Name: ……. **Index Number: ……**

Class: ……

233/2
CHEMISTRY
PAPER 2
THEORY
TIME – 2HRS

SUPA JET

Mock Examination
July, 2013

INSTRUCTIONS TO THE CANDIDATES:-

- Write your **Name** and **Index number** in the spaces provided.
- Answer ***all*** the questions in the spaces provided.
- Mathematical tables and electronic calculators may be used
- All working **MUST** be clearly shown where necessary.

For Examiners Use Only

Question	Maximum score	Candidate's score
1	10	
2	12	
3	12	
4	11	
5	13	
6	11	
7	11	
Total	**80**	

1. The grid below shows part of the periodic table. Use it to answer the questions that follow. The letters do not represent actual symbols. (10 marks)

					S	U	V
P	R				T	X	W
Q							

(a) Which of the elements has the highest atomic radius? Explain. (2 marks)

……

……

……

(b) Identify the most reactive non-metal. Explain. (2 marks)

……

……

……

(c) Compare the atomic radius of P and R. (1 mark)

……

(d) Give the formula of one stable ion with an electron arrangement of 2.8 which is:

(i) Negativity charged divalent ion. (2mks)

……

(ii) Positively charged monovalent.

……

(e) Given that the mass number of W is 40. Write down the composition of its nucleus. (1 mark)

……

……

(f) Write the formula of the compounds formed between.

(i) Element R and X. (1 mark)

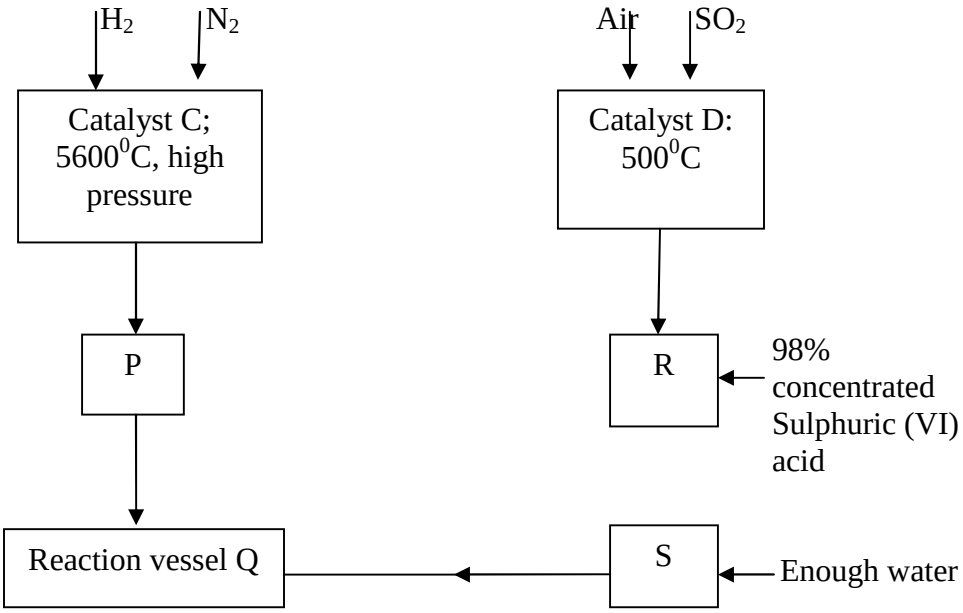
……

(ii) Give one property of the structure formed when R and X bond. (1 mark)

……

……

2. The flow chart below shows how a fertilizer can be manufactured. Use it to answer the questions that follow.



I. (a) Name catalyst C and catalyst D. (1 mark)

……

……

(b) Give the identifies of substance: (1 ½ marks)

P:……

Q:……

R:……

(c) Give the identity of the fertilizer formed. (½ mark)

……

(d) Write an equation for the reaction at vessel Q. (1 mark)

……

(e) Explain why substance R is absorbed in 98% sulphuric (VI) acid first betone adding water. (1 mark)

……

……

(f) Name the methods by which pollution is controlled in contact process (1 mark)

……

(g) Which industry can be set next to the plant (1mark)

……

II. (a) When hydrogen sulphide gas was bubbled into an aqueous solution of Iron (III) chloride, a yellow precipitate was deposited.

(i) State another observation that was made. (1 mark)

……

(ii) Write an equation for the reaction that took place. (1 mark)

……

……

III. (a) Explain why old newspapers slowly turn brownish when exposed to air and sunlight. (1 mark)

……

……

(b) Describe a chemical test that can be used to distinguish sodium sulphate and sodium sulphite. (2 marks)

……

……..

