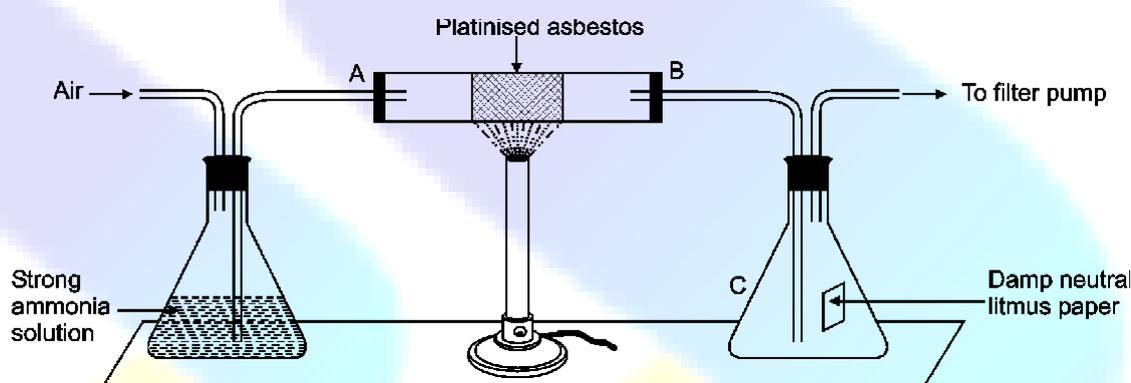


1. (a) 1. "To test the nitrate radical, only freshly prepared ferrous sulphate solution is used." Explain.
2. Why is freshly prepared concentrated nitric acid yellow in colour?
3. Write equations for the following and state which one of these reactions is a decomposition.
 - (i) One reaction of nitric acid with copper chips.
 - (ii) The action of heat on lead nitrate.
 - (iii) Reaction when ammonia is passed over heated cupric oxide.
- (b) When the air is drawn through the apparatus shown in the diagram, the following observations are made :



- (i) The damp neutral litmus paper in the flask turns blue.
 - (ii) The platinised asbestos glows and continues to glow when the burner is removed.
 - (iii) A colourless liquid condenses at B.
 - (iv) Brown fumes appear in the flask and the litmus now turns pink.
 1. What is the purpose of platinised asbestos ?
 2. Describe in words or in equations the chemical changes that are occurring in the apparatus, explaining the observations in (i), (ii), (iii) and (iv). Give reasons for your answers.
 - (c) Give two uses of nitric acid.
 - (d) Write down the equations for the following reactions :
 - (i) When ammonium chloride is warmed with sodium hydroxide solution.
 - (ii) When ammonium chloride is warmed with concentrated sulphuric acid.
2. (a) During a rainstorm, the rainwater contains traces of nitric acid. Explain.
 - (b) Lead nitrate is heated. Write a balanced equation.
 - (c) Explain briefly or give balanced equations to show how would you obtain :
 - (i) Copper oxide from copper nitrate,
 - (ii) Ammonia from ammonium chloride.
 - (d) (i) Give two large-scale uses of nitric acid.

- (ii) A sample contains nitric oxide. The nitric oxide can be removed by passing the mixture through solution "S". Name the solution "S".
- (iii) Nitrogen can be obtained in its pure state by heating a mixture of ammonium chloride and substance X. Name the substance X.
- (e) Nitrogen dioxide is called mixed anhydride. Explain.
3. (a) Name the gas evolved and write chemical equation when ammonium nitrate is heated.
- (b) Name : (1) A metal which reacts with very dilute nitric acid to liberate hydrogen.
(2) A substance, which on heating decomposes, but does not leave any residue behind.
- (c) What is the product of oxidation of ammonia in Ostwald's process?
4. (a) Name :
- (i) A gas which dissolves in water to give an alkaline solution.
- (ii) A metal which reacts with very dilute nitric acid to liberate hydrogen.
- (iii) A salt which is insoluble in cold water but is soluble in hot water.
- (b) State the products of the following reactions :
- (i) When ammonium nitrate is heated.
- (ii) When a mixture of ammonium chloride and calcium hydroxide is heated.
- (c) What is the importance of nitrogen gas in air?
- (d) Write "word equations" or correctly balanced molecular equations for each of the following :
- (i) Sodium nitrate is heated strongly.
- (ii) Ammonium hydroxide is added to aqueous solution of iron (III) chloride.
- (iii) A mixture of common salt (sodium chloride) and manganese dioxide is warmed with conc. sulphuric acid.
- (iv) Magnesium nitride is treated with water.
- (e) Give chemical names for :
- (i) Aqua fortis (ii) Sal ammoniac.
5. (a) (i) Name a drying agent for ammonia.
(ii) Name a nitrate of metal which on heating does not give nitrogen dioxide.
- (b) Name all the products formed when :
- (i) Ammonium nitrate is heated. (ii) Ammonia is passed over heated copper oxide.
- (c) Name all the products formed when ammonium chloride is mixed with sodium nitrite and the mixture is heated.
- (d) Calculate the percentage of nitrogen in ammonium nitrate (NH_4NO_3).
[At. wt. of H = 1; N = 14; O = 16]
- (e) Write a balanced equation for the preparation of nitric acid from potassium nitrate.
- (f) Under what conditions do nitrogen and hydrogen combine to form ammonia?
State one large-scale use of ammonia.
- (g) Write balanced word equations or balanced equations for the following :

