NAME……ADM NO:…….

STUNDENT'S SIGNATURE……DATE……..

SCHOOL……

233/2 FORM THREE
CHEMISTRY
THEORY
Paper 2
END YEAR 2017 EXAMS.
Time: 2 Hrs **FORM THREE CHEMISTRY 233/2**

INSTRUCTIONS TO CANDIDATES

- Write your Name and Index No. in the spaces provided.
- Sign and write the date of examination in the spaces provided.
- Answer ALL the questions in the spaces provided.
- All working must be clearly shown where necessary.
- Mathematical tables and silent electronic calculators may be used.

EXAMINERS USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1	09	
2	12	
3	08	
4	14	
5	13	
6	10	
7	14	
Total	80	

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

1. The grid below shows part of the periodic table. Study it and answer the questions that follows.

								Q
				S		R	K	
A	J		Y	U		P	L	
W							M	B

a) Give the name of the elements represented by the shaded region. (1 mark)

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b) Identify an element which form ion with +2 charge. (1 mark)

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c) Which non-metal is most reactive ? (1 mark)

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d) Element V is in the second period and group V of the periodic table. Place it on the above grid of the periodic table. (1 mark)

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e) State and explain how the atomic radius of U and J compare. (2marks)

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f) Write a chemical equation for the reaction between the oxide of A and water. (1 mark)

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g) Explain how the electrical conductivity of A and Y compare. (2 marks)

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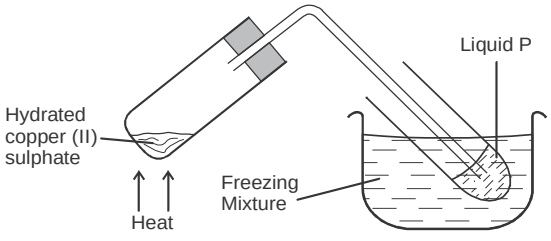
2. a) The diagram below shows a set up used to heat hydrated copper (II) sulphate crystals.



i) State the colour change that occurred in the copper (II) sulphate crystals when heated. (1 mark)

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ii) Identify liquid P (1 mark)

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iii) Describe the chemical test that could be used to confirm liquid P. (3 marks)

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b) Liquid P was heated for 8 minutes in a beaker. The results are given in the table below.

Time (minutes)	0	1	2	3	4	5	6	7	8
Temperature (°C)	-2	0	0	23.0	46.5	70	95	95	96

i) On the grid provided, plot a graph of temperature of liquid P (y-axis) against time (x-axis) (3 marks)

ii) On the graph, show the freezing point and boiling point of P. (2 marks)

iii) What is the effect of adding sodium chloride to the boiling point of liquid P ? Explain. (2 mark)

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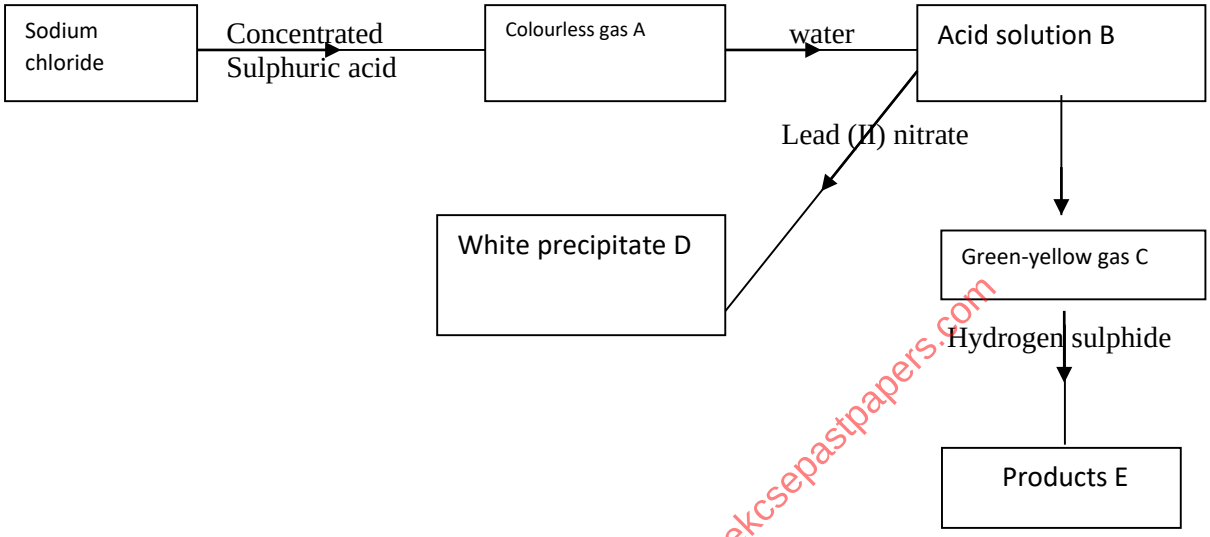
3.The diagram below summarizes the results of a series of chemical reaction.



