

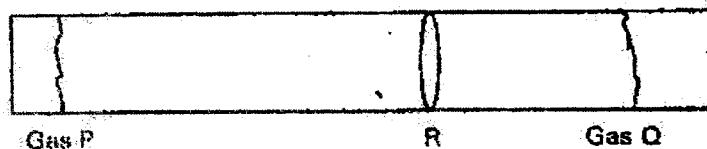
FORM 3 CHEMISTRY AUGUST HOLIDAY ASSIGNMENT

GAS LAW

1.

Explain why the volume of a gas increases when its temperature is increased at a constant pressure. (1 mk)

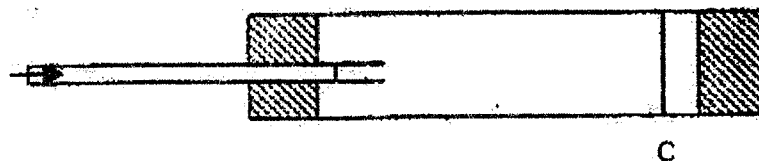
Cotton wool pads were soaked with concentrated solutions of gas "p" and gas "Q" the pads were then placed of the opposite ends of a long horizontal glass tube at the same time. The tube was then immediately corked at both ends as shown the diagram below.



After sometimes the gases were observed to meet at point "R" which of the two gases is dense? Explain your answer (2 mks)

2.

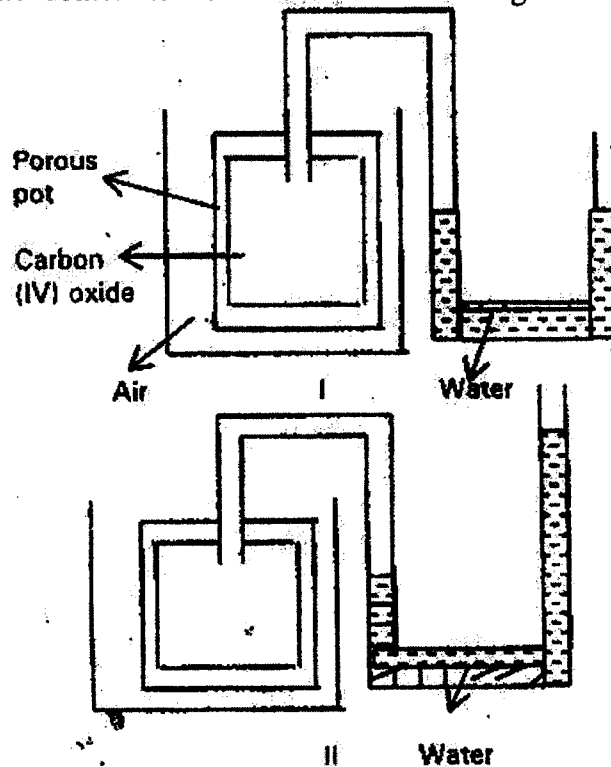
A mixture containing equal volumes of hydrogen and carbon (IV) oxide was introduced as shown below



Which gas would be detected at point "C" first? Explain (2 mks)

3.

In an experiment to study diffusion of gases a student set up the apparatus shown in the diagram I. After sometime the student noticed a change in the water level as shown in diagram II

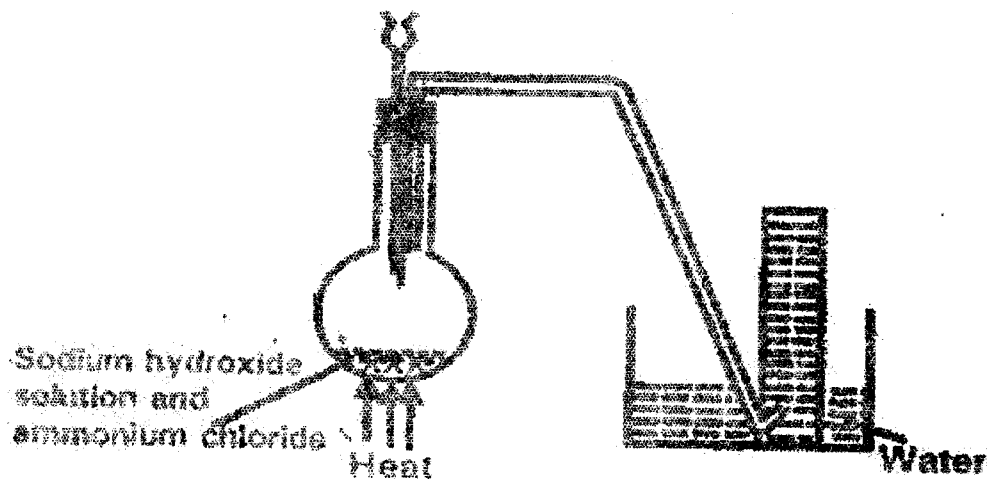


Give an explanation for the change in water level (2 mks)

