

18. Pharmaceutical Technology

BIOCHEMISTRY AND CELL BIOLOGY

Cell structure and organization – Prokaryotic and eukaryotic cells. Biomolecules – Structure and functions of carbohydrates, proteins, lipids, and nucleic acids. Enzymes – Classification, mechanism of enzyme action, enzyme kinetics. Vitamins and coenzymes. Bioenergetics – Glycolysis, TCA cycle, and oxidative phosphorylation.

MICROBIOLOGY AND IMMUNOLOGY

Classification of microorganisms. Microscopy and staining techniques. Sterilization and disinfection methods. Microbial growth and kinetics. Microbial assays. Types of immunity- innate and acquired. Humoral and cell-mediated immunity. Structure and functions of immunoglobulins. Antigen-antibody reactions. Hypersensitivity reactions. General principles of vaccine preparation-bacterial and viral vaccines.

BIOTECHNOLOGY

Fundamentals of biotechnology. Fermentation technology – Types of fermentation processes. Fermenter design – Basic components and operation. Upstream and downstream processing. Biopharmaceuticals – Introduction and applications.

PHARMACEUTICAL TECHNOLOGY

Introduction to dosage forms – tablets, capsules, parenterals, suspensions, emulsions, semisolids, suppositories, and liquid dosage forms. Stability of pharmaceutical products. Introduction to novel drug delivery systems (NDDS). Basic concepts of bioavailability and bioequivalence. Principles of fluid flow, heat transfer, evaporation, distillation, drying, size reduction, size separation, filtration, and centrifugation.

INSTRUMENTAL METHODS AND MEDICINAL CHEMISTRY

Principles, instrumentation, and pharmaceutical applications of UV–Visible spectroscopy, Infrared spectroscopy, Nuclear Magnetic Resonance spectroscopy, and Mass spectrometry. Chromatographic techniques – TLC, HPTLC, GC and HPLC. Classification, mechanism of action, and therapeutic uses of cardiovascular drugs, antidiabetic drugs, analgesics, CNS drugs, and antihyperlipidemic drugs. Introduction to drug design, concept of lead compounds and physicochemical parameters influencing drug action- QSAR and molecular docking.