

### S.3 Chemistry Holiday Work.

(First Copy the notes given to you, read and attempt)

1. (a) (i) Define the term allotropes.  
(ii) Name one example of an element that shows allotropy other than carbon.
- (b) (i) Give the allotropes of carbon.  
(ii) State two properties of one of the allotropes of carbon you named in (i).  
(iii) Explain how the allotrope is used due to its properties named in (b) (ii) above.
- (c) Describe how you would show by a chemical test that graphite is made up of carbon atoms.
2. Carbon dioxide gas can be prepared in the laboratory by reacting an acid with a carbonate.
  - (a) Write an ionic equation for the reaction.
  - (b) Draw a well labeled diagram of the apparatus that can be used in the laboratory to prepare and collect a sample of carbon dioxide.
  - (c) Write equations to show how carbon dioxide reacts with each of the following and state what would be observed in each case:
    - (i) sodium hydroxide solution
    - (ii) calcium hydroxide solution.
    - (iii) Magnesium metal.
  - (d) name one process in each case by which the concentration of carbon dioxide in the atmosphere
    - (i) increased
    - (ii) decreased.

- (e) When a solution of sodium hydroxide was exposed to air, a white solid was formed on the surface.
- Name the white solid.
  - Write an equation to show how the white solid is formed.
3. Soap can be prepared by boiling a vegetable oil with sodium hydroxide solution and adding a solution of sodium chloride to the reaction mixture.
- What name is given to the reaction leading to the formation of soap?
  - Name one crop from which oil for making soap can be obtained.
  - Why is sodium chloride added to the reaction mixture?
  - State one advantage and one disadvantage of using detergents instead of soap.
4. Soap forms scum when mixed with certain types of water
- What is the chemical name of scum?
  - Outline a physical method used to obtain water free from hardness.
  - Give two advantages of hard water.
5. (a) (i) State two differences between fats and oils.
- Give one example of each.
- Briefly describe how soap can be prepared.
  - State what would be observed if soap solution was shaken with a solution containing magnesium hydrogen carbonate.
  - Explain your answers in (c).
  - State what would be observed if a solution of soap less detergent was used instead of soap solution.

- (f) Give one disadvantages of soap less detergents.
6. (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) Explain the following observations:
- (i) Water containing calcium hydrogen carbonate will not lather 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.
- (c) State:
- (i) the advantage of using a detergent instead of soap for laundry work.
- (ii) one disadvantage of using a detergent.
7. In the extraction of cast iron using a blast furnace, spathic iron ore, which contains some impurities, is first roasted in air. It is then mixed with some other substances and finally introduced into the blast furnace. Cast Iron can be obtained from iron (II) carbonate ore.
- (a) Name the major impurity in the iron ore.
- (b) (i) Give the chemical name of spathic iron ore.
- (ii) Write an equation for the reaction which takes place when iron (II) carbonate is roasted in air.
- (c) Name the substances that are fed into the blast furnace:
- (i) from the top.
- (ii) from the bottom.
- (d) Outline the reactions leading to:
- (i) the formation of cast iron.
- (ii) the removal of the major impurity you have named in (a).
- (e) State the major components of steel.

**END**