4. 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 Hg pressure.
5. A gas occupies a volume of 400 cm^3 at 500 k and atmospheric pressure. What will be the temperature of the gas when the volume and pressure of the gas is 100 cm^3 and 0.5 atmospheric pressure respectively? (2 mks)
6. A sealed glass tube containing air at S.T.P was immersed in water at 100°C . Assuming there was no increase in volume of the glass tube due to expansion of the glass. Calculate the pressure of the air inside the tube.
Standard pressure = 760 mmHg ; Standard temperature = 273 K . (2 mks)
7. 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)
8. A few crystals of potassium manganate VII were carefully placed in a beaker at one spot. The beaker was left undisturbed for two hours. State and explain the observation that was made. (2 mks)

TOPIC 4
NITROGEN AND ITS COMPOUNDS

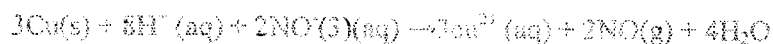
1. A student set-up apparatus to prepare and collect a sample of ammonia gas as shown in the diagram below. Study the set-up and answer the question that follows



Identify the two mistakes in the set-up represented by the diagram (2 mks)

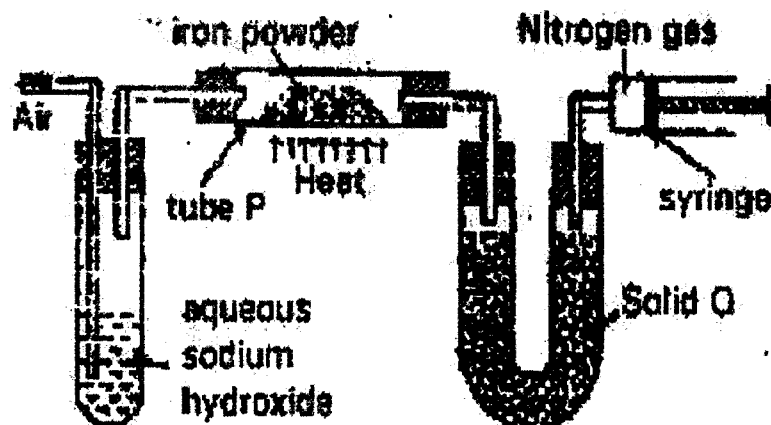
2. State two observations that would be made when solid lead (II) Nitrate is heated strongly. (2 mks)

3. Dilute nitric acid reacts with copper according to the equation



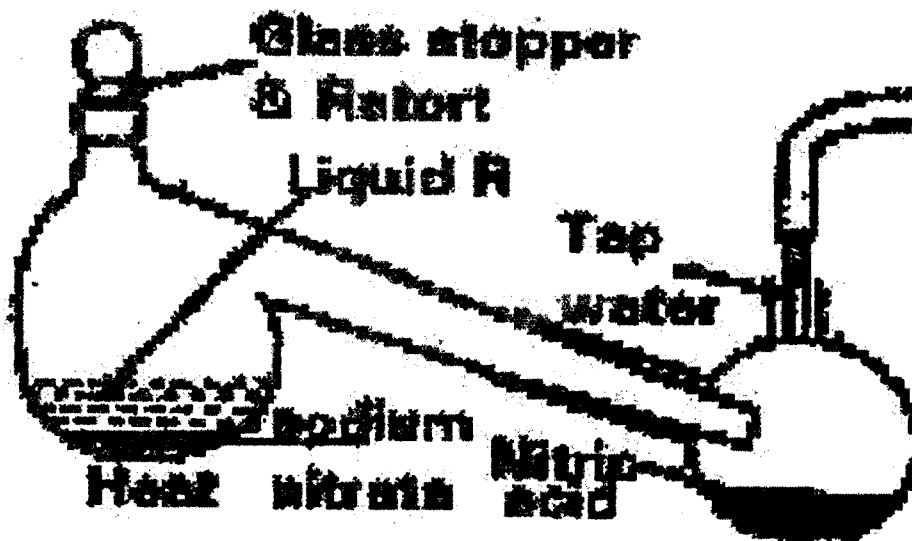
- (a) What is the oxidation number of nitrogen in NO_3^- and NO ? (2 mks)
- (b) With respect to nitrogen, explain whether the above reaction is an oxidation or reducing process. (1 mk)
4. On strong heating, sodium nitrate liberates oxygen gas, draw a labeled diagram of set up that could be used for heating sodium nitrate and collecting the oxygen gas liberated. (3 mks)

5. The diagram below represents a set up used to obtain nitrogen from air. Study and answer the questions that follow



- (i) Name solid Q (1 mk)
- (ii) What is the purpose of sodium hydroxide (1 mk)
- (iii) Write an equation for the reaction which took place in tube "P" (1 mk)
- (iv) Give the name of one impurity in the nitrogen gas obtained (1 mk)
- (v) Give a reason why liquid nitrogen is upside for storage of semen for artificial insemination (1 mk)

