

## DEPARTMENT OF CHEMISTRY

### CHEMISTRY IN DAILY LIFE

#### UNIT-I

**Dairy Products:** Composition of milk and milk products. Analysis of fat content, minerals in milk and butter. Estimation of added water in milk.

**Beverages:** Analysis of caffeine in coffee and tea, detection of chicory in coffee, chloral hydrate in toddy, estimation of methyl alcohol in alcoholic beverages.

**Food additives, adulterants and contaminants-** Food preservatives like benzoates, propionates, sorbates, disulphites.

**Artificial sweeteners:** Aspartame, saccharin, dulcin, sucralose and sodium cyclamate.

**Flavours:** Vanillin, alkyl esters (fruit flavours) and monosodium glutamate.

**Artificial food colorants:** Coal tar dyes and non-permitted colours and metallic salts. Analysis of pesticide residues in food.

**Paints & Pigments:** White pigments (white lead, ZnO, lithopone, TiO<sub>2</sub>). Blue, red, yellow and green pigments. Paints and distempers: Requirement of a good paint. Emulsion, latex; luminescent paints. Fire retardant paints and enamels, lacquers. Solvents and thinners for paints.

**Dyes:** Colour and constitution (electronic concept). Classification of dyes. Methods of applying dyes to the fabrics. A general study of azo dyes, Mordant brown, Congo red and methyl orange.

#### UNIT II

**Air Pollution:** Air pollutants, prevention and control, Green house gases and acid rain. Ozone hole and CFC's. Photochemical smog and PAN. Catalytic converters for mobile sources. Bhopal gas tragedy.

**Hydrologic cycle,** sources, criteria and standards of water quality-safe drinking water. Public health significance and measurement of water quality parameters- (Colour, turbidity, total solids, acidity, alkalinity, hardness, sulphate, fluoride, phosphate, nitrite, nitrate, BOD and COD). Water purification for drinking and industrial purposes.

**Toxic chemicals** in the environment. Detergents- pollution aspects, eutrophication. Pesticides and insecticides-pollution aspects. Heavy metal pollution. Solid pollutants- treatment and disposal. Treatment of industrial liquid wastes. Sewage and industrial effluent treatment.

**Composition of soil** – inorganic and organic components in soil-micro and macronutrients.

**Fertilisers:** Classification of Fertilizers- Straight Fertilizers, Compound/Complex Fertilizers, Fertilizer Mixtures. Manufacture and general properties of Fertilizer products- Urea and DAP.

#### UNIT-III

**Carbohydrates:** Structure, function and Chemistry of some important mono and disaccharides.

**Vitamins:** Classification and Nomenclature. Sources, deficiency diseases and structures of Vitamin A<sub>1</sub>, Vitamin B<sub>1</sub>, Vitamin C, Vitamin D, Vitamin E & Vitamin K<sub>1</sub>.

**Drugs:** Classification and nomenclature.

Structure and function of: *Analgesics* – aspirin, paracetamol.

*Anthelmintic drug:* mebendazole.

*Antiallergic drug:* Chloropheneramine maleate.

*Antibiotics:* Pencillin V, Chloromycetin, Streptomycin.

*Anti-inflammatory agent:* Oxypheno-butazone.

*Antimalarials:* Primazuine phosphate & Chloroquine.

**Oils and fats:** Composition of edible oils, detection of purity, rancidity of fats and oil. Tests for adulterants like aregemone oil and mineral oils.

**Soaps & Detergents:** Structures and methods of use of soaps and detergents.

#### UNIT IV

**Chemical Thermodynamics:** Concept of fugacity and free energy, Acitivity and activity coefficient, spontaneity of processes- entropy and free energy changes. Partial molar quantities, colligative properties, Le-Chatelier principle, phase equilibria. Enzyme catalysed reactions.

**Principles of Reactivity:** Basis kinetic concepts, rates of simple and complex chemical reactions, empirical rate equations. Temperature dependence of rates and activation parametrs. Branched chain reactions – explosion limits. Oscillatroy reactions.

**Corrosion:** Types and prevention, corrosion failure and analysis

**Chemical energy system** and limitations, principles and applictions of primatry & secondary batteries and fuel cell. Basics of solar energy, future energy storer.

**Polymers :** Types and classification of polymers. Source and general characteristics of natural and synthetic polymers. Typical examples of polymers used as plastics, in textiles, in electronic and automobile components, in the medical and aerospace materials. Problems of plastic waste management. Strategies for the development of environment friendly polymers.

#### **References**

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2. Medicinal Chemistry by Ashtoush Kar.
3. Drugs and Pharamaceutical Sciences Series, Marcel Dekker, Vol. II, INC, New York.
4. Analysis of Foods – H.E. Cox: 13. Chemical Analysis of Foods – H.E.Cox and pearson.
5. Foods: Facts and Principles. N. Shakuntala Many and S. Swamy, 4<sup>th</sup> ed. New Age International (1998)
6. Physical Chemistry – P I Atkins and J. de Paula – 7<sup>th</sup> Ed. 2002, Oxford University Press.
7. Handbook on Feritilizer Technology by Swaminathan and Goswamy, 6<sup>th</sup> ed. 2001, FAI.
8. Organic Chemistry by I. L. Finar, Vol. 1 & 2.
9. Polymer Science and Technology, J. R. Fired (Prentice Hall).