The City School

Curriculum Distribution Chart

Class 9: August '18 – May '19

Subject: Chemistry			CIE Code: 5070
Month : August 2018			**Syllabus Content (As taken from the CIE 2016 - syllabus)**
Topic	**Content**	**Week***	**Learning Outcomes (*Candidates should be able to :*)**
2. The particulate nature of matter	**2.1 Kinetic particle theory**	3 weeks	*(a)* *describe the solid, liquid and gaseous states of matter and explain their interconversion in terms of the kinetic particle theory and of the energy changes involved *(b)* *describe and explain evidence for the movement of particles in liquids and gases (the treatment of Brownian motion is not required) *(c)* explain everyday effects of diffusion in terms of particles, e.g. the spread of perfumes and cooking aromas; tea and coffee grains in water *(d)* *state qualitatively the effect of molecular mass on the rate of diffusion and explain the dependence of rate of diffusion on temperature *(e)* state qualitatively and explain the effects of temperature and pressure on the volumes of gases
	2.3 Structure and Properties of Matter		*(a)* describe the differences between elements, compounds and mixtures
1.Experimental Chemistry	**1.1Experimental design**		*a)* name appropriate apparatus for the measurement of time, temperature, mass and volume, including burettes, pipettes, measuring cylinders and gas syringes *b)* suggest suitable methods of purification, given information about the substances involved (from 1.2 Methods of purification and anaylsis) *(b)* suggest suitable apparatus, given relevant information, for a variety of simple experiments, including collection of gases and measurement of rates of reaction

September 2018			
2. The particulate nature of matter	**2.2 Atomic structure**	Week 4	*a)* state the relative charges and approximate relative masses of a proton, a neutron and an electron *(b)* *describe, with the aid of diagrams, the structure of an atom as containing protons and neutrons (nucleons) in the nucleus and electrons arranged in shells (energy levels) (no knowledge of s, p, d and f classification will be expected; a copy of the Periodic Table will be available in Papers 1 and 2) *(c)* define proton number and nucleon number *(d)* interpret and use symbols such as $_{6}C^{12}$
		Week 5	*(e)* define the term *isotopes* *(f)* deduce the numbers of protons, neutrons and electrons in atoms and ions from proton and nucleon numbers *(g)* state that some isotopes are radioactive
8. The Periodic Table	**8.1 Periodic trends**	Week 6 Week 7 *(Oct '17)* Week 8	*(a)* describe the Periodic Table as an arrangement of the elements in the order of increasing proton (atomic) number *(b)* *describe how the position of an element in the Periodic Table is related to proton number and electronic structure *(c)* *describe the relationship between Group number and the ionic charge of an element *(d)* explain the similarities between the elements in the same Group of the Periodic Table in terms of their electronic structure *(e)* describe the change from metallic to non-metallic character from left to right across a period of the Periodic Table *(f)* *describe the relationship between Group number, number of valency electrons and metallic/ non-metallic character *(g)* *predict the properties of elements in Group I, VII and the transition elements using the Periodic Table
October 2018			
8.The Periodic Table	**8.2 Group Properties**	Week 9	*(a)* describe lithium, sodium and potassium in Group I (the alkali metals) as a collection of relatively soft, low-density metals showing a trend in melting point and in their reaction with water

