S.4 HOLIDAY WORK ON APPLIED CHEMISTRY

READ, RESEARCH AND ATTEMPT

1. (a) (i) Describe how you would obtain a sample of sugar crystals from sugar cane.

(ii) Name the materials left over from sugar processing and mention two uses of each

(iii) State **two** uses of sugar in the world of the sick.

(iv) Name any other plant other than sugar cane from which sugar may be obtained.

(b) Concentrated sulphuric acid was added to sugar.

(i) What was observed ?

(ii) What name is given to this process ?

(iii) How would you convert sugar to alcohol (ethanol) ?

(iv) Why is ethanol important to society ?

(c) A mass of 3.10 g of an organic compound that contains carbon, hydrogen and oxygen atoms only, produced 4.40 g of carbon dioxide and 2.70g of water on complete combustion.

2. (a) (i) State the difference between fats and oils.

(ii) Give one example of each.

(b) Briefly describe how soap can be prepared.

(c) State what would be observed if soap solution was shaken with a solution containing magnesium hydrogen carbonate.

(d) Explain your answers in (c).

(e) State what would be observed if a solution of soapless detergent was used instead of soap solution.

(f) Give one disadvantages of soapless detergents.

3. Glucose $C_6H_{12}O_6$, can be converted to ethanol by a catalytic reaction caused by an enzyme produced from yeast.

(a) Name

(i) the reaction in which yeast converts glucose into alcohol.
(ii) the enzyme produced by yeast during the reaction.

(b) Write the equation for the reaction that leads to the formation of ethanol.

(c) Briefly describe how the ethanol produced can be concentrated.

4. Soap can be prepared by boiling a vegetable oil with sodium hydroxide solution and adding a solution of sodium chloride to the reaction mixture.

(a) What name is given to the reaction leading to the formation of soap?

(b) Name one crop from which oil for making soap can be obtained.

(c) Why is sodium chloride added to the reaction mixture?

(d) State three advantages and three disadvantages of suing detergents instead of soap.

5. Soap forms scum when mixed with certain types of water
(a) What is the chemical nature of scum?

(b) Outline a physical method used to obtained water free from hardness.
(c) Give three advantages of hard water.

6. (a) Explain what is meant by polymerisation
b) Name three natural polymers and three synthetic polymers and state one use of each of the polymers named.

7. (a) (i) What is water pollution?

(ii) How can you tell that water is polluted? Give two ways.

(b) (i) What is Sewage ?

(ii) How does sewage pollute water?

(iii) Describe how urban sewage is treated?

(iv) How can sewage be useful to the society ?

8. (a) Name the raw materials used in your locality to make an alcoholic drink.

(b) Briefly describe how ethanol can be obtained from the materials you have

named in (a).

(c) State how ethanol prepared in (b) can be concentrated and suggest one way of determining whether the ethanol is pure or not.

(d) Ethene can be formed from ethanol. Write equation and state the conditions for the reaction leading to the formation of ethene.

(e) Name two uses of ethanol apart from the preparation of ethene,

9. During the manufacture of soap, sodium hydroxide was boiled with substance X.

(a) Identify substance X.

(b) What name is given to the- process leading to the formation of soap.

(c) Name a substance that can be used in precipitate the soap from the Solution

(d) State what would be observed if soap solution was reacted with aqueous calcium hydrogen carbonate.

10. (a) (i) State one word, which means "formation of soap"

(ii) Name two sources of vegetable oils that can be used to make soap.

(b) Briefly describe how soap can be prepared.

(c) Explain the following observations:

(i) Water containing calcium hydrogen carbonate will not lather easily with soap unless the water is boiled prior to using soap.

(ii) Water containing magnesium sulphate will not lather with soap even after boiling the water.

(d) State:

(i) the advantage of using a detergent instead of soap for laundry work.

(ii) one disadvantage of using a detergent.

Calculate the empirical formula of the organic compound.

11. (a) In sewage treatment, the sewage is brought into contact with appropriate

bacteria under controlled conditions.

(i) Explain what is meant by the term ‘sewage’

(ii) Explain the role of bacteria in sewage treatment.

State the conditions under which bacteria will be active during the treatment of sewage.

12. (a) Beer of 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.

(iii) Is the process of fermentation endothermic or exothermic?

(b) Describe briefly how in the homes alcoholic drinks can be prepared from either ripe bananas or millet flour.

(c) Draw a diagram of the apparatus that can be used to concentrate the alcohol produced in (b) above.

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

END