……

3. (a) What is solubility as used in chemistry? (1 mark)

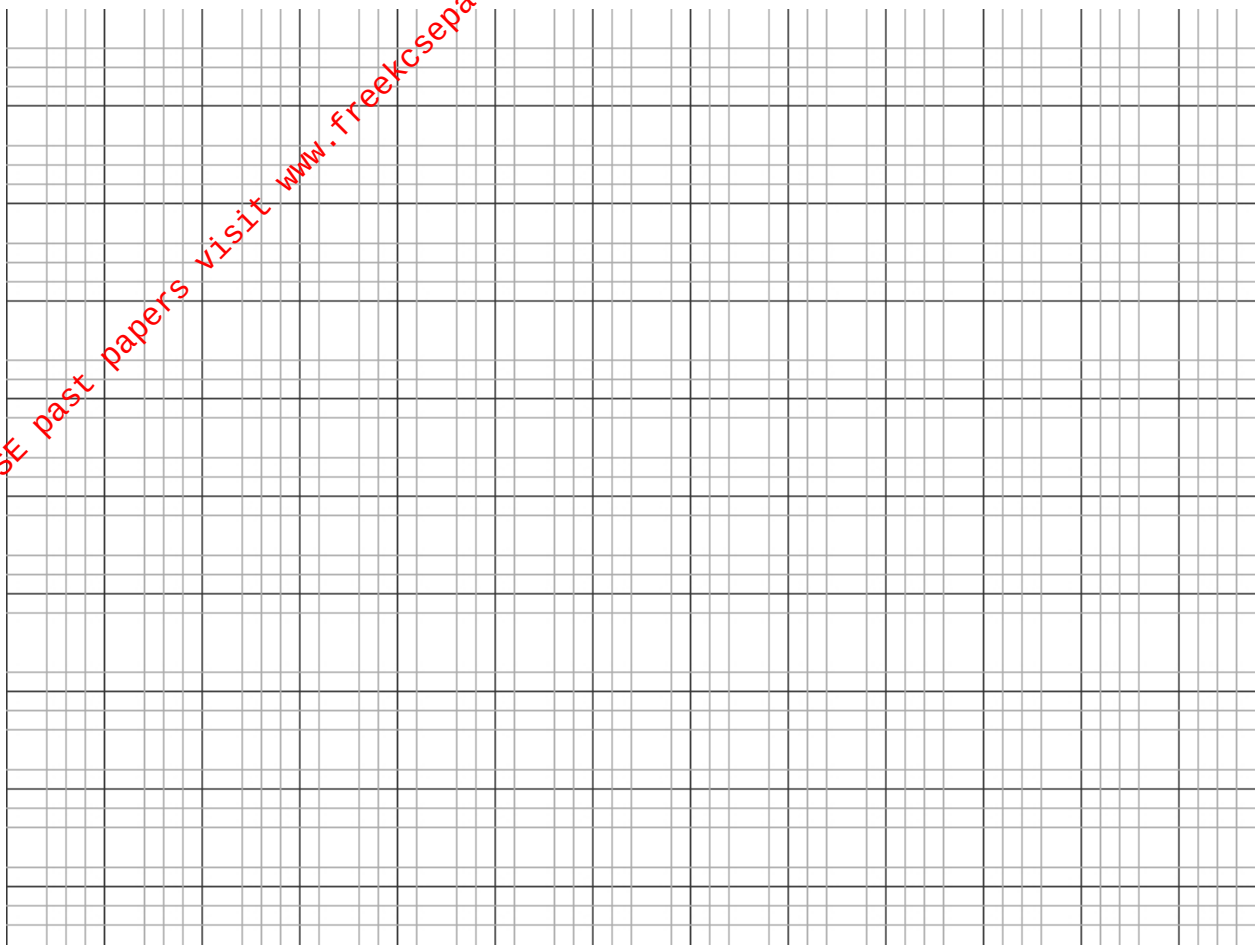
……..

……

……

(b) By using the same axes, plot graphs of solubility of substances X and Y against temperature from the data below. (5 marks)

Temp (^{0}c)	15	25	35	45	55	65	75
Sol. of X (g/100 gH_2O)	26	38	53	72	98	124	155
Sol of Y (g/100 gH_2O)	35.8	36.2	36.6	37	37.4	38	38



(c) From the graph, answer the following question:

(i) At what temperature are the solubilities of X and Y the same? (1 mark)

……..

(ii) By how many grams of solute does solubility of substance Y exceed that of substance Y at 50^0C? (1 mark)

……..

