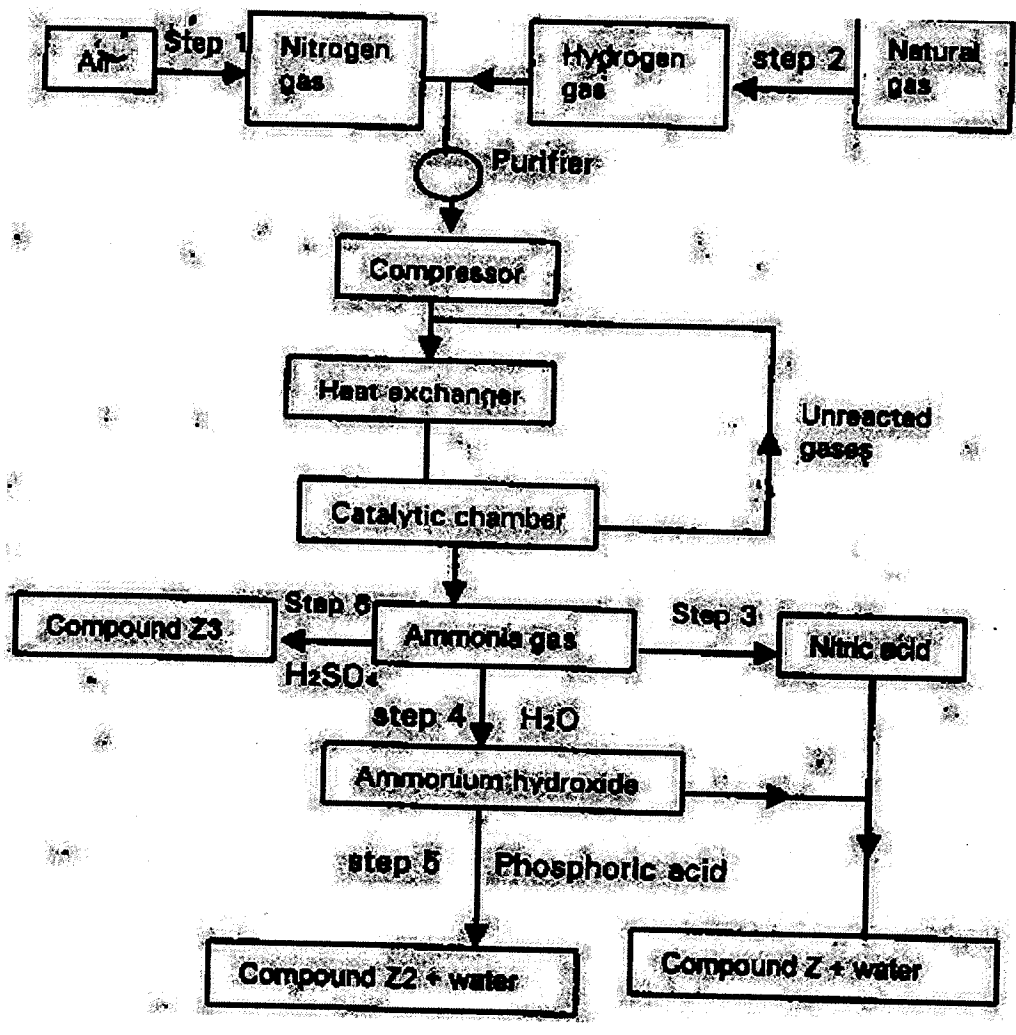


FORM THREE CHEMISTRY MID-TERM TEST

Term II 2015 time 1½ hrs

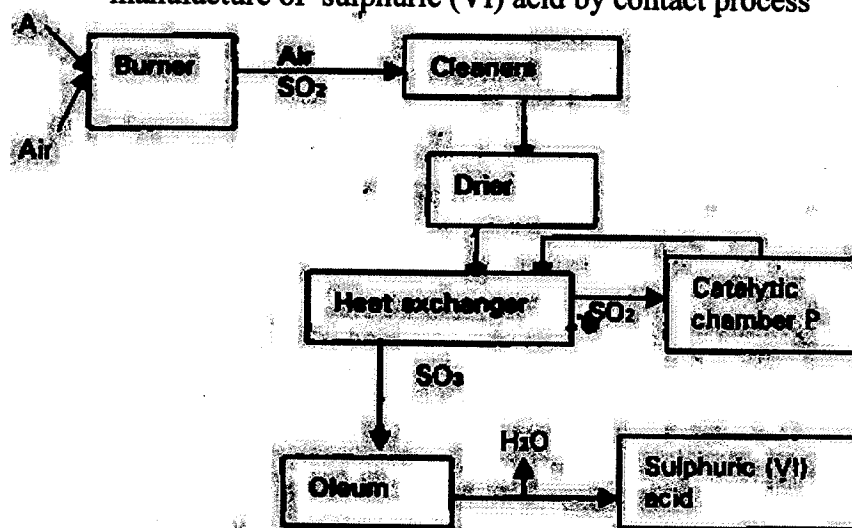
1. The flow chart below shows the industrialization of ammonia and the process used in the manufacture of some ammonium compounds. Study it and answer the questions that follow



- (a) Give the name of the
 - (i) Process in step 1 (1 mk)
 - (ii) Reaction that takes place in step 5 (1 mk)

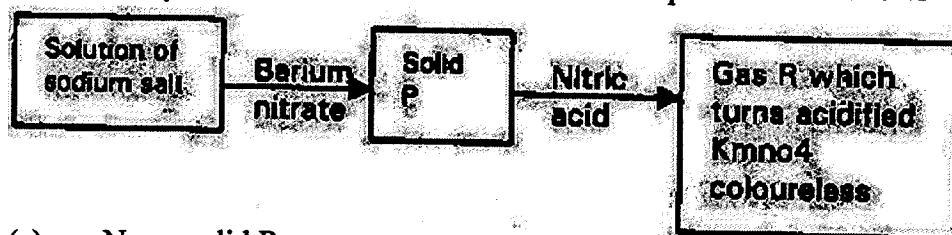
- (b) State one other source of hydrogen gas apart from natural gas (1 mk)
- (c) Explain why it is necessary to compress nitrogen and hydrogen in this process (2 mks)
- (d) Write an equation for the reaction which takes place in step 6 (1 mk)
- (e) Name the catalyst and reagents used in step 3 (2 mks)
- (f) Name compound Z_1 (1mk)