(i) Name gas A …….. (1 mark)

(ii) State how gas A can be tested. (1 mark)

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(iii) Write the chemical equation for the formation of gas A. (1 mark)

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(iv) What effect would solution B have on phenolphthalein indicator? (1 mark)

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(v) Name reagent used to convert B to C (1 mark)

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(vi) Identify

(a) White precipitate D (1 mark)

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(b) Products E (1 mark)

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(vii) Write ionic equation for the formation of white precipitate D. (1 mark)

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4. (a) Name each of the processes described below which takes place when salts are exposed to air for sometime.

(i) Anhydrous copper (II) sulphate becomes wet. (1 mark)

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(ii) Common table salt forms an aqueous solution (1 mark)

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(iii) Fresh crystals of sodium carbonate $Na_2CO_3.10H_20$ becomes covered with white powder of formula $Na_2CO_3.H_2O$ (2marks)

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(b) Write the formula of the complex ion formed in each of the reactions described below.

(i) Zinc metal dissolves in hydrochloric acid (1mark)

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(ii) Copper hydroxide dissolves in excess ammonia solution (1mark)

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(c) A hydrated salt has the following composition by mass. Iron 20.2%, Oxygen 23%, Sulphur 11.5% and water 45.3%. Its relative formula mass is 278.

(i) Determine the formula of the hydrated salt. (3marks)
(Fe = 56, S = 32, O = 16, H = 1)

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(ii) 6.9g of the hydrated salt was dissolved in distilled water and the total volume made to $250cm^3$ of solution. Calculate the concentration of the salt solution in moles per litre. (2marks)

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(d) Describe how a solid sample of lead (II) chloride can be prepared using the following reagents: - dilute nitric acid, dilute hydrochloric acid and lead carbonate. (3 marks)

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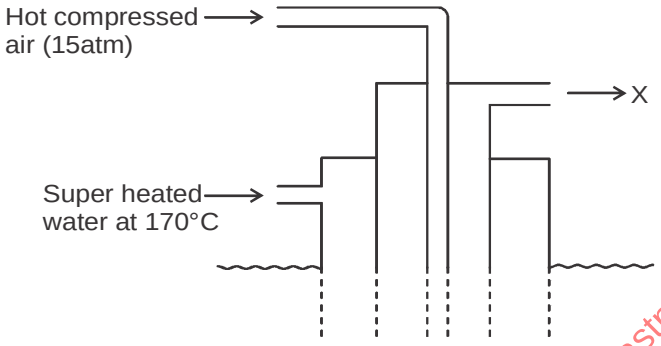
5. a) The diagram below shows the Frasch process used for extraction of sulphur. Use it to answer the questions that follow.



i) Identify X ..... (1 mark)

ii) Why is it necessary to use superheated water in this process. (1 mark)

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iii) State two physical properties of sulphur that makes it possible for it to be extracted by this method. (2 marks)