……

……

(d) Given a mixture of equal masses, 80g each, of X and Y, how would you obtain some pure substance Y and how much? (2 marks)

……..

……

……

……

(e) 40g of X solution saturated at 80^0C are cooled to 15^0C. What mass of solid will separate out? (1 mark)

……..

……..

4. Excess marble chips ($CaCO_3$) was put in a beaker containing $100cm^3$ of dil. Hcl. The beaker was then placed on a balance and the total loss in mass recorded after every 2 minutes as shown in the table below.

Time (min)	0	2	4	6	8	10
Total loss is mass (g)	0	1.8	2.45	2.95	3.2	3.3

(a) Why was there loss in mass? (1 mark)

……..

(b) Calculate the average rate of loss in mass between: (2mks)

(i) 0 and 2 minutes.

……..

……..

(ii) 6 and 8 minutes.

……..

……..

(iii) Explain the difference in the average rates of reaction in (i) and (ii) above(1 mark)

……..

……..

(c) Write the equation for the reaction that takes place in the beaker. (1 mark)

……..

……..

(d) State two ways in which the rate of the reaction above could be increased. (2 marks)

……..

……..

(e) The solution in the beaker was evaporated to dryness. Explain what would happen if the open beaker and its contents were left in the laboratory overnight. (2 marks)

……..

……..

(f) Finally some water was added to the content of the beaker. When aqueous sodium sulphate was added to the content of the beaker, a white ppt was found.

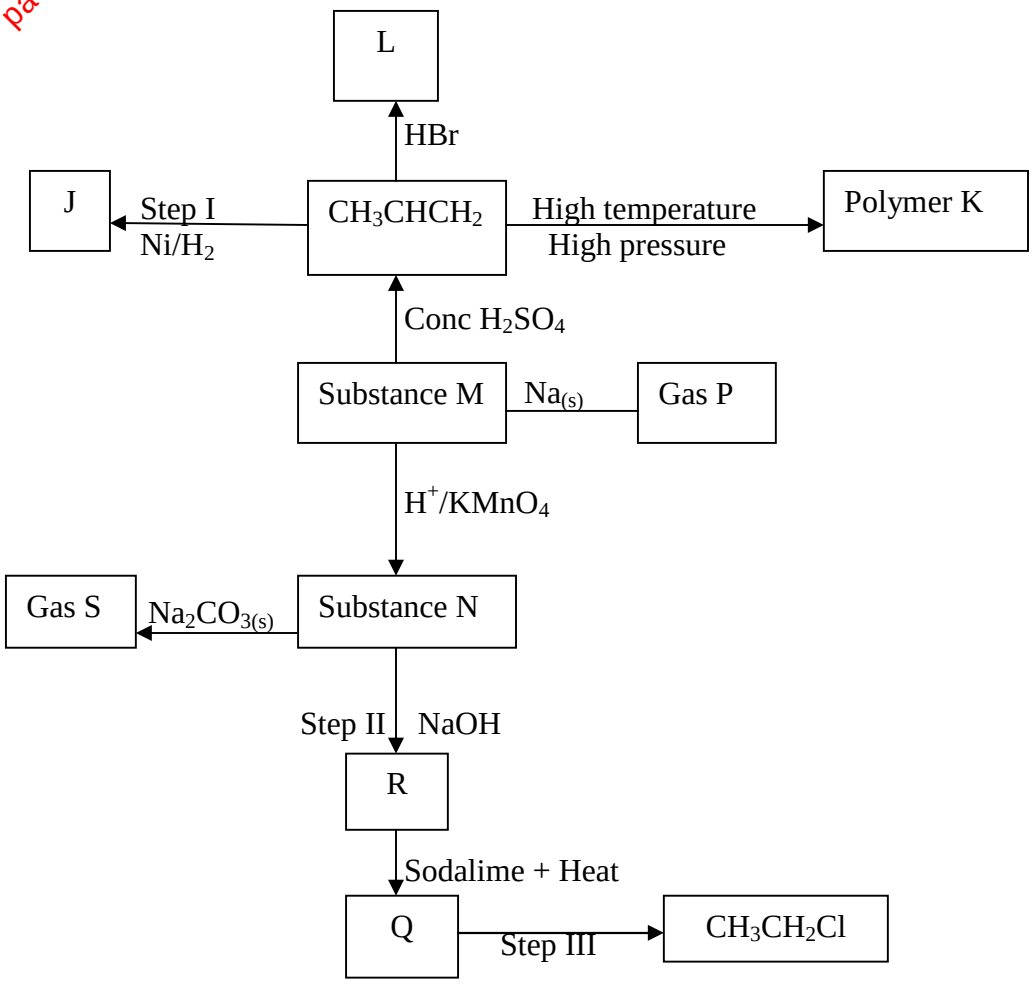
(i) Identify the white ppt. (1 mark)

……..