	8.3 Transition elements	Week 10 Week 11	*(b)* describe chlorine, bromine and iodine in Group VII (the halogens) as a collection of diatomic non-metals showing a trend in colour, state and their displacement reactions with solutions of other halide ions (c) describe the elements in Group VIII (the noble gases, also known as Group 0) as a collection ofmonatomic elements that are chemically unreactive and hence important in providing an inert atmosphere, e.g. argon and neon in light bulbs; helium in balloons; argon in the manufacture of steel (d) describe the lack of reactivity of the noble gases in terms of their electronic structures
	8.3 Transition elements	Week 12 Week 13	*(a)* describe the central block of elements (transition metals) as metals having high melting points, high density, variable oxidation state and forming coloured compounds *(b)* state the use of these elements and/or their compounds as catalysts, e.g. iron in the Haber process; vanadium(V) oxide in the Contact process; nickel in the hydrogenation of alkenes, and how catalysts are used in industry to lower energy demands and hence are economically advantageous and help conserve energy sources
Month : December 2018			
		Week 1	**Revision /** (buffer to complete the syllabus)
		Week 2	**Revision**
Mid - Year Examination 2018			
SECOND TERM			
Month : January 2019			
1. Experimental Chemistry	**1.2 Methods of purification and analysis**	Week 1 & 2	*(a)* describe methods of purification by the use of a suitable solvent, filtration and crystallisation, distillation and fractional distillation, with particular references to the fractional distillation of crude oil, liquid air and fermented liquor

		Week 3	*(c)* describe paper chromatography and interpret chromatograms including comparison with 'known' samples and the use of R_f values *(d)* explain the need to use locating agents in the chromatography of colourless compounds
		Week 4	*(e)* deduce from the given melting point and boiling point the identities of substances and their purity *(f)* explain that the measurement of purity in substances used in everyday life, e.g. foodstuffs and drugs, is important
Month: February 2019			
	2.4 Ionic bonding	Week 5	*(a)* *describe the formation of ions by electron loss/gain in order to obtain the electronic configuration of an inert gas *(b)* *describe the formation of ionic bonds between metals and non-metals, e.g. NaC*l*; MgCl_2 *(c)* *state that ionic materials contain a giant lattice in which the ions are held by electrostatic attraction, e.g. NaC*l*(candidates will not be required to draw diagrams of ionic lattices) *(d)* deduce the formulae of other ionic compounds from diagrams of their lattice structures, limited to binary compounds *(e)* relate the physical properties (including electrical property) of ionic compounds to their lattice structure
2. Particulate Nature of Matter	**2.5 Covalent bonding**	Week 6	*(a)* *describe the formation of a covalent bond by the sharing of a pair of electrons in order to gain the electronic configuration of an inert gas *(b)* describe, using 'dot-and-cross' diagrams, the formation of covalent bonds between non-metallic elements, e.g. H_2; Cl_2; O_2; HC*l*; N_2; H_2O; CH_4; C_2H_4; CO_2 *(c)* deduce the arrangement of electrons in other covalent molecules *(d)* relate the physical properties (including electrical properties) of covalent compounds to their structure and bonding
	2.6 Metallic bonding	Week 7	*(a)* *describe metals as a lattice of positive ions in a 'sea of electrons' *(b)* *relate the malleability of metals to their structure and the electrical conductivity of metals to the mobility of the electrons in the structure
	2.3 Structure and properties of materials	Week 8	*(b)* *compare the structure of simple molecular substances, e.g. methane, iodine, with those of giant molecular substances, e.g. sand, diamond, graphite in order to deduce their properties *(c)* *compare the bonding and structures of diamond and graphite in order to deduce properties such as electrical conductivity, lubricating or cutting

			action (candidates will not be required to draw the structures) *(d)* deduce the physical and chemical properties of substances from their structures and bonding and vice versa
3. Formulae, stoichiometry and the mole concept		Week 9 Week 10	*(a)* state the symbols of the elements and formulae of the compounds mentioned in the syllabus *(b)* deduce the formulae of simple compounds from the relative numbers of atoms present and *vice versa* *(c)* deduce the formulae of ionic compounds from the charges on the ions present and *vice versa* *(e)* define relative atomic mass, A_r *(f)* define relative molecular mass, M_r , and calculate relative molecular mass (and relative formula mass) as the sum of relative atomic masses
Month: March 2019			
7. The chemistry and uses of acids, bases and salts	**7.1 The characteristic properties of acids and bases**	Week 11	**7.1 The characteristic properties of acids and bases** *(a)* describe the meanings of the terms acid and alkali in terms of the ions they contain or produce in aqueous solution and their effects on Universal Indicator paper *(b)* describe how to test hydrogen ion concentration and hence relative acidity using Universal Indicator paper and the pH scale
		Week 12	*(c)* describe the characteristic properties of acids as in reactions with metals, bases and carbonates *(d)* describe qualitatively the difference between strong and weak acids in terms of the extent of Ionisation *(e)* describe neutralisation as a reaction between hydrogen ions and hydroxide ions to produce water, $H^+ + OH^- \rightarrow H_2O$
		Week 13	*(f)* describe the importance of controlling the pH in soils and how excess acidity can be treated using calcium hydroxide *(g)* describe the characteristic properties of bases in reactions with acids and with ammonium salts *(h)* classify oxides as acidic, basic or amphoteric, based on metallic/non-metallic character

