

## Intermediate II YEAR -CHEMISTRY (THEORY)

### 1. V A GROUP ELEMENTS:

1.1 V A group elements – Nitrogen and Phosphorus General characteristics with special reference to Hydrides, Oxides, Halides, Structural aspect of Oxy-acids.

1.2 Preparation and uses of Ammonia and super-phosphate.

06 Periods

### 2. VI A GROUP ELEMENTS:

2.1 Oxygen and sulphur – Allotropy – General characteristics with special reference to Hydrides, Oxides ( $\text{SO}_2$ ,  $\text{SO}_3$ ) Halides, Structural aspect of Oxy acids.

2.2 Preparation and properties of Ozone and Sodium thiosulphate.

06 Periods

### 3. VII A GROUP ELEMENTS:

3.1 General characteristics of Halogens.

3.2 Preparation, properties and uses of fluorine and chlorine.

3.3 Oxides and oxy-acids of chlorine only (only structural treatment and oxidation states).

3.4 Preparation, properties and uses of Bleaching Powder.

06 Periods

### 4. TRANSITION-ELEMENTS (d-BLOCK ELEMENTS):

Definition – General characteristics of 3d series with special reference to variable Oxidation states, magnetic properties, colour, formation of alloys and complex compounds – Werner's theory.

### 5. SOLUTIONS:

5.1 Methods of expressing concentration of solutions – Molarity, Molality, normality and mole-fraction.

5.2 Vapour pressure-effect of temperature on Vapour pressure-Vapour pressure and Boiling point. Relative lowering of vapour pressure-Raoult's law (elementary treatment).

08 Periods

### 6. ACIDS AND BASES:

6.1 Theories of Acids and Bases Lowry – Bronsted concept Lewis theory of acids and bases.

6.2 Ionic product of water, PH, Buffers – Numerical problems on these, Indicators – Choice of indicators, PH-range and uses.

6.3 Salt hydrolysis – Types of hydrolysis with examples.

10 Periods

### 7. CHEMICAL KINETICS, CHEMICAL EQUILIBRIUM AND ENERGETICS:

7.1 Concepts of reaction rate, factors affecting reaction rates, Rate law, rate constant and its units. Order and Molecularity – First order rate equation and half life – Collision Theory of reaction rate (No derivation).

7.2 Reversible and Irreversible reactions. Concept of chemical equilibrium – Law of Mass Action – chemical equilibrium- $K_c$ ,  $K_p$  and their relationship with respect to Ammonia and Sulphur Trioxide.

7.3 Lechatelier's Principle and its application to the industrial processes like Ammonia and Sulphur Trioxide.

7.4 Thermochemistry: Exothermic and Endothermic reactions with examples – Heat of reaction (the relation between  $\Delta E$  and  $\Delta H$ ) Combustion, formation, solution and neutralisation – Hess's law of constant heat summation.

14 Periods

### 8. ELECTRO-CHEMISTRY:

8.1 Electrolytes and Non-electrolytes.

- 8.2 Faraday's laws of electrolysis.  
8.3 Galvanic & Voltaic cells – representation  
06 Periods  
8.4 Nernst equation (No derivation) – e.m.f. calculations.

### **9. NUCLEAR CHEMISTRY:**

- 9.1 Composition of Nucleus – Isotopes, Isotones, Isobars, Isodiaphers, Nuclear stability – Factors effecting Nuclear stability, mass defect, binding energy, Average binding energy, N/P ratio, Magic Numbers).  
9.2 Radio-active disintegration and its rate-Half-life and average life.  
9.3 Natural and artificial radio-activity, disintegration series-Group displacement law-Types of Nuclear reactions (fission and fusion)-Differences between Nuclear and Chemical reactions- Radio-active isotopes and their applications Iodine <sup>131</sup>, Cobalt <sup>60</sup>, Sodium <sup>24</sup>, C <sup>14</sup> and P <sup>30</sup>.

### **10. SURFACE CHEMISTRY :**

- 10.1 Adsorption and absorption. Physical and chemical adsorption-distinguishing properties-Adsorption of gases on Metals Adsorption from solutions (Elementary treatment).  
10.2 Colloidal state:- True and colloidal solutions – Explanation of the terms – Dispersion medium, dispersed phase, lyo-phillic and lyo-phobic sols using the examples; smoke, cloud, blood, milk, starch solution and gold sol.  
10.3 Emulsions:- Emulsifying agent and emulsification – its applications. Miscelles – cleansing action of soap.  
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10.4 Catalysis – Explanation of the terms – Homogeneous and Hetero-geneous catalysis – distinctions with suitable Examples-auto-catalysis with one example.  
08 Periods

### **11. CARBON COMPOUNDS**

- 11.1 Alkyl Halides – Nomenclature-Preparation, properties and uses of Ethyl chloride and chloroform.  
11.2 Oxygen compounds:- Nomenclature of Alcohols, Ethers, Aldehydes, Ketones and Carboxylic acids. Preparation, properties and uses of Ethyl Alcohol, Diethyl ether, Acetaldehyde, Acetone and Acetic acid.  
11.3 Nitro-compounds-Nomenclature of Amines and Nitro-compounds- Preparation, Properties and uses of Nitro-benzene and aniline.  
14 Periods

### **12. CHEMISTRY IN BIOLOGY AND MEDICINE:**

- 12.1 Brief Survey on the importance of Metals in the bio-molecules viz., Haemoglobin Cyano-cobalamin (Vitamin B12) and Chlorophyll-basic structure, function of metal ions and uses.  
12.2 Common drugs used in Medicine-Acetyl Salicylic Acid (Aspirin)-Paracetamol, Methyl Salicylate (Oil of winter green) preparation and uses only.  
08 Periods