1. (a) The non – luminous flame is used in different areas. Give three (03) such areas and explain why a flame is preferred for those uses

 (b) With one examples categorize laboratory apparatus according to their uses (4 category only)

1. **(a**) Element K and L have atomic number 19 and 17 respectively, according to the periodic table
2. Write the electronic configuration of K and L
3. Which is non- metal between K and L
4. Write the chemical formula when K combines with L

**(b)**Give the appropriate extinguisher for the following classes of fire

1. Class A
2. Class B
3. Class E
4. Class F
5. (a) There is a campaign to stop the use of charcoal as a domestic fuel. Give three points to support the Campaign

b) Assume the equation for dissociation of Calcium Carbonate in a closed system is

CaCO3(s) CaO(s) + CO2 (g)ΔH =+175.5KjMol-1

What will be the effect on the proportion of Calcium carbonate in the equilibrium mixture if:-

1. Temperature is increased
2. Pressure is increased
3. Carbon dioxide is removed from the system
4. Helium gas is introduced into the system
5. (a) Provide a suitable indicator to be used in the following titrations
6. Ethanoic acid with ammonia solution
7. Sulphuric acid and Sodium hydrogen Carbonate
8. Sodium hydroxide and ethanoic acid

(b) You are provided with the following solutions in bottles labeled A, B, C and D attached with PH values 5.4, 7.3, 13 and 7 respectively. Which bottle contain

1. Detergent soap
2. Water
3. Lemon juice
4. Blood
5. (a)Write the balanced ionic equation from the following statements
6. Neutralization of potassium hydroxide solution with Sulphuric acid solution
7. The reaction of zinc powder with dilute hydrochloric acid

(b) Write four characteristics of a good chemical equation

1. (a) Define Mole

(b) What volume of oxygen at S.T.P will be produced if 20g of potassium chloride (v) are thermally decomposed?

1. (a) Differentiate between the following
2. An isotope and isotopy
3. An ion and an atom

(b) Sir Dalton has been so influential in chemistry by his useful contribution in explaining issues related to atoms. Using five points elaborate the main concerns of his contribution about atomic theory.

1. (a) Name the following compounds according to IUPAC system
2. (NH4)2CO3 (ii) N205 (iii) SF6

(b) A compound is analyzed and found to contain 68.54% Carbon 863% Hydrogen and the rest is Oxygen. Calculate

1. Its empirical formula
2. Its molecular formula if its vapor density is 52
3. (a) Explain the effect of adding the following substances to Hard water
4. Lime water
5. Washing soda

(b) Formation of lime scale in the pipes is both advantageous and disadvantageous. Verify this statement by giving one point in each

1. (**A**)You are provided with the following reactions
2. 2H2O2 →2H2O +Y2
3. Zn +H2SO4 →Y +H2(g)
4. Identify the gas x and compound Y
5. Mention any three uses of gas x

(**B)** Explain the property of hydrogen gas that make it suitable for

1. Production of oxy-hydrogen flame
2. Filling weather balloon
3. Manufacture of Ammonia
4. (a) Define the following
5. Standard Solution
6. Molar solution
7. Indicator

(b) A form three students conducted titration which involved solution NaXCO3 and Nitric acid solution if 25cm3 of solution NaXCO3 required exactly 12.5cm3 of 0.2M of Nitric acid for complete neutralization. Calculate:

1. The Molarity and molar mass of NaxCO3 if its concentration in g/dm3 is 8.4
2. The atomic mass of element x given that NaxCO3 reacted with HNO3 in a 1:1 mole ratio
3. Suggest the name of element X
4. Give the name of anion XCO3
5. Assign the correct charge of anion XCO3
6. (a).Define the following terms
7. Electrolysis
8. Electrolyte
9. Electrode
10. Electrolytic cell

(b) State Faraday second law of electrolysis

(c)Mention three (3) factors for selective discharge of ions during electrolysis

(d)Briefly explain three (3) application of electrolysis