

**Module I****Chapter 1 : Principles of Spectroscopy****1-1 to 1-13**

Syllabus : Introduction : Principle of spectroscopy, Definition, Origin of spectrum, Classification of spectroscopy – atomic and molecular, selection rules. Table of relation between electromagnetic spectrum, types of spectroscopy and energy changes.

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Module II**Chapter 2 : Applications of Spectroscopy****2-1 to 2-12**

Syllabus : Emission spectroscopy : Principle, Instrumentation and applications (Flame Photometry), Introduction to fluorescence and phosphorescence, Jablonski diagram, application of fluorescence in medicine only.

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Module III

Chapter 3 : Concept of Electrochemistry

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Syllabus : Concept of electrode potential, Nernst equation, concept of standard electrode with examples, electrochemical series, simple numericals.

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Module IV

Chapter 4 : Corrosion

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Syllabus : Definition, Mechanism of Corrosion : (I) Dry or Chemical Corrosion- (i) Due to oxygen (ii) Due to other gases. (II) Wet or Electrochemical corrosion - Mechanism (i) Evolution of hydrogen type (ii) Absorption of oxygen.

Types of Corrosion : Galvanic cell corrosion, Concentration cell corrosion(differential aeration principle), Pitting corrosion, Intergranular corrosion, Stress corrosion. Factors affecting the rate of corrosion : (i)Nature of metal, (ii)Nature of corroding environment. Methods of corrosion control :

(I) Material selection and proper designing,

(II) Cathodic protection- (i) Sacrificial anodic protection (ii) Impressed current method,

(III) Metallic coatings- only Cathodic coating (tinning) and anodic coatings (Galvanising)

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**Module V****Chapter 5 : Green Chemistry and Synthesis of Drugs****5-1 to 5-22**

Syllabus : Definition, significance Twelve Principles of Green chemistry, numerical on atom economy, Conventional and green synthesis of Adipic acid, Indigo, Carbaryl, Ibuprofen, Benzimidazole, Benzyl alcohol, % atom economy and their numericals. Green fuel- Biodiesel.

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**Module VI****Chapter 6 : Fuels and Combustion****6-1 to 6-88**

Syllabus : Definition, classification, characteristics of a good fuel, units of heat (no conversions). Calorific value- Definition, Gross or Higher calorific value and Net or lower calorific value, Dulong's formula and numerical for calculations of Gross and Net calorific values. Solid fuels - Analysis of coal-Proximate and Ultimate Analysis- Numerical problems and significance. Liquid fuels- Petrol- Knocking, Octane number, Cetane number, Antiknocking agents, Unleaded petrol, oxygenates (MTBE), catalytic converter. Combustion-Calculations for requirement of only oxygen and air (by weight and by volume only) for given solid and gaseous fuels.

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