CHEMISTRY FORM FOUR

TERM TWO -2020

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|  |  | SCHEME OF WORK FORM FOUR CHEMISTRY TERM TWO 2020 |  |
| WK**NO** | L/**NO** | TOPIC /**SUBTOPIC** | **LESSON / SPECIFIC**OBJECTIVES | **TEACHING / LEARNING**ACTIVITIES | **MATERIALS /****RESOURCES** | REF. | REM. |
| 1 | 1 | ELECTRO-CHEMISTRY.Redox reactions. | Describe redox reactions in terms of gain / loss of electrons.Identify oxidizing / reducing agents involved in redox reactions. | Q/A: review cations, anions and charges.Write down ionic half equations and identify reducing / oxidizing agents. |  | K.L.B. BK IVPages 108-9 |  |
| 2 | Oxidizing Numbers. | Outline rules of assigning oxidation numbers.Determine the oxidation numbers of an element in a given compound.Explain the use of oxidation numbers in naming compounds.  | Exposition and giving specific examples.Work out oxidizing number of elements in given compounds.Copy and complete a table of compounds containing elements that more than one oxidation number. |  | K.L.B. BK IVPages 109-116 |  |
| 3,4 | Displacement reactions. | Explain change of oxidation numbers during redox / displacement reactions. Arrange elements in order of their reducing power. | Class standard experiments: reacting metals with solutions containing metal ions.Taking note of reactions and those that do not take place; and tabulating the results. | Metals: Ca, Na, Zn, Fe, Pb, and Cu.Solutions containing Ca2+, Mg2+, Zn2+, Fe2+. | K.L.B. BK IVPages 116-120 |  |
| 5 | The oxidizing power of an element. | Arrange elements in order of their oxidizing power. | Teacher demonstration / group expts:Adding halogens to solutions containing halide ions.Tabulate the results.Discuss the results and arrive at the *oxidizing power* series of halogens. | *Halogens:**Cl2 (g),* *Br2 (l),* *I2 (s).**Halides:* *KCl, KBr, KI.* | K.L.B. BK IVPages 120-122 |  |
| 2 | 1 | Cell diagrams. | Define the terms electrode, potential and e.m.f. of an electrochemical cell.Describe components of a cell diagram.Draw cell diagrams using correct notations. | Teacher demonstration: Zinc/ copper cell.Q/A & discussion: changes in oxidation numbers.Exposition: cell diagram and deducing the direction of electron flow. | *Zinc/ copper cell.* | K.L.B. BK IVPages 123-128 |  |
| 2 | Standard Electrode Potentials. | Identify standard conditions for measuring electrode potentials.Define the term standard electrode potential of a cell.Write half reactions of electrochemical cells. | Descriptive and expository approaches: teacher exposes new concepts. |  | K.L.B. BK IVPages 129-131 |  |
| 3,4 | Standard electrode potential series. | Recall the order of standard electrode potentials.Compare oxidizing and reducing powers of substances. | Q/A: review reactivity series, oxidizing agent, reducing agent.Exposition: the order of standard electrode potentials.Discussion: oxidizing and reducing powers of substances. |  | K.L.B. BK IVPages 131-133 |  |
| 5 | Emf of a cell. | Calculate emf of a cell using standard electrodes potentials. | Q/A: review half-cells.Worked examples; supervised practice.Assignment. |  | K.L.B. BK IVPages 133-136 |  |
| 3 | 1 | Possibility of a reaction to take place. | Predict whether a reaction will take place or not using standard electrode potentials. | Worked examples.Oral exercise.Assignment. |  | K.L.B. BK IVPages 136-137 |  |
| 3 | 2 | Primary and secondary chemical cells. | Describe the functioning of primary and secondary chemical cells. | Exposition of new concepts and brief discussionAssignment. |  | K.L.B. BK IVPages 138-141 |  |
| 3,4 | Electrolysis of dilute NaCl. | Define the term electrolysis.Explain the concept of preferential discharge of ions. | Teacher demonstration: electrolysis of dilute sodium chloride with carbon electrodes.Test for gases collected.Write down equations of reactions at each electrode.Discussion: preferential discharge of ions at electrodes. | Dilute sodium chloride voltameter. | K.L.B. BK IVPages 141-144 |  |
| 5 | Electrolysis of brine. | Identify products of electrolysis of brine***.*** | Teacher demonstration/ group experiments.Test for the products of electrolysis.Write relevant equations. | Brine voltameter. | K.L.B. BK IVPages 144-146 |  |
