**FORM 4 CHEMISTRY**

**APRIL HOLIDAY ASSIGNMENT**

1. During electrolysis of copper (II) Sulphate solution, a current of 4.0 Amperes was passed through the solution for Y minutes to deposit 2.39g of copper at the cathode. Determine the value of Y (Cu=64, 1F=96,500C).
2. a) (i) Which of the following metals could be used as a sacrifcial anode in order to prevent the corrosion of iron? Explain your answer. Magnesium, zinc, lead, copper.

b) An iron becomes coated when placed in a solution of copper (II) sulphate, CuSO4 (aq). Write half equations for the oxidation / reduction reaction involved.

1. A solution contains 7.5g of solution in 20cm3 of water. When the solution is cooled crystals begin to appear at 100C. Calculate the solubility of the solute at 100C.
2. Explain why the PH of 1.0M Hydrochloric acid is 1.0 while that of 1.0 M ethanoic acid is 5.0.
3. (a) A solution contains 7.5g of solute in 20cm3of water. When the solution is cooled crystals begin to appear at 100C. Calculate the solubility of the solute at 100C.

B) What causes permanent hardness of water?

1. The solubility of potassium nitrate in water at 700C is 155g/100g of water while at 200C, the solubility is 31g/100g of water. A saturated solution of potassium nitrate in 50grammes of water at 700C was cooled to 200C. Calculate the mass of the salt deposited.
2. (a) Apart from Bauxite, state any other two ores of aluminium.

(b) Name the method that is used to extract aluminium from Bauxite.

 (c) (i) Name two major impurities in Bauxite

 (ii) Explain how the impurities are removed.

 (d) Cryolite is used in the extraction of aluminium from Bauxite. State its function.

(e) Aluminium is a reactive metal yet utensils made of aluminium do not corrode easily. Explain this observation.

(f) Explain the economic and environmental benefits of recycling aluminium (from scrap metal) over extraction of aluminium from Bauxite.

1. In a remote area in Kenya a scientist discovered a metal ore which he believed must have been containing Copper. After analysis he ascertained that what he had discovered was one of the principle ores of copper.
2. Name and give the chemical formulae of the two principle ores of copper
3. What processes are first carried out to increase the concentration of copper?
4. The concentration obtained in (b) above was first roasted and products mixed with silica. Explain using equations.
5. How is blister copper formed? Name the impurities.
6. After removing sulpuric (IV) oxide from blister copper the impure copper was then purified by electrolysis. Draw a diagram showing an arrangement of apparatus used.
7. Write half equation for the reactions that took place at the anode and the cathode
8. State two uses of copper
9. When 25 cm3of 0.5MHCl is added to 25 cm3 of 0.5 M NaOH the temperature of the solution rose from 250C to 260C. Given that the density of the solution is 1g cm -3 and its specifc heat capacity is 4.2 jg-1k-1
10. Determine the amount of heat evolved that caused the temperature rise.
11. Work out the molar enthalpy of neutralization for this reaction
12. 10.0g of ethanol (C2H5OH) were completely burnt in air. The heat evolved caused the temperature of 400cm3 of water to rise from 220C to 870C. Calculate the molar heat of combustion of ethanol (H=1, C=12, O=16, specifc heat capacity of water = 4.2 kJkg-1k-1; Density of water = 1gcm-3)
13. (a) The grid given below represents part of the periodic table. Study it and answer the questions that follow. (The letters do not represents the actual symbol of the elements)



1. What name is given to the group of elements to which **C** and **F** belong?
2. Compare the atomic radius of element C and F. explain
3. Which letter represents the element that is the least reactive?
4. What type of bond is formed when **B** and E react? Explain
5. Write the formula of the compound formed when element **D** and oxygen gas react.
6. On the grid, indicate with a tick the position of element **G** which is in the third period of the periodic table and forms **G3**- ions