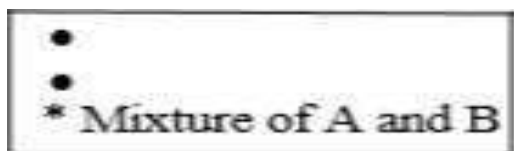


FORM FOUR CLUSTER KCSE MODEL 6

CHEMISTRY PAPER 2 QUESTIONS

1. (a) The diagram below represents a paper chromatograph of two types of pigments A and B.

On the diagram:



(i) Label the baseline and the solvent front. (1mark)

(ii) State two properties of A that makes it move faster than B up front. (2marks)

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What is chromatography? (1mark)

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.....

(b) Describe how solid ammonium chloride can be separated from a solid mixture of ammonium chloride and anhydrous calcium chloride. (3marks)

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(c) The table below shows liquids that are miscible and those that are immiscible

Liquid	L ₃	L ₄
L ₁	Miscible	Miscible
L ₂	Miscible	Immiscible

Use the information given to answer the questions that follow:

(i) Name the method that can be used to separate L₁ and L₃ from a mixture of the two. (1mark)

.....
(ii) Describe how a mixture of L2 and L4 can be separated. (2marks)

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.....

2. 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	K		J			E	R
B							W
C							X

(a)(i) An element V has atomic number 7 indicate the position of V on the grid. (1mark)

(ii) Compare the atomic radius of E to that of R. Explain. (2marks)

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.....

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

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(b)(i) Give the most reactive metal and state why? (2marks)

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(ii) Write the formula of the compound formed when B reacts with E. (1mark)

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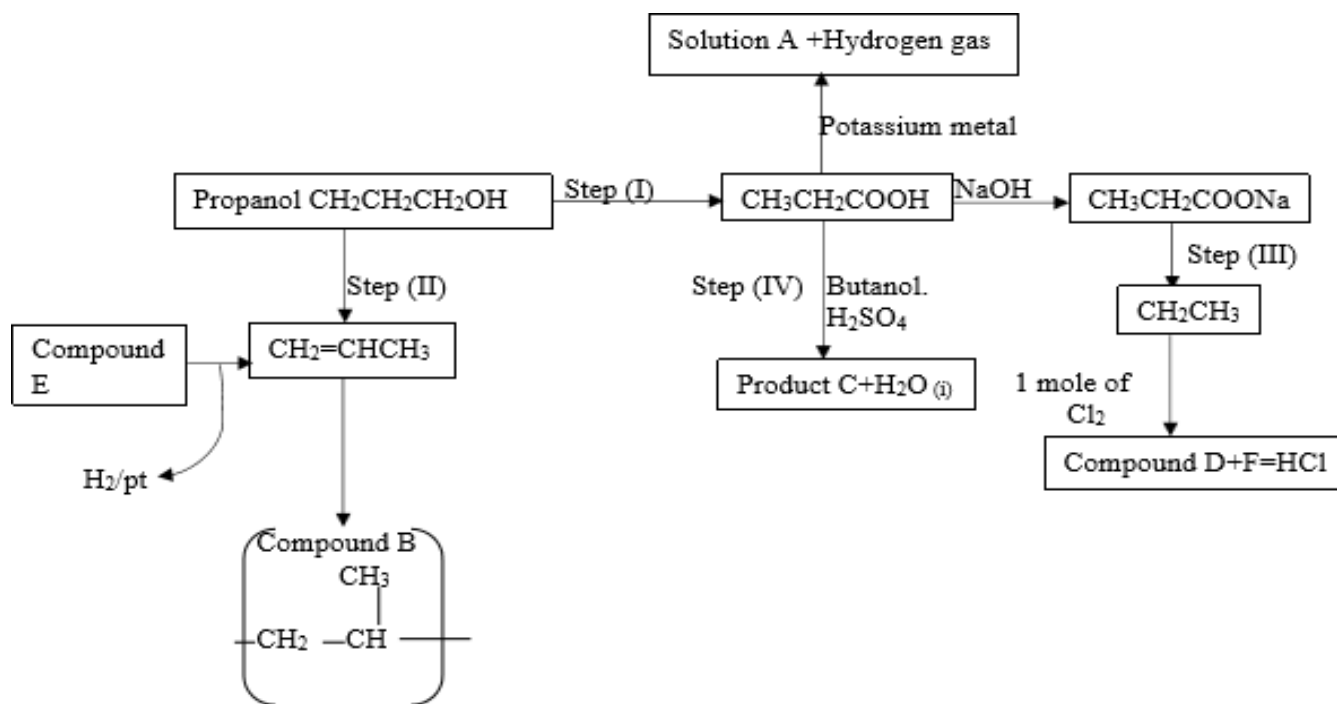
(c) What type of bond is formed between A and R? Explain. (2marks)

.....