| 4 | 1 | Electrolysis of dilute sulphuric (VI) acid. | Identify products of electrolysis of dilute sulphuric (VI) acid. | Teacher demonstration/ group experiments.Test for the products of electrolysis.Write relevant equations. | Sulphuric acid voltameter. | K.L.B. BK IVPages 146-148 |  |
| 2 | Factors affecting electrolysis. | Explain factors that affect electrolytic products discharged at electrodes. | Q/A: review the electrochemical series of elements.Teacher writes down order of ease of discharge of ions at electrodes.Discussion: other factors; giving suitable examples. |  | K.L.B. BK IVPages 153-5 |  |
| 4 | 3 | Application of electrolysis. | Describe some applications of electrolysis. | Probing questions and brief discussion on applications of electrolysis.Practical assignment on electrolysis: electroplating an iron nail with a suitable metal. | Suitable voltameter. | K.L.B. BK IVPages 155-7 |  |
| 4 | Faraday’s law of electrolysis. | Determine quantity of electricity required to deposit one mole of a metal | Group experiments: record initial mass of cathode electrode, final mass, time taken, current flowing.Calculate quantity of electricity using the equation Q = It. | Weighing balance, stop watch, copper sulphate voltameter.  | K.L.B. BK IVPages 160-161 |  |
| 5 | Faraday’s law of electrolysis. | State Faraday’s law of electrolysis.Solve problems related to Faraday’s law of electrolysis. | Discuss above results, leading to Faraday’s law of electrolysis.Worked examples.Assignment. | Weighing balance, stop watch, copper sulphate voltameter. | K.L.B. BK IVPages 161-4 |  |
| 5 | 1 | C.A.T. |  |  |  |  |
| 2 | METALSOres of some metals. | Name the chief ores of some metals. | Exposition and brief discussion. |  | K.L.B. BK IVPages 168-9 |  |
| 3 | Occurrence and extraction of sodium. | Describe occurrence and extraction of sodium. | Oral questions on electrolysis and equations at electrodes.Brief discussion on occurrence and extraction. | Chart: Down’s cell. | K.L.B. BK IVPages 170-171 |  |
|  | 4 | Occurrence and extraction of aluminium. | Describe occurrence and extraction of aluminium. | Brief discussion.Write relevant chemical equations. |  | K.L.B. BK IVPages 171-3 |  |
| 5 | Occurrence and extraction of iron. | Describe occurrence and extraction of iron. | Brief discussion.Write relevant chemical equations. | Chart: Blast furnace. | K.L.B. BK IVPages 173-5 |  |
| 6 | 1,2 | Occurrence and extraction of zinc. | Describe occurrence and extraction of zinc by electrolysis and reduction methods. | Brief discussion.Write relevant chemical equations. | Flow chart: extraction of Zinc. | K.L.B. BK IVPages 175-9 |  |
| 3 | Extraction of lead. | Explain how lead is extracted. | Q/A & brief discussion.Write balanced chemical equations leading to extraction of lead. | Flow chart: extraction of lead. | K.L.B. BK IVPages 179-80 |  |
| 4 | Occurrence and extraction of copper. | Describe extraction of copper. | Q/A & brief discussion.Write balanced chemical equations leading to extraction of copper. | Flow chart: extraction of copper. | K.L.B. BK IVPages 181-183 |  |
| 5 | Physical properties of some metals. | State general properties of metals.Explain the difference in physical properties of metals. | Compare physical properties of some metals as summarized in a chart.Q/A & discussion based on physical properties. |  | K.L.B. BK IVPages 183-4 |  |
| 7 | 1,2 | Reaction of metals with oxygen. | Explain effect of burning metals in air. | Teacher demonstration / Group experiments.Burning some metals in air.Write relevant equations.Brief discussion. | Common lab. metals. | K.L.B. BK IVPages 184-6 |  |
|  | 3,4 | Reaction of metals with cold water and steam. | Describe reaction of metals with cold water and steam.Arrange the metals in order of reactivity with cold water and steam. | Class experiments: Investigate reaction of some metals with cold water and steam.Analyse the results. | Metals: Al, Zn, Fe, Cu.  | K.L.B. BK IVPages 186-9 |  |
| 5,1 | Reaction of metals with chlorine. | Describe the reaction of metals with chlorine. | Teacher demonstration in a fume cupboard / in the open.Investigate reaction of metals with chorine Write corresponding equations. |  Metals: Al, Zn, Fe, Cu. | K.L.B. BK IVPages 189-191 |  |
