

Adm No..... Name..... Class.....

**FORM THREE MID TERM EXAM 3RD TERM 2015**

**Time 2hrs**

**Answer all the questions in the spaces provided**

1. (a) The grid given 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)*

<b>A</b>				<b>E</b>			<b>H</b>	
	<b>C</b>		<b>D</b>		<b>G</b>			<b>K</b>
<b>B</b>				<b>F</b>			<b>J</b>	

- (i) select the element which is

I. Most reactive non metal

(1mks)

II. Most reactive metal

(1mks)

- (ii) How does reactivity of A compare with that of B. Explain

(1mk)

- (iii) Explain why the atomic radius of K is smaller than that of G

(1mk)

- (iv) An element W forms ion  $W^{2-}$ , if W is in period 3, indicate the position of W on the grid.

(1mk)

(v) Write the formula of the compound formed when C reacts with H (1mk)

(b) Study the information in the table below and answer the questions that follow

Substance	M.P(°C)	B.P(°C)	Electrical conductivity		Solubility in water
			In solid state	In molten state	
P	714	1418	Does not conduct	Conducts	Very soluble
Q	-95	56	Does not conduct	Conducts	Insoluble
R	1083	2580	Conducts	Conducts	Insoluble
S	-101	-34	Does not conduct	Does not conduct	Very soluble
U	-23	77	Does not conduct	Does not conduct	Soluble
V	-219	-183	Does not conduct	does not conduct	Insoluble
W	1560	2600	Does not conduct	does not conduct	Insoluble

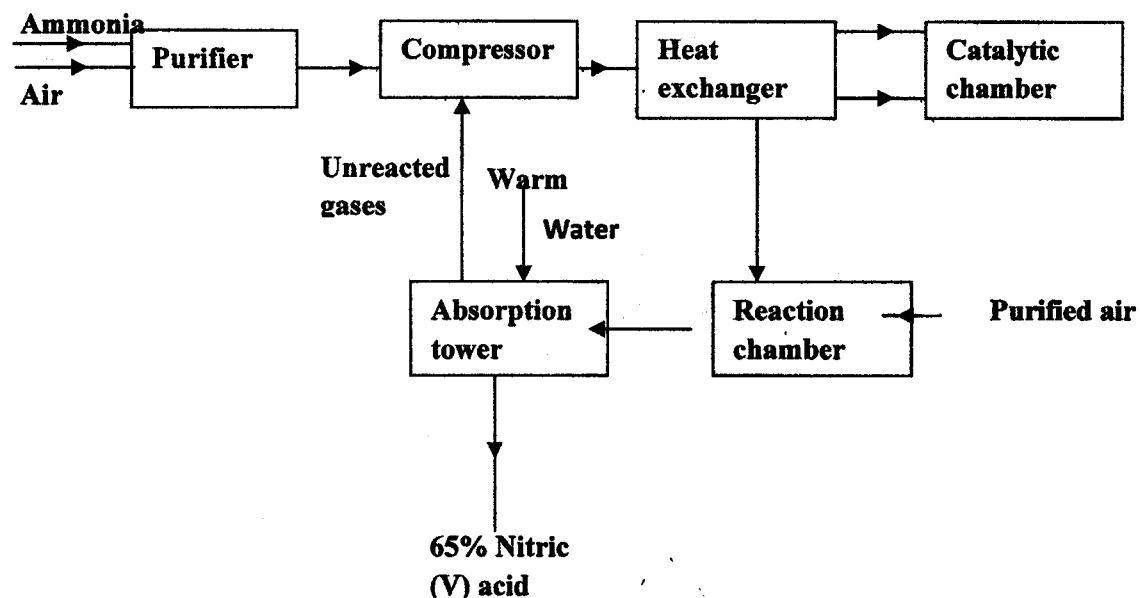
(i) Name two substances which are gaseous at room temperature (1mk)

(ii) Select the substance that could be dissolved in water and be separated from the solution by Fractional distillation (1mk)

(iii) Which substance could be an electrolyte? (1mk)

(iv) Element U has low M.P and B.P whereas W has high M.P and B.P. Explain (2mks)

2. (a) The diagram below shows part of the processes in the manufacture of Nitric (V) acid. Study it and answer the questions that follow.



- (i) What is the work of the purifier (1mk)
- (ii) State the pressure used in the compressor (1mk)
- (iii) State two functions of the heat exchanger (1mk)
- (iv) Name the catalyst used in the catalytic chamber (1mk)
- (v) Write equation of the reaction that takes place in:
- (I) Catalytic chamber (1mk)
- (II) Reaction chamber (1mk)
- (III) Absorption tower (1mk)

(c) Name two commercial uses of Nitric (V) acid

(2mks)