(d) Explain why chloride of J dissolved in organic solvents while that of K not. (2marks)

.....

3. The scheme below shows a series of reactions starting with propanol. Study it and answer the questions that follow:



a)(i) Name the type of reactions in step I and II.

Step I... (1mark)

Step II... (1mark)

b) Write the equation for the reactions that takes place in step III (1mark)

c) Name substances labeled A, B, C, D, and E. (4marks)

A.....

C.....

D.....

E.....

d) Draw the structural formula of product C. (1mark)

e) Name the process in step IV. (1mark)

f) Name compound B and state the type of reaction involved in its formation.

(i) Name compound B. (1mark)

.....

(ii) Type of reaction. (1mark)

g) If the relative molecular mass of B is 35,700, determine the value of n. (2marks)

4.(a) Define the terms: (2marks)

(i) Saturated solution.

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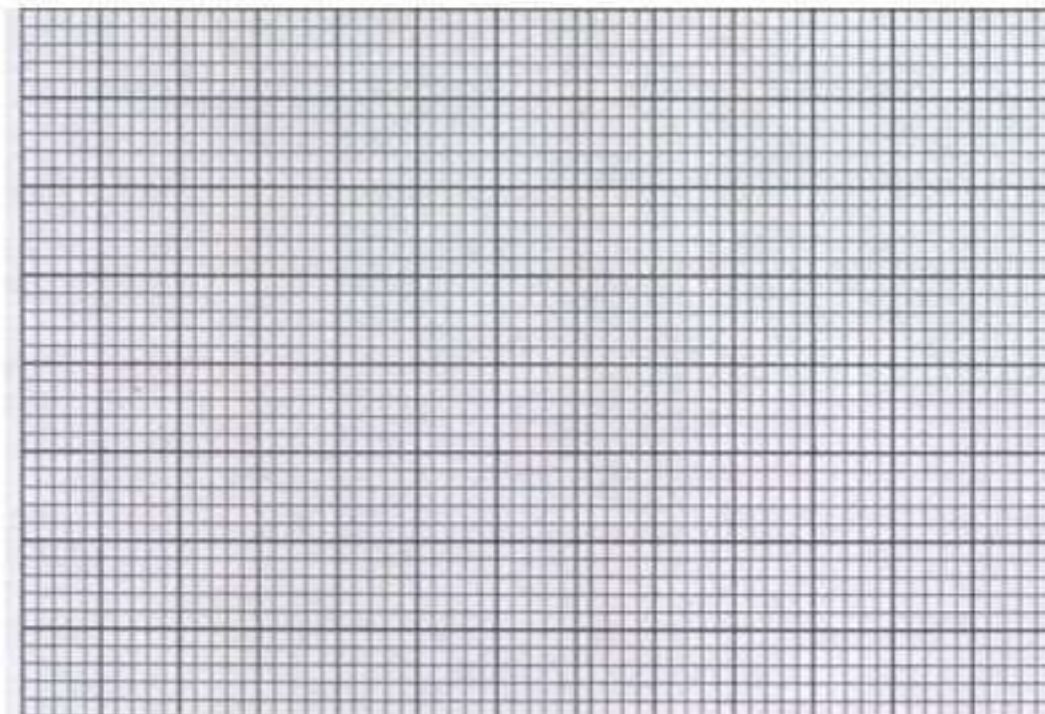
(ii) Solubility.

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(b) The table below gives the solubilities of potassium nitrate at different temperatures.

Temperatures $^{\circ}$ C	12	20	28	36	44	52
Solubility g/100g of water	22	31	42	55	70	90

(i) Plot a graph of solubility of potassium nitrate (vertical axis) against temperature. (3marks)



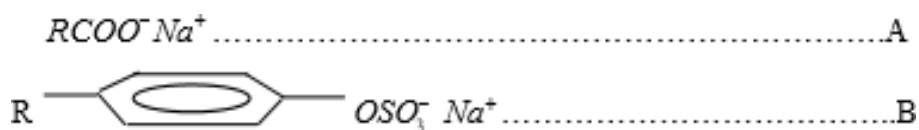
Using a graph.

(ii) Determine the solubility of potassium nitrate 150 C. (1mark)

(iii) Determine the mass of potassium nitrate that remained undissolved given that 80 g of potassium nitrate were added to 100cm³ of water and warmed to 400C. (2marks)

(c) Determine the molar concentration of potassium nitrate at 150 C (Assume there's no change in density of water at the temperature K =39, N=14 O=16) (2marks)

(d) Below are structures of two cleaning agents.