- (i) Action of concentrated nitric acid on copper.
- (ii) Action of heat on sodium nitrate.
- (iii) Water is added to aluminium nitride.
6. (a) Give reasons for the following :
- (i) In the laboratory preparation of nitric acid, the mixture of concentrated sulphuric acid and sodium nitrate should not be heated very strongly above 200 °C.
- (ii) Though ammonium nitrite readily gives nitrogen on heating, a mixture of ammonium chloride and sodium nitrite in water is heated to prepare nitrogen in the laboratory.
- (iii) Reagent bottles containing sodium hydroxide solutions should have rubber stoppers and not glass stoppers.
- (iv) Ammonia cannot be collected over water.
- (b) Complete and balance the following equations :
- (i) $\text{Cu} + \text{HNO}_3 \rightarrow \dots + \text{NO}_2$
- (ii) $\text{NH}_4\text{NO}_3 \rightarrow \dots + \dots$
- (c) Give a chemical name or the formula of a substance formed as a brown ring in the test for nitrates.
- (d) Explain by giving a reason that commercial concentrated nitric acid is yellow in colour. But when it is diluted with water, it turns colourless.
- (e) State the conditions for the oxidation of ammonia to nitrogen monoxide (nitric oxide) in the manufacture of nitric acid by Ostwald's process. Also write the balanced equation of reaction which takes place.
- (f) Like oxygen, nitrous oxide (N_2O) also supports combustion. A glowing splint introduced in the jar of nitrous oxide is rekindled. Give one chemical test to distinguish oxygen from nitrous oxide.
- (g) Give (i) one chemical test for nitric acid (ii) two large-scale uses of ammonia.
7. (a) State what will you observe when :
- (i) lead nitrate crystals are heated in a dry test tube.
- (ii) ammonium hydroxide solution is added to copper sulphate solution, first a little and then in excess.
- (b) Name the products formed when :
- (i) a mixture of carbon and conc. nitric acid is heated.
- (ii) dilute nitric acid is added to copper.
- (c) Nitrogen prepared from atmosphere is more dense than nitrogen prepared by chemical reactions. Explain.
8. (a) Copy and complete the following table :

Process	Name of Product	Name of Catalyst	Approx. Temperature	Approximate Pressure
Haber's Process				

- (b) Write the balanced equation for the preparation of ammonia from ammonium chloride.
- (c) Explain, why ammonia gas is evolved when water is added to the product formed, when magnesium is burnt in air.
- (d) Name the gas evolved when the following mixtures are heated:
- Ammonium chloride and calcium hydroxide.
 - Ammonium chloride and sodium nitrate.
- (e) (i) Sodium hydroxide solution is added to solution A, a white ppt. is formed, which is insoluble in excess of sodium hydroxide. What metal ion is present in A?
- (ii) Ammonium hydroxide solution is added to solution B when a pale blue ppt. is formed. This pale blue ppt. dissolves in excess of ammonium hydroxide to give inky blue colouration. Name the cation present in B. Name the probable colour of solution B.
- (iii) When an ammonium salt is warmed with sodium hydroxide solution, ammonia gas is evolved. State three ways in which you can identify the gas.
9. (a) Describe all that you would observe when copper nitrate is heated.
- (b) The following statement is correct only under certain conditions. Rewrite the statement, stating experimental conditions. "Copper and nitric acid react together producing nitrogen dioxide".
- (c) Name the product, catalyst, and approximate temperature in Ostwald's process. How is the temperature maintained in Ostwald's process?
- (d) During a thunderstorm, the rainwater contains nitric acid. The nitric acid formed as a result of three chemical reactions. Describe (or write balanced chemical equations for) these three reactions.
10. (a) Copy and complete the following equations :
- $Mg_3N_2 + 6H_2O \rightarrow$
 - $2NH_3 + 3CuO \rightarrow$
 - $8NH_3 + 3Cl_2 \rightarrow$
 - $4NH_3 + 5O_2 \rightarrow$
- (b) (i) How would you obtain the compound magnesium nitride?
- (ii) What property is illustrated by reaction (ii) above in (a) ?
- (iii) What important industrial process starts with reaction (i) above? Name the catalyst used.
- (c) During laboratory preparation how is ammonia dried and collected.