| 8 |
| 2,3 | Reaction of metals with acids. | Describe and explain reaction of metals with acids. | Group experiments: investigate reaction of metals with dilute acids.Teacher demonstration: investigate reaction of metals with concentrated acids.Discuss the observations made and write relevant chemical equations. | Metals: Al, Zn, Fe, Cu.Acids; HCl, HNO3, H2SO4. | K.L.B. BK IVPages 191-4 |  |
| 4 | Uses of metals. | State uses of some metals and alloys. | Q/A & brief discussion;Uses of Sodium, Aluminium, Zinc, Iron and Copper & some alloys. |  | K.L.B. BK IVPages 194-7 |  |
| 5 | Environmental effects of extraction of metals. | Identify some environmental effects of extraction of metals. | Oral questions and open discussion.Assignment / Topic review. |  | K.L.B. BK IVPages 197-8 |  |
| 9 | 1 | ORGANIC CHEMISTRY II**(ALKANES & ALKANOIC ACIDS)**Alkanols (Alcohols). | Identify the functional group of alkanols.Explain formation of alkanol molecules. | Q/A: review alkanes, alkenes and alkynes.Teacher exposes new concepts and links them with already known concepts. |  | K.L.B. BK IVPage 205 |  |
| 2 | Nomenclature of alkanols.  | Name and draw the structure of simple alkanols. | Guided discovery of naming system for alkanols.Draw and name structures of alkanols. |  | K.L.B. BK IVPages 206-8 |  |
| 3 | Isomerism in alkanols. | Describe positional and chain isomerism in alkanols.Explain formation of primary and secondary alkanols. | Q/A: review the terms positional and chain isomerism.Brief discussion on isomerism.Oral exercise: naming given organic compounds.Written exercise: writing structural formulae for isomers of organic compounds of a given molecular formula.  |  | K.L.B. BK IVPages 208-10 |  |
| 4-5 | Preparation of ethanol in the lab. | Describe preparation of ethanol in the laboratory. | Group experiments / teacher demonstration.Discuss the fermentation process.  | Calcium hydroxide solution, sugar solution, yeast. | K.L.B. BK IVPages 210-11 |  |
| 10 | 1 | Physical properties of alkanols. | Explain the physical properties of alkanols***.*** | Comparative evaluation of physical properties of alkanols.Q/A & discussion on variation in physical properties of alkanols. |  | K.L.B. BK IVPage 212 |  |
| 2 | Chemical properties of alkanols. | Describe some chemical reactions of alkanols. | Group experiments/ teacher demonstration to investigate combustion of ethanol and its reaction with metals.Write corresponding chemical equations.  |  | K.L.B. BK IVPages 213-5 |  |

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|  | 3 | Esters and esterification. | Explain formation of esters.Describe the esterification process. | Teacher exposes and explains new concepts.Assignment.  |  | K.L.B. BK IVPages 215-6 |  |
| 4,5 | Oxidation of ethanol. Uses of alkanols. | Explain oxidation of ethanol by an oxidizing agent. State uses of alkanols.Explain the effects of alcohol on human health | Q/A: review redox reactions, oxidizing and reducing agents.Brief discussion: oxidation of ethanol using potassium (VII) manganate or potassium (VI) dichromate.Write corresponding chemical equations.Open discussion. |  | K.L.B. BK IVPages 216-8 |  |
| 11 | 1 | Alkanoic (Carboxylic Acids). | Identify the functional group of alkanoic (carboxylic) acids.Explain formation of alkanoic acid molecule. | Q/A: review functional group of alkanols.Brief discussion. |  | K.L.B. BK IVPage 219 |  |
| 2 | Nomenclature of alkanoic acids. | Name and draw the structure of simple alkanoic acids. | Guided discovery of the naming system for alkanoic acids. |  | K.L.B. BK IVPages 219-221 |  |
| 3 | Lab preparation of ethanoic acid. | Describe laboratory preparation of ethanoic acid. | Teacher demonstration: prepare ethanoic acid in the lab.Brief discussion on preparation of ethanoic acid. |  | K.L.B. BK IVPages 221-223 |  |
| 4,5 | Physical properties of alkanoic acids. | Explain some physical properties of alkanoic acids. | Compare physical properties of some alkanoic acids.Discuss the difference in physical properties among alkanoic acids. |  | K.L.B. BK IVPages 223-4 |  |