(i) Identify the cleansing agent suitable to use in water containing magnesium chloride. (1mark)

.....

(ii) State one advantages of using cleaning agent B. (1mark)

.....

5. In an experiment to determine the molar heat of neutralization of hydrochloric acid with sodium hydroxide, students of a secondary school reacted 100cm³ of 1M hydrochloric acid with 50cm³ of 2M sodium hydroxide they obtained the following results:

Initial temperature of acid =25.00 C Initial temperature of base =25.00 C

Highest temperature reached with acid alkali mixture. =34.00 C

a) Define the term molar heat neutralization. (1mark)

.....

b) Write an ionic equation for the neutralization reaction between hydrochloric acid and sodium hydroxide. (1mark)

c) Calculate:

i) The change in temperature (2mks)

ii) The amount of heat produced during the reaction (specific heat capacity of solution=4.2 (2marks)

iii) The molar heat neutralization of sodium hydroxide. (2marks)

d) Write the thermochemical equation for the reaction. (1mark)

.....

e) Draw an energy level diagram for the reaction. (2marks)

6.a)(i) Define the term allotropy. (1mark)

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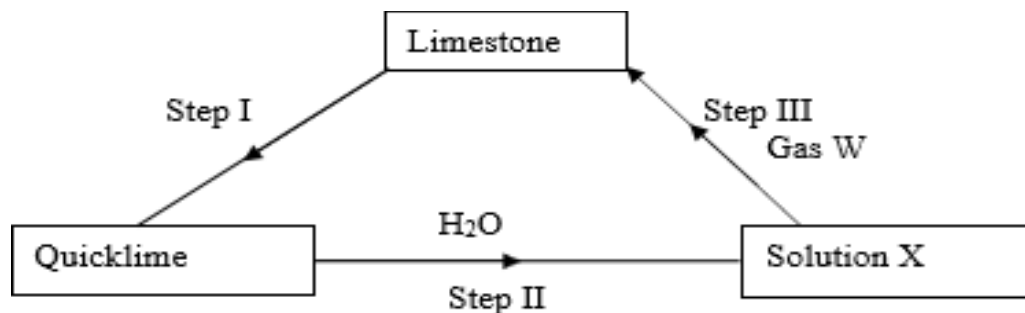
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(ii) State two crystalline forms of carbon. (1mark)

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b) Study the following diagram and answer the questions below:



(i) Name the process in step I (1mark)

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(ii) Write the equation in step II (1mark)

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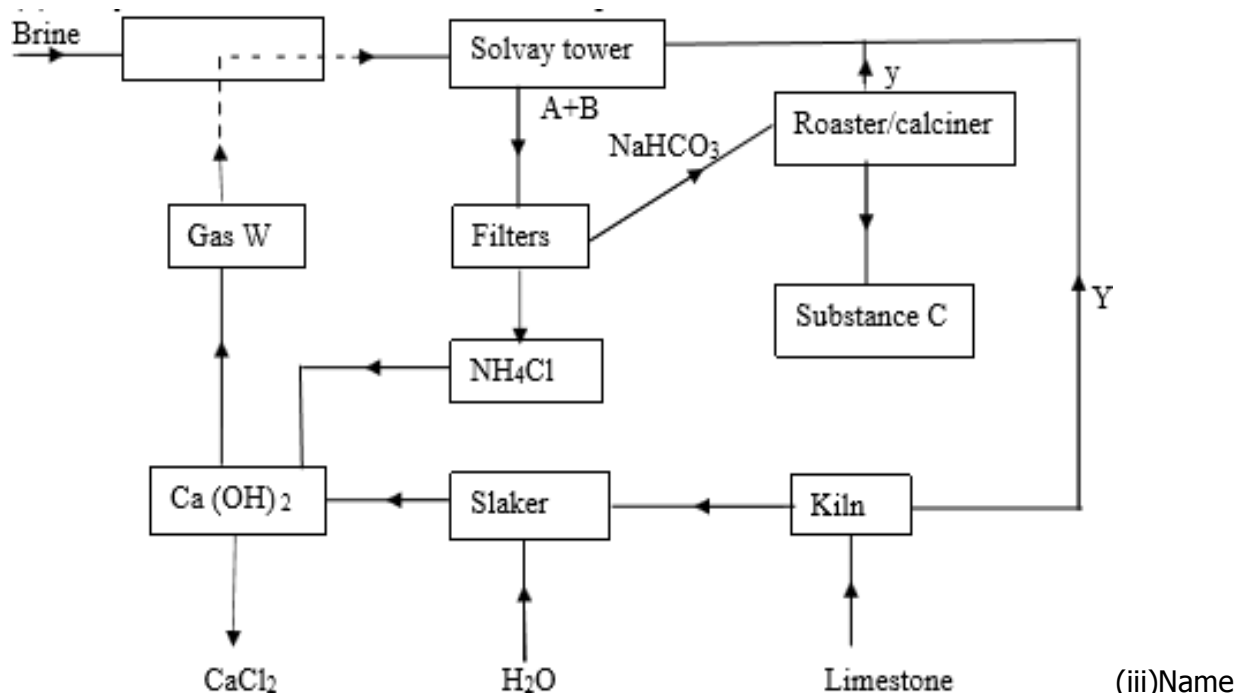
iii) Identify gas W (1mark)

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c)(i) Name the main raw material used in the Solvay process. (1mark)

.....