3. The apparatus below was used for preparation of hydrogen sulphide gas in the laboratory.



a) Name

a. Substance V \_\_\_\_\_ (1mark)

b. Solid W \_\_\_\_\_ (1mark)

c. Solid X \_\_\_\_\_ (1mark)

a) Write an equation for the preparation of hydrogen sulphide. (1 mark)

b) What property of the gas enables it to be collected by the method shown in the diagram? (1 mark)

c) What is the purpose of the water in the second flask? (1 mark)

d) What precaution should be taken when preparing the gas? (1 mark)

a) Explain the observation made when dry hydrogen sulphide is exposed on to wet lead (ii) acetate paper. (1 mark)

b) State the observation that would be made when hydrogen sulphide gas is bubbled through acidified potassium dichromate (vi) solution. (1 mark)

c) Explain why it is not advisable to dispose off hydrogen sulphide gas by burning. (1 mark)

4. In a certain volumetric analysis experiment, a student was provided by the following materials

a) Solution M which is 0.2 M sodium hydroxide

b) Solution N which is a Hydrochloric acid

The student was required to **standardize solution N using solution M**

**Procedure**

The student titrated  $25\text{cm}^3$  portions of sodium hydroxide (**solution M**) with hydrochloric acid (**solution N**) using phenolphthalein indicator, and recorded the results in table I below. She repeated the procedure two more times to complete the table.

Table	1	2	3
Final burette readings( $\text{cm}^3$ )	24.9		49.6
Initial burette readings( $\text{cm}^3$ )	0.0	0.0	
Volume of HCl used $\text{cm}^3$ ( solution N)		24.8	24.8

Complete the table by filling the missing values (3mks)

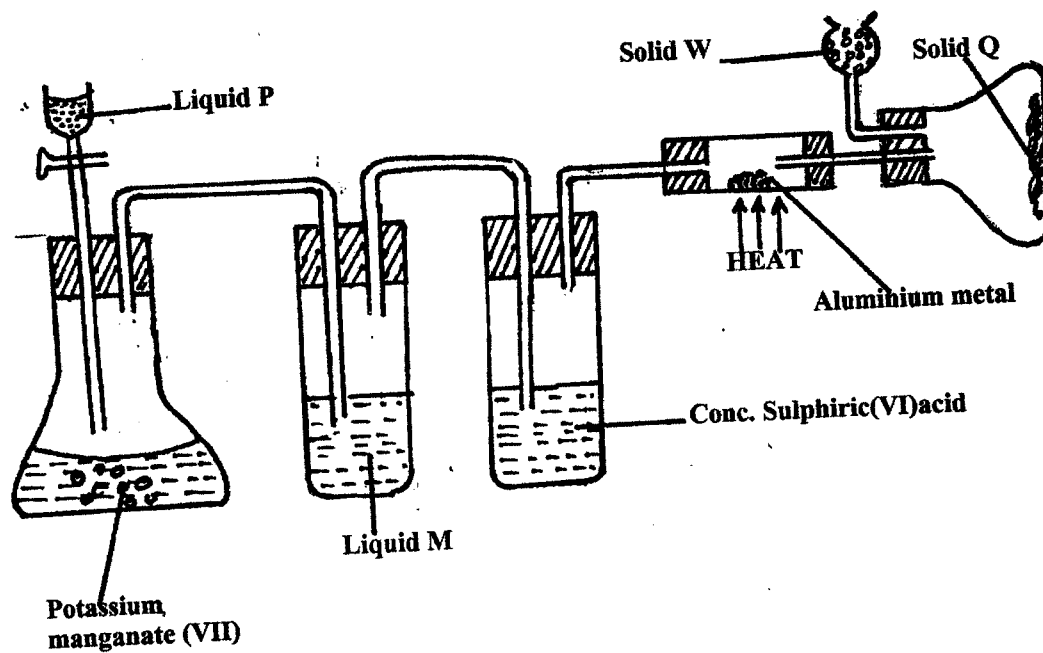
- a) What colour change took place in the conical flask given that solution M was placed in the conical flask? (1mk)
- b) What does the colour change you have stated in (a) above indicate. (1mk)
- c) i) Determine the average volume of solution N used. (1mk)
- ii) Calculate the number of moles of sodium hydroxide in  $25\text{cm}^3$  of solution M used. (2mks)

iii) write an equation for the reaction between sodium hydroxide and hydrochloric acid. (1mk)

iii) Calculate the number of moles of hydrochloric acid in the average volume of solution N used. (1mks)

iii) Calculate the concentration of hydrochloric acid (solution N) in moles per  $\text{dm}^3$  ( $\text{mol dm}^{-3}$  i.e. moles in  $1000\text{cm}^3$  of solution N) (1 mk)

(a) Study the diagram below and use it to answer the questions that follow.



(i) Name liquid:

P..... (1mk)

M..... (1mk)

(ii) What is the function of

I. concentrated sulphuric(VI) acid in the set-up? (1mk)

II. potassium manganate (VII) (1mk)



- (iii) Suggest one suitable reagents that can be used as solid W. (1mk)
- (iv) State the role of solid W in the set-up. (1mk)
- (v) Explain why solid Q collect further away from heated aluminium metal. (1mk)
- b) Two moles of aluminium atoms reacted completely with 6 moles of chlorine atoms to form a compound with molar mass of 267
- (i) Write the molecular formula of the compound formed. (1mk)
- (ii) Draw the structural formula of the compound formed. (1mks)

(NB. Al = 27; Cl = 35.5 )