	7.2 Preparation of salts	Week 14	*(a)* *describe the techniques used in the preparation, separation and purification of salts as examples of some of the techniques specified in Section 1.2(a) (methods for preparation should include precipitation and titration together with reactions of acids with metals, insoluble bases and insoluble carbonates)
Month: April 2019			
7. The chemistry and uses of acids, bases and salt	**7.2 Preparation of salts**	Week 15	*(b)* describe the general rules of solubility for common salts to include nitrates, chlorides (including silver and lead), sulfates (including barium, calcium and lead), carbonates, hydroxides, Group I cations and ammonium salts
			(c) suggest a method of preparing a given salt from suitable starting materials, given appropriate information
3. Formulae, stoichiometry and the mole concept		Week 16	*(d)* interpret and construct chemical equations, with state symbols, including ionic equations
		Week 17	Revision (*buffer week to complete any topic)*
Month: May 2019			
		Week 1 , 2 & 3	Revision
Annual Examination 2019			

* Break-up in weeks is only suggestive and not prescriptive

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Topic Wise Syllabus Break up Chemistry 5070

- The learning outcomes in weekly break up have been taken from the CIE syllabus. A topic wise break up of units as mentioned in most Chemistry books (CIE content is different from the one being shown in most text book) is given below to assist you in using the text book to the maximum of students' advantage.

Year	Topics/ Units	
Year/ term	**First Term**	**Second Term**
Year 1	• 2.1 Kinetic particle theory (a - e) • 2.3 structure and properties of materials (a) • 1.1 Experimental design (a, b) • 2.2 Atomic structure (a-g) • 8.1 Periodic trends (a-g) • 8.2 Group properties (a-d) • 8.3 Transition elements (a, b)	• 1.2 Methods of purification (a-f) • 2.4 Ionic bonding (a-e) • 2.5 Covalent bonding (a-d) • 2.6 Metallic bonding (a,b) • 2.3 structure and properties of materials (b,c,d) • Formulae and stoichiometry and the mole concept (a-f) • 7.1 The characteristic properties of acids (a – h) • 7.2 Preparation of salts (a-c)
Year 2	• 5 Energy from chemicals (a – j) • 3 Formula, stoichiometry and the mole concept (g – k) • 1.3 Identification of ions and gases (a – d) • 6.1 Rate of reaction (a – f)	• 7.3 Properties and uses of ammonia (d - g) • 7.4 Sulfuric acid (a, b, c) • 6.2 Redox (a – d)

	• 6.3 Reversible reactions (a, b) • 4 Electrolysis (a- k) • 9.1 Properties of metals (a – d) • 9.2 Reactivity series (a – d) • 9.3 Extraction of metals (a – c) • 9.4 Iron (a – e) • 9.5 Aluminium (a – e) • 7.3 Properties and uses of ammonia (a,b,c)	• Revision • Past papers sessions /practice.
Year 3	• 10.1 Air (a – j) • 10.2 Water (a – d) • 11.1 Alkanes (a – e) • 11.2 Alkenes (a –g) • 11.3 Alcohols (a – e) • 11.4 Carboxylic acids (a – g) • 11.5 Macromolecules (a –k)	• Revision • Past papers sessions /practice.