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



the substance:

i) Gas A... (½mark)

ii) Y... (½mark)

d) Write the general equation taking place in the Solvay tower to produce substance A and B. (2marks)

e) State the function of baffle plates in the Solvay tower. (1mark)

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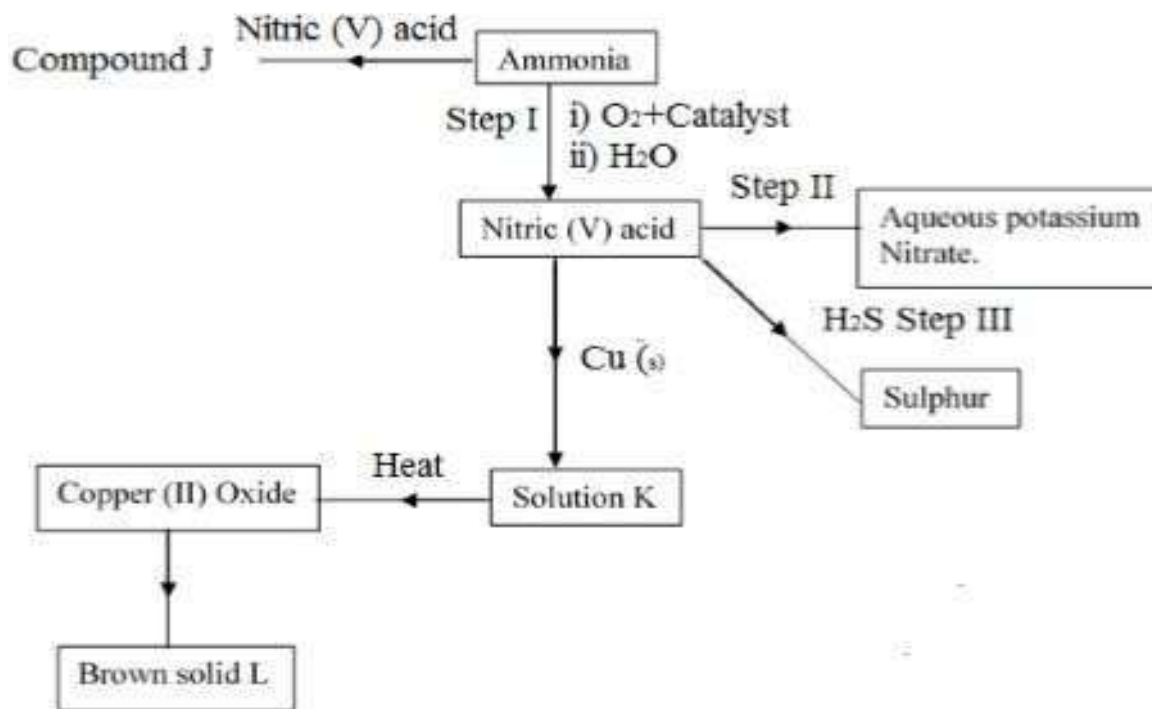
f) Explain why the same method would not be used to manufacture potassium hydrogen carbonate. (2marks)

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g) State one industrial use of substance C. (1mark)

.....

7. The scheme below shows various reactions starting with ammonia. Study it answer the questions that follow:



a)(i) Name the catalytic use in step 1. (1mark)

.....

(ii) Write the equation for catalytic oxidation of ammonia gas in step I. (1mark)

.....

(iii) Explain how the reaction in step II that takes place. (2marks)

.....

(iv) Name a chemical substances that can be added to solution K to form solid L. (1mark)

.....

(v)a) Write the chemical formula of compound J. (1mark)

.....

b) Calculate the percentage of nitrogen by mass that is present in compound. (2marks)

c) Ammonia can be used to manufacture ammonium sulphate ($(NH_4)_2SO_4$)

phosphate $(NH_4)_3PO_4$

and ammonium

fertilizer. Give two advantages that ammonium phosphate has over ammonium sulphate. (2marks)

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ii) Give one advantage of using artificial fertilizer. (1mark)

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