

B.Sc. IInd Semester-Industrial Chemistry

Course No: DSC-6B

Course Weightage: 04 Credit

Unit-I: Fuels and Combustion

(14 Contact hours)

Introduction, classification of fuels, caloric value – Gross Caloric value and net Calorific value. Characteristics of good fuel.

Coal : Classification of Coal by Rank, selection of Coal, composition and carbonization of coal.

Coal gas, Producer gas and water gas composition and uses.

Fractionation of Coal tar , uses of Coal tar based chemicals. Coal liquefaction and Solvent refining.

Unit II: Petroleum and Petrochemical Industry:

(16 Contact hours)

Composition of crude petroleum, Refining and different types of petroleum products and their applications. Fractional Distillation (Principle and process), Cracking (Thermal and catalytic cracking). Reforming Petroleum and non-petroleum fuels (LPG, CNG, LNG, bio-gas, fuels derived from biomass), fuel from waste, synthetic fuels (gaseous and liquids), clean fuels, Petrochemicals: Vinyl acetate, Propylene oxide, Isoprene, Butadiene, Toluene and its derivatives-Xylene.

Unit III: Lubricants

(14 Contact hours)

Classification, Mechanism of Lubricants (Friction and wear). Lubricating oils (Conducting and Non-conducting) and their properties. Solid and Semisolid Lubricants, Synthetic Lubricants. Properties of Greases.

Properties of Lubricants (Viscosity index, cloud point, pore point) and their determination.

Vegetables oils and Fatty acids as Lubricants. Additives for Lubricating oils.

Unit IV: Oils and Fats

(16 Contact hours)

Classification of oils, Fat splitting, distillation of completely miscible and non-miscible oils, hydrogenation of oils, rancidity, saponification value, iodine number and acid value.

Soap and Synthetic Detergent: Classification of Surface active agents, Bio-degradability of Surfactants.Preparation of Soap and detergent. Different types of soap and their composition, cleansing action of soap. Metal soaps, oils used for soaps.

Books Recommended:

1. Introduction to petroleum chemicals, H. Steiner Pergamon Press.
2. Handbook of petroleum refining processes: R.A. Meyers, McGraw Hill, New York.
3. Introduction to petroleum chemicals; H. steiner , Pergamon Press.

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Course No: DSC-6B (Lab)

Course Weightage: 02 Credit

1. Determination of alkali in water samples and soaps.
2. Separation of essential oils by soxhlet extractor
3. Analysis of oils and fats (iodine value, saponification value, acid value)
4. Estimation of hardness of water by titration with soap solution
5. Estimation of Available Oxygen in Hydrogen Peroxide
6. Preparation of Soap.
7. Determination of physical constants – Refractive index, Surface tension- effect of Surfactants on Surface tension. Viscosity and optical rotation effect.
8. Determination of smoke point of Kerosene oil
9. Determination of acid value of oil or fat

Books Recommended:

1. Vogel's Qualitative Inorganic Analysis; S. Vohra; 7th ed.; Orient Longman; 2004.
2. Practical industrial chemistry, Zeba N. Siddiqui, Anmol publications Pvt. Ltd New Delhi
3. Advanced Practical Inorganic Chemistry; Gurdeep Raj; 24th ed.; Goel Publishing House; 2012.
4. Analytical Chemistry; Gary D-Christian; 6th ed.; Wiley; 2010.