St. Peter's Senior Secondary School - Naalya

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S.3 CHEMISTRY

CARBON AND ITS COMPOUNDS:

1. (a) Zinc carbonate was strongly heated in a test-tube until no further change.

   (i) State what was observed.

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

   (b) The residue formed in (a) above was added to dilute sulphuric acid and heated.

   (i) Write the equation for the reaction.

   (ii) State what was observed.

2. (a) Define allotropy.

   (b) Give the three allotropes of carbon.

   (c) Give two examples of other elements which show allotropy and name their allotropes.

3. (a) Name two common reagents used in the laboratory preparation of carbon dioxide.

(b) State what is observed when carbon dioxide is bubbled in fairly concentrated sodium hydroxide solution for some time.

(c) Write the equation(s) of the reaction(s) that take(s) place.

4. (a) Describe the structure of graphite.

   (b) Explain why graphite conducts electricity whereas diamond does not.

   (c) State any two uses of diamond.

   (d) Describe how you would show by a chemical test that graphite is made up carbon atoms.

ORGANIC CHEMISTRY:

1. Under certain conditions ethene undergoes a reaction that can be represented by the following equation.
   $nCH_2 = CH_2 \rightarrow CH_2 - CH_2$

   (a) Name the type of reaction.
   (b) Name the product of the reaction.
   (c) Give any one use of the product.
   (d) Explain one major environmental problem associated with the use of the product named in (b).
2. (a) Explain what is meant by polymerization.
   (b) State one natural polymer formed by condensation polymerization and state its monomer.

3. a) In the manufacture of soap, oil or fat is heated with sodium hydroxide solution.
   (i) Name the process of making soap.

   (ii) What is the purpose of adding saturated sodium chloride solution?

   (iii) State the chemical nature of soap.

   (b) Sometimes when soap is used for washing clothes, a scum is formed.

(i) What is a scum?

(ii) What causes the formation of scum?

(iii) Give the general name given to water which forms scum with soap.

(iv) Describe a chemical method by which the type of water you named in b(iii) can be treated to avoid formation of scum. Write equations for the reactions that are involved.

4. (a) Crude ethanol is manufactured by the process known as fermentation.
(i) Explain what is meant by the term fermentation.

(ii) Write equation for the reaction that takes place during fermentation.

(b) Write equation to show how ethanol can be converted to ehtene and indicate the conditions for the reaction.

(c) (i) State what would be observed when ethene is reacted with bromine

(ii) Write an equation for the reaction

MOLE CONCEPT:

1) A compound contains 43.4% by mass of sodium, 11.3% carbon and 45.3% oxygen. Calculate the simplest formula of the compound (Na = 23, C = 12, O = 16)

2) A compound contains 40% carbon, 6.67% hydrogen, the rest being oxygen. The relative molecular mass of the compound is 180 (C=12, H =1, O = 16). Determine the empirical formula of the compound and the molecular formula of the compound

3) Ammonium chloride reacts with calcium hydroxide according to the equation

$Ca(OH)_2(s) + 2NH_4Cl\ (aq) \rightarrow CaCl_2(s) + 2NH_3(g) + 2H_2O\ (l)$

If 14.8g of calcium hydroxide was reacted completely with ammonium chloride, what volume of ammonia gas will be evolved? (H=1, N=14, O=16, Ca=40, I mole of gas occupies 24dm^3)

4) Carbon burns in oxygen according to the following equation

   $C(s) + O_2(g) \rightarrow CO_2(g)$

Calculate the volume of carbondioxide collected at s.t.p when 10g of carbon is burnt (c =12, one mole of a gas occupies 22.4l at s.t.p)

END.