- (g) Give one commercial used of compound Z_2 (1 mk)

2. Below is a flow chart showing some of the major steps involved in the manufacture of sulphuric (VI) acid by contact process



- (a) Identify
- (i) Substance A (1 mk)
- (ii) Catalyst used in chamber "P" (1 mk)
- (b) Give the temperature and pressure used in the contact process. (2mks)
- (c) Write an equation for
- (i) The formation of Oleum (1 mk)
- (ii) Formation of sulphuric (IV) acid from Oleum (1mk)

3. Study the flow chart below and answer the question that follows



- (a) Name solid P (1 mk)
- (b) Give the formula of sodium salt (1 mk)
- (c) Name gas R (1 mk)
- (d) Write an equation for the reaction between Nitric acid and solid "P" (1 mk)

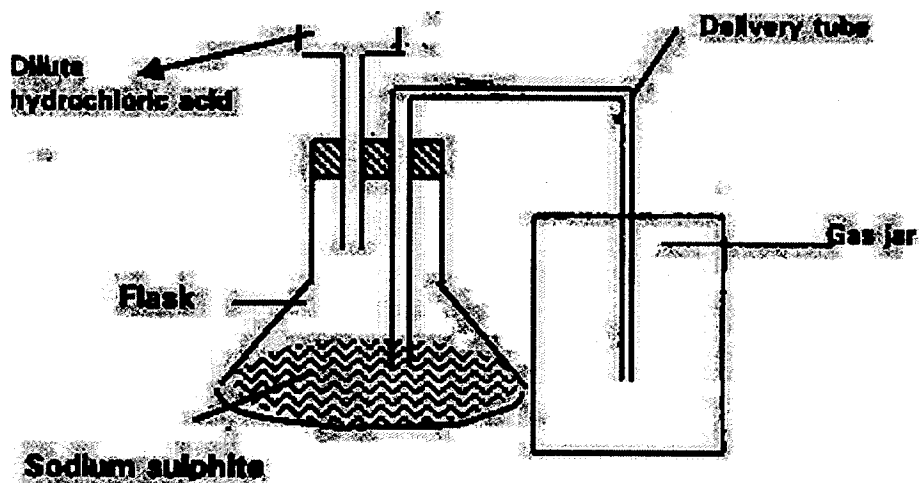
4. Sulphur is one of the elements that exhibits allotropy
What is allotropy (1 mk)