(ii) State one use of the substance identities in f (i) above. (1 mark)

……..

5. Use the flow chart below to answer the questions that follow.



(a) Name the following: (1 ½ marks)

(i) Gas S……..

(ii) Gas P …….

(iii) Gas J ……..

(b) Name the process involved in the following step. (1 ½ marks)

(i) Step I……..

(ii) Step II ……

(iii) Step III ……..

(c) Draw two possible structure of compound L. (2 marks)

(d) Write equation for;

(i) The complete combustion of substance M (1 mark)

……..

……..

(ii) Formation of substance R. (1 mark)

……

……..

(e) Name the condition and reagent in step III. (2 marks)

Reagent:……..……..

Condition:……..

(f) Draw the structure formula of compound N. (1 mark)

(g) Chlorine is used to prepare vinylchloride (chloroethene), ($CH_2 = CHCl$).

(i) State why chloroethene, undergoes addition polymization. (1 mark)

……..

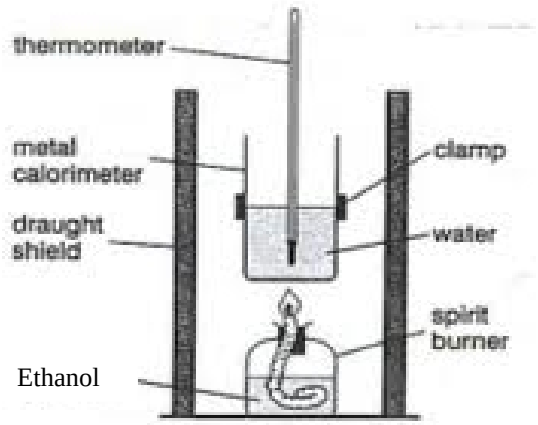
(ii) Name the polymer formed (1 mark)

……..

(iii) Complete the following equation to show the two monomers combined during the polymerization. (1mark)

$CH_2 = CHCl + CH_2 = CHCl \longrightarrow$

6. The diagram below shows the setup of the apparatus by a student to determine the enthalpy change of combustion of ethanol. The heat produced by burning fuel warms known mass of water.



Results

Volume of water in the beaker = 500 cm^3

Initial temperature of water = 12^0C

Final temperature of water = 31.5^0C

Mass of ethanol burnt = 1.50g

Density of water = 1 g/cm^3

Specific heat capacity = 4.2 $jg^{-1}K^{-1}$

(a) Define standard heat of combustion. (1 mark)

……

……...

.

(b) Calculate the heat required to raise the temperature of the water from 12^0C to 31.5^0C. (2 marks)

……..

……..

……..

(c) Find the molar enthalpy of combustion of ethanol. (2 marks)

……..

……..

……..

(d) An accurate value for ΔH_c^{θ} of ethanol is -1368 $kJmol^{-1}$. State two sources of errors for the low figure obtained. (2 marks)

……

……

……

(e) Draw an energy level diagram for the combustion of ethanol. (2 marks)

(f) Calculate the heating value of ethanol. (C = 12, H = 1, O = 16 (2 marks)

……

……

……

7. The extraction of copper from copper pyrites is done in three main stages before pure copper is obtained.
   (i) The concentration of the ore to remove impurities.
   (ii) Roasting of the ore and reduction.
   (iii) Purification of blister copper.
   (a) Name the methods used to purify the ore. (1 mark)

……

……

(b) One of the equation in stage (ii) to form blister copper is

(c)

$$CU_2S + 2CU_2O_{(s)} \longrightarrow CU_{(s)} + SO_{2(g)}$$

I. Name the reducing agent. (1 mark)

……

II. Explain why this type of Copper is called “blister copper”. (1 mark)

……..

(d) One of the uses of copper is to make electrical conductors and it must be 99.99% pure.

I. Draw a diagram to illustrate how blister copper is purified. (2 marks)

II. State one other uses of copper. (1 mark)

……..

(e) (i) State two properties of aluminium that makes if possible to be used in making overhead electric cables. (2 marks)

……..

……..

(ii) A typical electrolysis cell uses a current of 40,000 amperes. Calculate the mass in kgs of Aluminium produced in ten hours. (IF = 96500C, Al = 27) (3 marks)

……..

……..

……..

……..