MERRYLAND HIGH SCHOOL - ENTEBBE
CHEMISTRY WORK
S.3
SET 2

1. a) Draw a labeled diagram of the apparatus that can be used to prepare ammonia in the laboratory.

   b) Describe an experiment that can be carried out to show that ammonia is a soluble alkaline gas.

   c) A piece of burning magnesium was introduced into a gas jar of nitrogen.
      (i) State what was observed
      (ii) Write an equation for the reaction that took place.

   d) Water was added to the product of reaction in (c) above and the resultant mixture tested with litmus.
      (i) State what was observed
      (ii) Write an equation for the reaction.

2. a) Calcium nitrate was strongly heated.
      (i) State what was observed.
      (ii) Write an equation for the reaction that took place.
      (iii) Name a gas that can be dried using the residue.
      (iv) Calculate the volume of the total gaseous products formed at room temperature when 4.3g of calcium nitrate is heated strongly.
      [Ca = 40, N = 14, 0 = 16, 1 mole of a gas occupies 24.0dm^3 at room temperature].

   b) The residue in (a) was dissolved in water. Write equation for the reaction that took place.

   c) Excess carbon dioxide was bubbled through the solution in (b). State;
      (i) What was observed and write equation(s) for the reaction(s) that took place.
      (ii) One application for this reaction in gas analysis.

   d) To the solution in (b) was added soap solution. State what was observed.

3. a) Nitrogen can react with hydrogen in the presence of a finely divided catalyst to form ammonia in the Haber process.
   (i) State the catalyst used in the reaction.
   (ii) Explain why the catalyst is finely divided.
   (iii) Write equation leading to the formation of ammonia.
   (iv) State two other factors which can affect the yield of ammonia in the Haber Process.

   b) Write equation for the reaction to show that ammonia can;

   (i) Act as reducing agent

   (ii) Burn in oxygen.

   c) Ammonia obtained from the Haber Process can be converted to Nitrogen (II) oxide.

   (i) Write equations for the reaction leading to the conversion of ammonia to Nitrogen (II) oxide.

   (ii) State the conditions for the reaction.

   d) Write equation(s) to show how nitrogen (II) oxide can be converted to nitric acid.

4. a) Using equations only, outline the process involved in the manufacture of nitric acid.
   b) A mixture of concentrated nitric acid and sulphur was warmed.
   (i) State what was observed.
   (ii) Write equation for the reaction that took place.
   c) (i) Ammonium nitrate dissolves in water according to the following equation.
   $NH_4NO_3(s) + H_2O(l) \longrightarrow NH_4OH(aq) + HNO_3(aq)$
   Excessive use of ammonium nitrate as a fertilizer can cause the soil to become acidic. Explain.
   d) Write equation to show the effect of heat on;
   (i) Silver nitrate
   (ii) Potassium nitrate

   e) State two uses of nitric acid other than in the manufacture of nitric acid.

5. a) Lead (II) oxide was added a little at a time to warm dilute nitric acid in a beaker until no further change.

(i) State what was observed

(ii) Write equation for the reaction that took place.

(iii) Describe how pure crystals of lead (II) nitrate can be obtained from the reaction mixture in the beaker.

b) State what would be observed and write equation for the reaction that would take place if lead (II) nitrate was heated strongly.

c) A few drops of aqueous sodium chloride were added to aqueous lead (II) nitrate solution;

(i) State what was observed.

(ii) Write equation to illustrate your observations in c(i) above.

d) The reaction mixture in (c) was heated and then allowed to cool.

(i) State what was observed.

(ii) Give a reason for your observation in d (i).

END