(ii) Give another element other than sulphur that shows allotropy (1 mk)

(iii) Name two allotropes of sulphur (2 mks)

(iv) State three major uses of sulphur (3mks)

5. Dilute hydrochloric acid and sodium sulphite were reacted as shown in the set up below



a) Identify two mistakes in the above set up. (2mks)

b) Name the gas that will produce in the flask if the mistakes are corrected. (1 mk)

c) Write an equation for the reaction that will take place in the flask. (1mk)

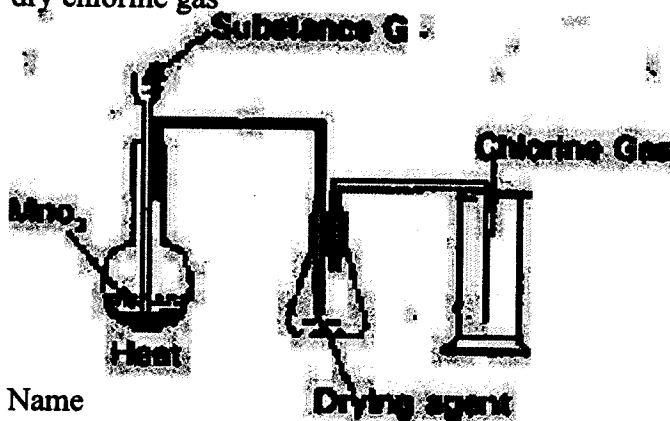
d) State the observations that are made when the gas collected is bubbled through
i) acidified potassium manganite (VII) solution. (1mk)

ii) Acidified potassium chromate (VI). (1mk)

iii) Aqueous solution of iron (III) chloride. (1mk)

e) If barium chloride solution is added to each of the solution obtained in d) (i), (ii) and (iii) above, a white precipitate is obtained. This precipitate does not dissolve in dilute nitric acid. Explain this observations. (2mks)

6. The diagram below shows a set up for the laboratory preparation and collection of dry chlorine gas



(a) Name
(i) Substance G (1 mk)

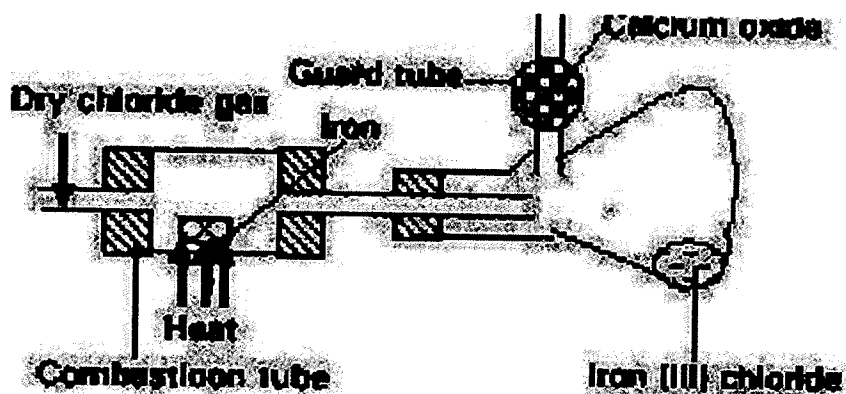
(ii) Suitable drying agent (1 mk)

(b) What property of chlorine make it possible for it to be collected as shown in the diagram (1 mk)

(c) Write an equation for the reaction that produced chlorine gas. (1mk)

(d) Name two other solids that can be used in the place of MnO_2 (2mks)

7. A student set out to prepare iron (III) chloride using apparatus shown in the diagram below



(a) Explain why it is necessary to pass chlorine gas through the apparatus before heating begins? (1 mk)

(ii) Calcium oxide would be preferred to calcium chloride in the guard tube (1 mk)

