

### S3 CHEMISTRY HOLIDAY WORK

1. Graphite is one of the crystalline allotropes of carbon.

(a) define the term allotrope

(b) Name the

(i) other crystalline allotrope(s) of carbon

(ii) non crystalline allotrope(s) of carbon

2. (a) Describe with aid of a diagram the structure of each of the crystalline allotropes of carbon.

(b) State any three uses of

(i) graphite

(ii) Diamond

(iii) an three forms amorphous carbon

(c) Explain why graphite conducts electricity while diamond does not

3. Soot was burnt in excess oxygen.

(a) Write an equation for the reaction

(b) The same amount of graphite was burnt in limited oxygen. Write an equation for the reaction

(c) Explain the danger of the gaseous product in 3(b) above to health.

4. A mixture of charcoal and Copper(II) oxide was heated strongly in a combustion tube.

(a) State what was observed

(b) Write an equation for the reaction

(c) Explain what would happen if magnesium oxide was used instead of copper(II) oxide.

- (e) State three other metal oxides which can react with charcoal in the same way.
- (d) Which property of carbon has been illustrated in these reactions?
5. (a) State the percentage composition by volume of carbon dioxide in air.
- (b) With aid of a well diagram describe how carbon dioxide gas can be prepared in the laboratory from Calcium carbonate.
- (c) Explain why the reaction of lead(II) carbonate and dilute hydrochloric acid yields very low volume of carbon dioxide gas.
- (d) State any three
- (i) physical properties of carbon dioxide gas.
  - (ii) uses of carbon dioxide gas
6. Burning splint of wood and burning magnesium ribbon where each separately lowered in gas jar of Carbon dioxide.
- (a) State what was observed for the
- (i) wood
  - (ii) magnesium
- (b) Explain your observations in (a) above
- (c) Write an equation for the reaction.
7. (a) Carbon dioxide gas was bubbled through lime water for a long time.
- (i) State what was observed
  - (ii) Write an equation(s) for the reaction
- (b) Soap solution was added to the resultant mixture in (a) above. State
- (i) What was observed?

- (ii) Write an equation for the reaction
- (iii) State one physical method that can be used to prevent the reaction in (b) above
- (c) Carbon dioxide gas was bubbled through sodium hydroxide solution for a some time.
  - (i) State what was observed.
  - (ii) Write equation(s) for the reaction(s)
- 8. Mention three processes which
  - (a) reduce carbon dioxide
  - (b) increase carbon dioxide content the atmosphere.
- 9. (a) State any four physical properties of carbon monoxide
  - (b) Zinc oxide was reacted with carbon monoxide in a combustion tube
    - (i) State the condition(s) for the reaction
    - (ii) State what was observed and write an equation for the reaction
    - (iii) Which property of carbon monoxide is illustrated in this reaction
    - (iv) Mention any three metal other oxides which react in the same way as zinc oxide.
  - (c) State any three uses of carbon monoxide
- 10. (a) State any four examples of carbonates
  - (b) A mixture of anhydrous sodium carbonate and lead(II) carbonate was heated strongly.
    - (i) Write an equation for the reaction
    - (ii) Give a reason for your answer
  - (c) Draw a well labeled diagram for preparation of sodium carbonate in the laboratory.

(d) (i) What is observed when washing soda ( $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ ) is exposed to atmosphere for some time

(ii) Write the equation for the reaction.

11. (a) Copper (II) carbonate was heated strongly until there was no further change.

(i) State what was observed

(ii) Write an equation for the reaction

(iii) Name the reagent which can be used to identify the gaseous product.

(b) Excess dilute sulphuric acid was added to the residue in (a) and the mixture warmed.

(i) State what was observed

(ii) Write an equation for the reaction.

12. (a) Distinguish between permanent hard water and temporary hard water.

(b) State two methods in each case that can be used to prevent

(i) Temporary hardness

(ii) Permanent hardness of water.

(c) State any two advantages of

(i) Hard water to soft water

(ii) Soft water to hard water.

13. A compound **Y** contains 62.5% lead, 8.5% nitrogen and the rest being oxygen. If the RFM of **Y** is 331;

(a) Determine the molecular formula of **Y**

(b) Compound **Y** was heated strongly

(i) State what was observed

(ii) Write equation for the reaction

14. (a) Calculate

(i) the number of moles in 20g of sodium hydroxide

(ii) the mass of 0.7moles of copper(II) Sulphate

(iii) number of atoms of aluminium in 0.2moles of aluminium

(iv) the mass of  $3.01 \times 10^{23}$  atoms of calcium

(b) Calculate the percentage composition of each element in

(i) lead(II) nitrate.

(ii) Aluminium sulphate

15. 3.6g of the oxide of copper when reduced by hydrogen forms 3.2g of copper.

(a) State the conditions for the reaction

(b) Calculate the empirical formula of the oxide of copper

(c) If the relative formula mass of the oxide of copper is 144, determine the molecular formula of copper.

(d) Write equation for the reaction between the oxide of copper and hydrogen gas.

16. 2.4g of magnesium ribbon was burnt in oxygen forming 3.9g of its oxide.

Determine

(a) the empirical formula of the compound formed

(b) molecular formula if its relative formula mass is 40.

17. A compound Y contains 15.8% aluminium, 56.2% oxygen and 28% sulphur.

(a) Calculate the empirical formula of Y

(b) The molecular mass of Y is 342. Determine the molecular formula of Y.

The following information is necessary ; atomic mass of C=12, O=16, S=32,  
Al=27,Pb=207,N=14, Na=23, Ca=40,H=1.

Respond through; [jwokape@gmail.com](mailto:jwokape@gmail.com), [gmumbi75@gmail.com](mailto:gmumbi75@gmail.com), [gnakiranda2014@gmail.com](mailto:gnakiranda2014@gmail.com)