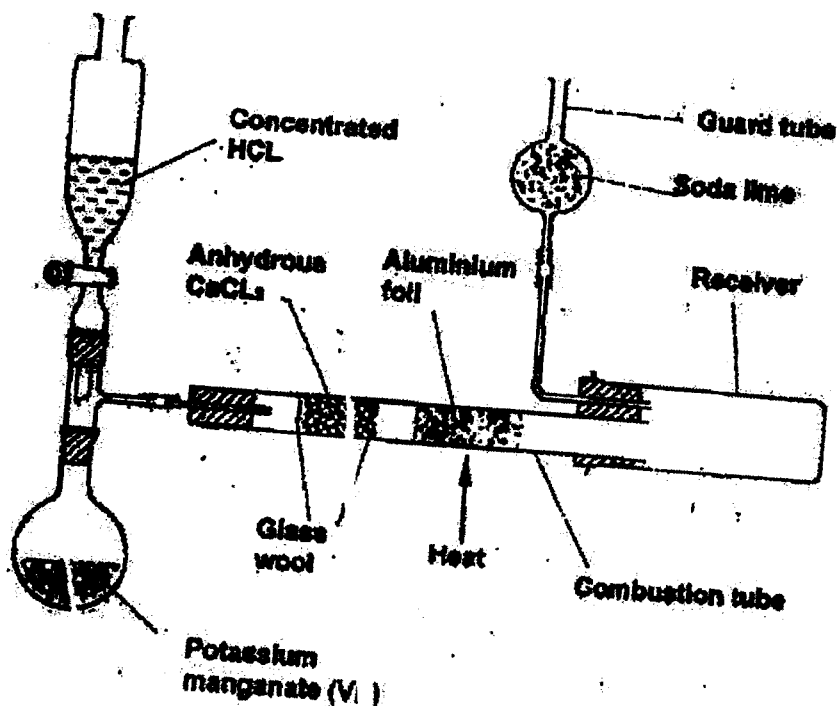
6. The set up below was used to prepare nitric acid



- (i) Give the name of liquid "R" (1 mk)
- (ii) Write an equation for the reaction which took place in the glass retort (1 mk)

CHLORINE AND ITS COMPOUNDS

The diagram below shows the set up used in an experiment to prepare chlorine gas and react it with aluminium foil. Study it and answer the questions that follow

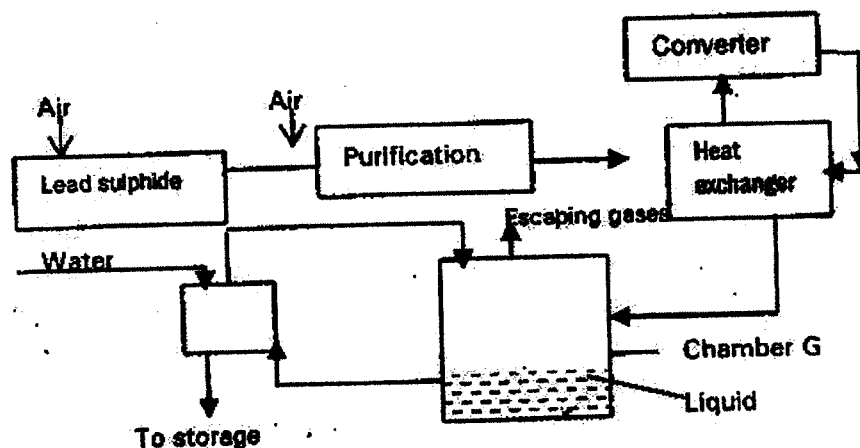


- In the experiment, concentrated hydrochloric acid and potassium manganate (VII) were used to prepare chlorine gas. State two precautions that should be taken in carrying out this experiment. (2 mks)
- (b) Write the formula of another compound that could be used instead of potassium manganate (VII). (1 mk)
- (c) Explain why it is necessary to allow the acid to drip slowly onto potassium manganate (VII) before the aluminium foil is heated. (2 mks)
- (d) State the property of the product formed in the combustion tube that makes it possible for it to be collected in the receiver. (1 mk)
- (e) When 1.08g of aluminium foil were heated in a stream of chlorine gas, the mass of the product formed was 3.47g. Calculate the:
- Maximum mass of the product formed if chlorine was in excess (3 mks)
 - Percentage yield of the product formed (1 mk)
- (f) Phosphorous trichloride is a liquid at room temperature what modification should be made to the set up if it is to be used to prepare phosphorous trichloride (1 mk)

- (iii) Explain the following
- Nitric acid is stored in dark bottles (1 mk)
 - The reaction between copper metal with 50% nitric acid in an open tube gives brown fumes (2 mks)

SULPHUR AND ITS COMPOUNDS

The diagram below shows some processes that takes place during the industrial manufacture of sulphuric acid.



- Write the equation for the reaction in which sulphur (IV) Oxide is produced (1 mk)
- Why is it necessary to keep the gas pure and dry? (1 mk)
- Describe the process that takes place in chamber G (1 mk)
- Name the gases that escape into the environment (1 mk)
- State and explain the harmful effect on the environment of one of the gases
- Give one reason why it is necessary to use 2- 3 atmospheric pressures and not more (1 mk)