(iii) What property of iron (III) chloride makes it possible to be collected as shown in the diagram (1 mk)

(iv) When hydrogen sulphide gas passed through a solution of iron (III) chloride the following observation was made
The colour of the solution changed from red- brown to green and yellow solid was deposited. Explain these observations (2 mks)

(b) State and explain the observations that would be made if a moist blue-litmus paper was placed in a gas jar full of chlorine gas (2 mks)

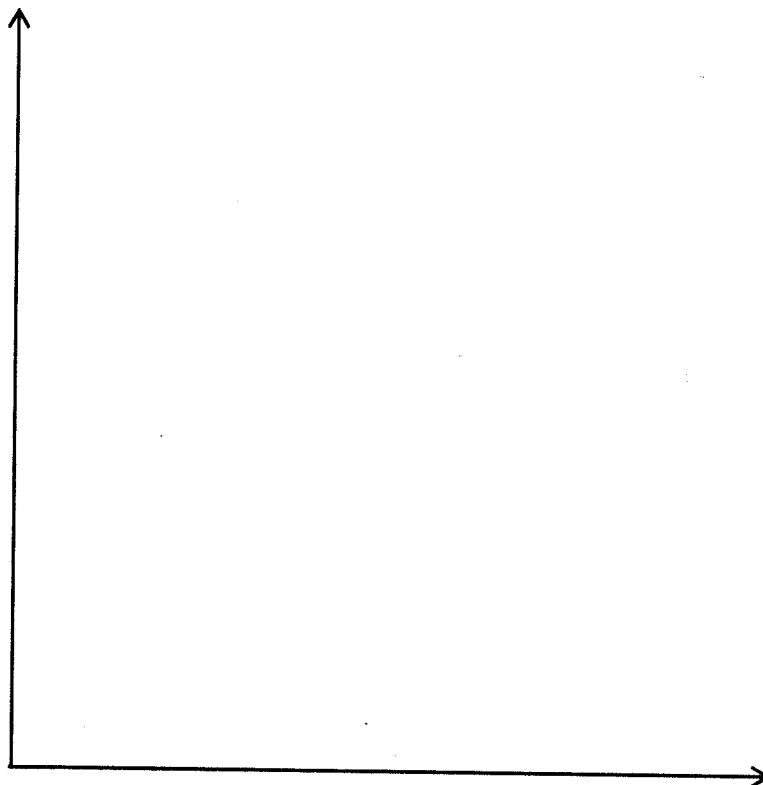
8. A fixed mass of gas has a volume of 250 cm^3 at a temperature of 270° and 750 mm Hg pressure. Calculate the volume the gas would occupy at 42°C and 750 mm pressure. (2mks)

9. A gas occupies a volume of 400 cm^3 at 500k and 2atmospheres. What will be the temperature of the gas when the volume and pressure of the gas is 100 cm^3 pressure of 0.5 atmospheres respectively? (2 mks)

10. A given volume of Ozone (O_3) diffused from a certain apparatus in 96 seconds. Calculate the time taken by equal volume of carbon (IV) oxide (CO_2) to diffuse under the same condition (O= 16) (C=12) (2 mks)

11. 88 cm^3 of gas K diffuse through a small hole in 40 seconds while 50 cm^3 of hydrogen gas diffuse through the same hole under the same conditions in 5 seconds. Calculate the RMM of the gas K (3 mks)

12. Sketch a demonstration graph showing variation of pressure of a gas against volume at a constant temperature. (2 mks)



13. A certain volume of CO_2 gas takes 200 seconds to diffuse through porous plug. How long would it take the same volume of HCl to diffuse under the same condition?
(NB $\text{H} = 1$; $\text{C} = 12$; $\text{Cl} = 35.5$) (2mks)

14. When 1.68 grams of iron reacted with steam, 2.32 grams of an oxide of iron was formed. Calculate

(a) Mass of oxygen in the iron oxide. (2mk)

(b) Empirical formula of the iron oxide. (3mks)

(NB $\text{Fe} = 56$, $\text{O} = 16$)

15. Calculate the relative formula mass of the following compounds.
(a) Sodium sulphate (Na_2SO_4) (2mk)

(b) Hydrated sodium carbonate ($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$) (2mk)