

SARDAR PATEL UNIVERSITY
B. Sc. (Biochemistry) Semester III
US03CBCH21 Biochemistry of Bio Molecules I

UNIT I: Carbohydrates and glycobiology.

- Definition, classification and functions of carbohydrates.
- Occurrence and biochemical roles of monosaccharides.
- Disaccharides (maltose, sucrose and lactose).
- Oligosaccharides (Raffinose).
- Polysaccharides (starch, glycogen, cellulose, heparin).
- Physical properties – Asymmetric carbon, D and L isomers, isomerism, mutarotation, optical activity, epimers, cyclization.
- Chemical properties – Osazone formation, action of acids and alkali on sugars
- Derivatives of Sugars with example.

UNIT II: Nucleotide and Nucleic acids:

1. Functions and composition of nucleic acids
2. Structure of nucleotides, purines and pyrimidines.
3. Nomenclature of nucleotides.
4. DNA
 - (a) Structure of DNA.
 - (b) DNA double helix (Watson and crick model).
 - (c) Chargaff's rule of DNA compositions.
 - (d) Different forms of DNA (Double Helix).
 - (e) The size of DNA.
 - (f) Organization of DNA in the cell.
 - (g) Denaturation & Renaturation of DNA strands.
5. RNA
 - Types & Structure of RNA:-
 - (a) Messenger RNA
 - (b) Transfer RNA
 - (c) Ribosomal RNA

UNIT III: Vitamins

Definition & Classification of Water soluble and fat soluble vitamins.
Sources, chemical nature (without structure) functions of vitamins.
Roles of Coenzymes

UNIT IV: Minerals

- ❖ Definition & classification
- ❖ Macro and Micro minerals - their sources, RDA.
- ❖ Role of Minerals as Co-factor (biochemical reaction)
- ❖ General Functions of Minerals.
- ❖ Disorders of Macro Minerals.

REFERENCE BOOKS:

1. Biochemistry Mathews –Van Holde.
2. Fundamentals of biochemistry Dr. J.L Jain, Dr.Sanjay Jain. Nitin Jain.
3. Textbook of biochemistry for medical students DM. Vasudevan, Sreekumari S. Kannan Vaidyanathan.
4. Zubay's Principles of biochemistry VeerBala Rastogi K.R. Aneja.
5. Textbook of Biochemistry for medical students RAFI MD.
6. Biochemistry U.Satayanarayana, U Chakrapani.
7. Outlines of Biochemistry Eric E. Conn, Paul k. Stumpf, George Bruening Roy H. Doi
8. Textbook of medical biochemistry :7th Edition – Rana Shinde, M.N. Chatterjea

SARDAR PATEL UNIVERSITY
B. Sc. (Biochemistry) Semester III

US03CBCH22 : BIOPHYSICAL BIOCHEMISTRY

UNIT-1 WATER:-

- 1) Structure and solvent properties.
- 2) Colligative properties of water.
- 3) Distribution of body water.
- 4) Normal water balance.
- 5) Regulatory mechanism of normal water balance.
 - A)** Role of kidney.
 - B)** Thirst mechanism.
 - C)** Role of ADH and Aldosterone
- 6) Abnormal water balance.
 - A)** Pure water Dehydration.
 - B)** Pure Salt Dehydration.
 - C)** Mixed type (water & Salt) Dehydration
 - D)** Over hydration.

UNIT-2 Acid, Base, and Buffer:-

1. Definition of Acid, Base, Buffer & pH and pH measurement methods.
2. Physiological Buffer System.
 - A. Intracellular

- B. Extracellular
3. Titration curve and pka of weak acid
 4. H-H equation & its example to find PH and pka

UNIT-3 Biophysical Biochemistry:-

- 1) Colloid:-Definition & classification of colloids
- 2) Properties of colloids (in short). (A) Tyndal effect (B) Dialysis (C) Brownian movement (D) Ageing (E) Coagulation (F) Electrical Properties.
- 3) Biological significance of Colloids.
- 4) Definition & significance of - Viscosity, surface tension, Osmosis, Diffusion, Donnan membrane equilibrium.

SARDAR PATEL UNIVERSITY
B. Sc. (Biochemistry) Semester III
COURSE: US03CBCH23 (P)
(BIOCHEMISTRY PRACTICAL)

- Rules and regulations in a biochemistry laboratory.
- Preparation of Normal ,% solution(understanding of practical calculation).
- Estimation of Vitamin – C by titrimetric method.
- Qualitative analysis of carbohydrate.
- Quantitative analysis by Beer's Law / λ_{max} . (K_{MnO4})
- Estimation of Iron.
- Estimation of Phosphorous.

REFERENCE BOOK:-

- Standard methods of biochemical analysis – S.R. Thimmaiah.
- Practical clinical biochemistry methods & interpretations – ranjana chawla.
- Practical biochemistry by Harold Varley.
- Laboratory manual in biochemistry – by J. Jayaraman
- Lab manual in biochemistry, immunology & biotech – by Arti Nigam, Archana Ayyagiri
- Laboratory manual in biochemistry – By Subrayaman

UNIT-4 Radioisotopes

- 1) Introduction of isotopes:-atomic Numbers, mass numbers, isotopes Radioisotopes, unit of radio activity, Half lives of isotopes. Radio active decay.
- 2) Techniques used in measurement of radioactivity:- Principle and method of Autoradiography, Scintillation Counting, Geigermuller Counter.
- 3) Biological hazards of radiation and its safety.
- 4) Significances and applications of radio isotopes in various field of biological science and medical field.

REFERENCE Books:-

1. Biophysical Chemistry BY Upadhayay and Nath.
2. Hawks biochemistry.
3. Human Physiology By C.C.Chetargy.
4. Principles of biochemistry – lehninger.

**SARDAR PATEL UNIVERSITY
B. Sc. (Biochemistry) Semester III
(BIOCHEMISTRY PRACTICAL)**

- ❖ Find out Normality of Base.
- ❖ Find out Normality of Acid.
- ❖ Measurement of pH of buffer by pH meter
- ❖ Verification of Beer's law (methelene blue)
- ❖ Acidity of water.
- ❖ Alkalinity of water.
- ❖ Qualitative analysis of Water.

REFERENCE BOOK:-

- Standard methods of biochemical analysis – s.r. thimmaiah.
- Practical cilinical biochemistry methods & interepretations – ranjana chawla.
- Practical biochemistry by harold varley.