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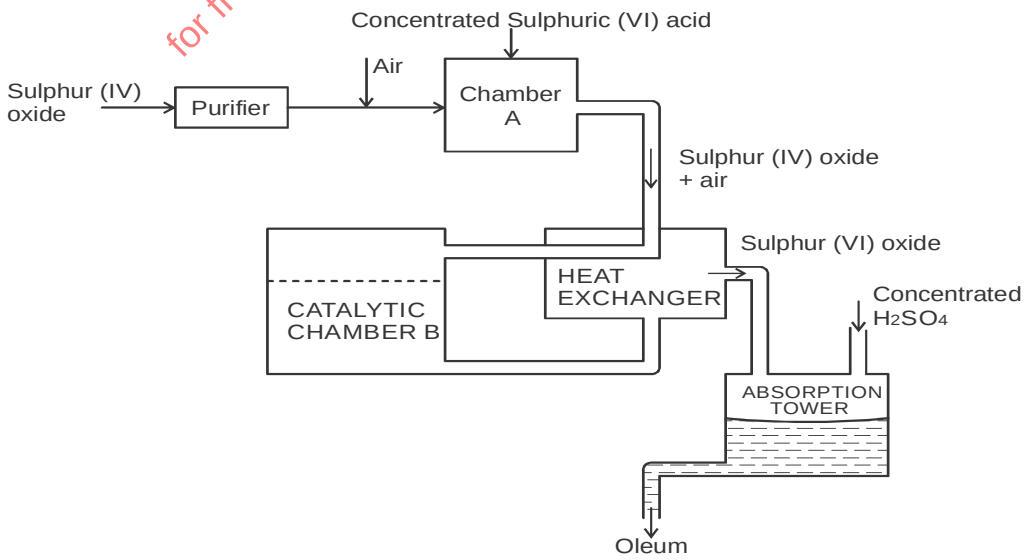
b) The diagram below shows part of the processes in the manufacture of sulphuric (VI) acid. Study it and answer the questions that follow.



i)Write an equation for the formation of sulphur (IV) oxide from sulphur. (1 mark)

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ii)What is the role of concentrated sulphuric (VI) acid in chamber A. (1 mark)

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iii)Name two catalyst that can be used in the catalytic chamber B. (2 marks)

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iv) State two roles of the heat exchanger. (2 marks)

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c) Explain one way in which sulphur (IV) oxide is a pollutant. (1 mark)

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d) What observation will be made when a few drops of concentrated sulphuric (VI) acid are added to crystals of sugar? Explain your answer. (2 marks)

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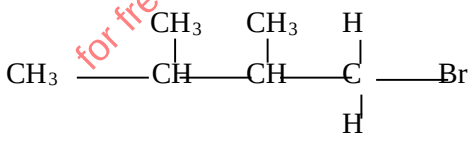
6.(a) Give the systematic names of the compounds having the structural formula given below.

(2 mks)

(i)



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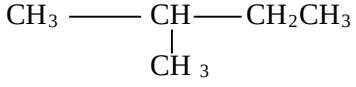
(ii)



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(b) Apart from its normal(straight chain) structure, draw two other isomers of Pentane (2 mks)

(i) ……
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(ii) ……
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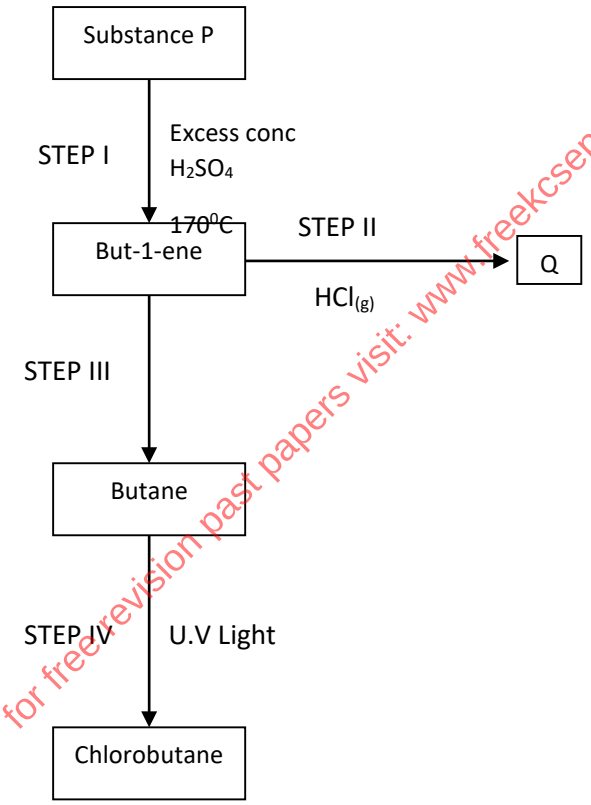
(c) Use the flow chart below to answer questions that follow



(i) Identify substances (2 mks)

I. P ……

II. Q ……

(ii) Name the reagent and conditions necessary for Step III to occur (2 mks)

