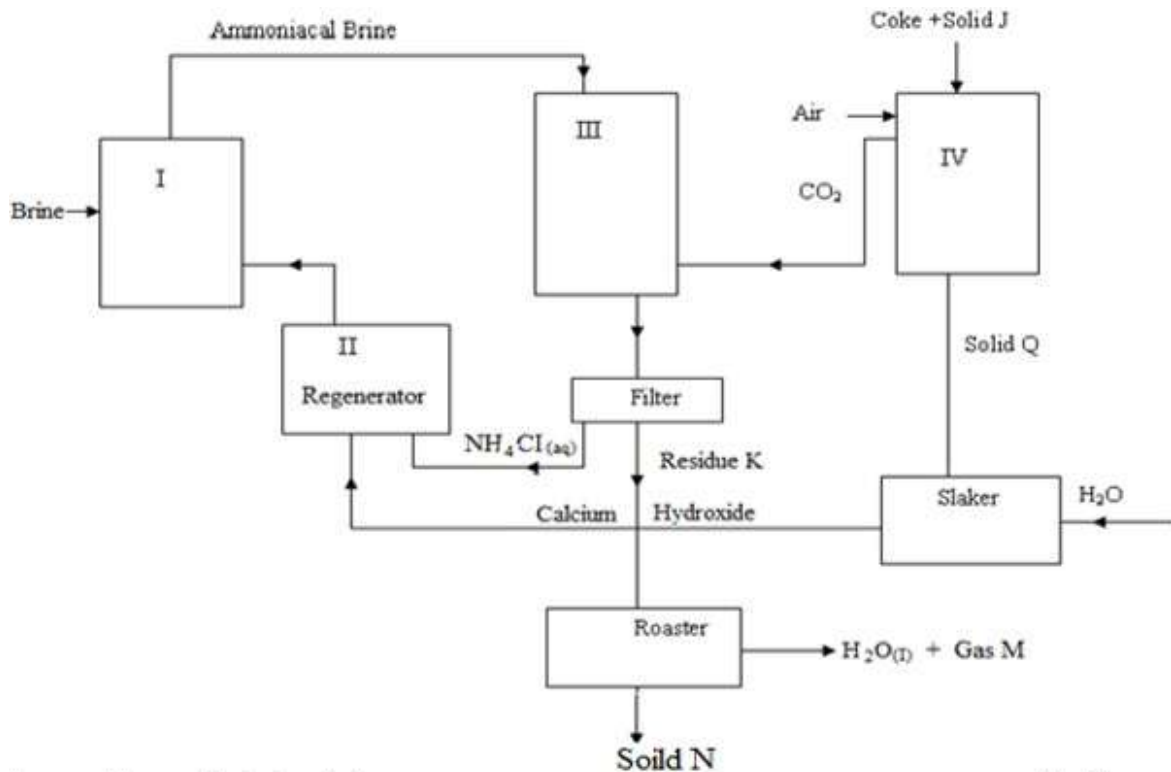
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.....
.....

ii) 0.6g of magnesium turnings were used instead of magnesium powder.

.....

e) Calculate the R.A.M of magnesium (molar gas volume =24000cm³)

7. a) Study the diagram below representing an industrial process



i) Name this industrial process

.....

..... ii) Name the main product obtained from the above process.

.....

..... iii) Name solids

J.....

K.....

Q.....

iv) Write down the chemical equation for the reaction that occur in ammonia regenerator chamber II

..... v) State two uses of gas M

..... b) i) When petrol or diesel burn in the engine a lot of carbon (II) oxide is emitted during cold weather. Explain

.....

ii) Levels of carbon (IV) oxide in the atmosphere is increasing due to the use of fossil fuels.

This has resulted in global warming due to green house effect. State two effects of global warming.

.....