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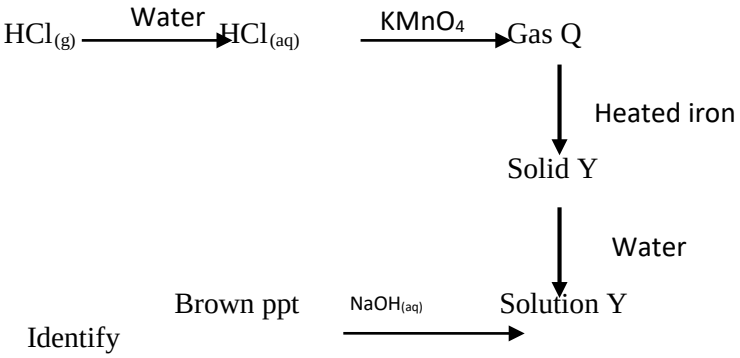
(iii) Name the type of reaction taking place in step I and IV. (2 mks)

Step I ……

Step IV ……..

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



(a) Identify

(i) Solid Y (1 mark)

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(ii) Gas Q (1 mark)

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(b) Write an equation for the formation of the precipitate (1 mark)

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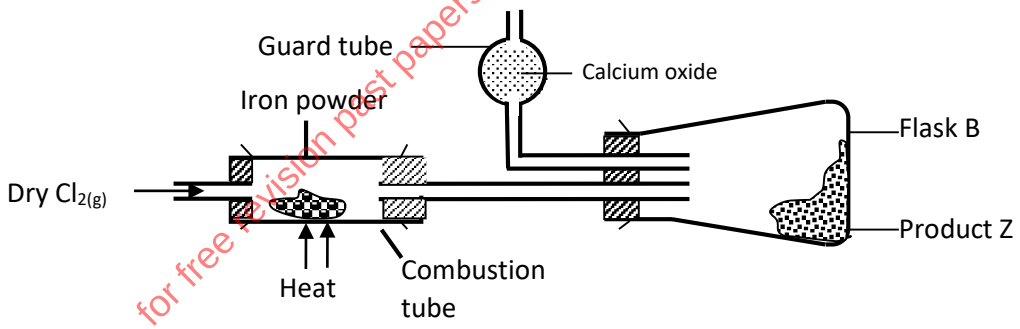
(ii) The set – up below was used to react dry chlorine gas with iron powder. The product Z was collected in flask B.



(a) Identify product Z. (1 mark)

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(b) What property of product Z makes it possible to be collected as shown in the diagram (1 mark)

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(c) Explain why calcium oxide would be preferred to calcium (II) chloride in the guard tube. (1 mark)

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(d) The total mass of product Z formed was found to be 0.5g. Calculate the volume of chlorine gas that reacted with iron. (Fe = 56, Cl = 35.5, M.G.V at 298k = 24000cm^3) (3 marks)

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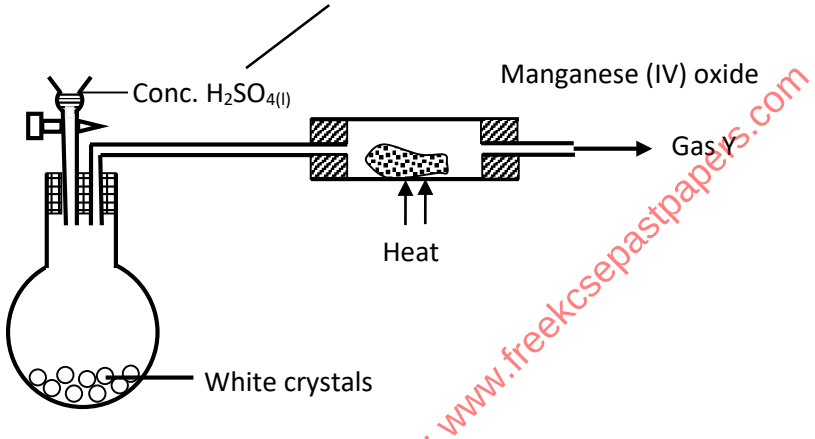
(iii) Concentrated sulphuric (VI) acid was added to white crystals as shown. The colourless gas P formed was passed over heated manganate (VI) oxide and a gas Y which bleached litmus paper was produced. The experiment was reacted using powdered metal 2 instead of manganese (IV) oxide. This time a gas R which burned inair with a blue flame was formed.



(a) (i) Name gases

Y……(1 mark)

R……(1 mark)

(ii) What type of chemical reaction occurred between gas P and manganese (IV) oxide (1 mark)

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(i) State two observations made when acidified potassium manganate (VII) solution is reacted with hydrogen sulphide. (2marks)

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This is the last printed page.