

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT**S. Y. B. Sc.****BIOSCIENCE Semester III****(Effective from June – 2012)****Paper - I Biochemistry****Unit : I Carbohydrates**

1. Introduction, natural occurrence & physiological importance.
2. Classification: aldoses & ketoses. Monosaccharide, Disaccharides & polysaccharides. Their structure.
3. Physical properties of carbohydrates, asymmetrical carbon atom, stereoisomerism & optical isomerism.
4. Configuration in Sugar: Linear & Ring structure.

Unit : II Amino acids & Proteins.

1. Introduction to amino acids.
2. Essential amino acids, structure & importance.
3. Peptide linkage, polypeptide –primary, secondary tertiary structure.
4. Classification of proteins. Importance of proteins.

Unit : III Fatty acids & lipids.

1. Introduction & classification of lipids.
2. Fatty acids - saturated & unsaturated.
3. Triglycerides, Phospholipids, glycolipids, lipoprotein, steroids.
4. Physiological importance

Unit : IV Enzymes & Solution

1. Introduction & Characteristics of enzymes.
2. Nomenclature, types, classification. Biological roles of enzymes.
3. Factors affecting enzyme activity. Mechanics of enzyme action.
4. Solution, suspension, Colloids & Buffers.

REFERENCES:

1. Outlines of Biochemistry by Conn & Stumpf, *5th* Ed., John Wiley and Sons
2. Harper's Reweiv of physiological chemistry. Lange med publication.
3. Fundamentals of Biochemistry Jain, J. L., & Jain, N. (2006)., 6Ed., S. Chand Publications.
4. Text book of Biochemistry by Trehan.

S. Y. B. Sc.**BIOSCIENCE Semester III****Paper - II Molecular Biology****Unit : I Biology of Nucleic acids.**

1. Introduction, Components and organization of nucleic acids
2. Nucleoside, nucleotide, polynucleotide.
3. DNA structure & importance.
4. RNA structure & types.

Unit : II DNA Replication.

1. Semi-conservative DNA replication
2. Patterns of DNA synthesis
3. The replication machinery
4. Replication fork, Termination of replication

Unit : III Gene Expression.

1. DNA as hereditary material
2. Genetic code & template theory.
3. The flow of genetic information
4. Transcription.

Unit : IV Gene Mutation.

1. Introduction, types of Mutations.
2. Gene mutation, Types of gene mutation
3. Spontaneous and induced mutations, Mutagens.
4. DNA Repair

REFERENCES:

1. Prescott, Harley, and Klein's Microbiology Wiley, J., & Sherwood, L. (2007), 7Ed., McGraw-Hill Science/Engineering/Math.
2. Genetics: A Molecular Approach Russell, P. J. (2005)., 2Ed., Benjamin Cummings.
3. Cell & Molecular Biology, De'Robertis.
4. Cell & Molecular Biology, Sheeler & Bianchi. Biley publication.

S. Y. B. Sc.**BIOSCIENCE Semester III****Paper - III Biophysics & Biostatistics****Unit : I Introduction to Biophysics.**

1. Introduction to Electromagnetic spectrum.
2. Types of EM Radiation – X Ray, Gamma, UV, Visible, Infrared, Microwave, Radio wave.
3. Introduction to Radiation & Radioactivity. Radioisotopes & their uses.
4. Radiation hazards

Unit : II Instrumentation.

1. Introduction, principle, operational technique of pH meter.
2. Beer's & Lambert's law.
3. Introduction & operational technique of photoelectric colorimeter
4. Introduction to spectrophotometer.

Unit : III Separation Techniques.

1. Chromatographic technique, Types of Chromatography.
2. Paper Chromatography – ascending, descending, radial
3. Thin layer Chromatography
4. Introduction, principle, operational technique of electrophoresis

Unit : IV Introduction to Biostatistics.

1. Data, table & frequency, statistical averages; mean, mode, median.
2. Graphical representation of statistical data.
3. Random sampling, standard error, Variation, standard deviation normal distribution study, normal curve, probability.
4. Chi-square test, test of significance

REFERENCES:

1. Biophysics by Casey, East West agency.
2. Biostatistics by Lecois, East West agency.
3. Methods in Biostatistics by Mahajan, Jaypee publication.
4. Instrumentation Techniques

S. Y. B. Sc.**BIOSCIENCE Semester III****Practicals (Paper – I, II & III)**

1. Qualitative determination of monosaccharides.
2. Qualitative determination of disaccharides.
3. Qualitative determination of polysaccharides.
4. Qualitative determination of protein.
5. Qualitative determination of unknown solution.
6. Preparation of normal solutions.
7. Preparation of molar solutions.
8. Preparation of molal solutions.
9. Preparation of % solutions.
10. Preparation of buffer solutions.
11. Introduction to principle & operational technique of pH meter.
12. Measurement of pH – tomato juice, whey, mild HCl & NaOH, HAc etc
13. Introduction to principle & operational technique of Photoelectric colorimeter.
14. Preparation of standard graph of sugar solution/ dye by colorimetric measurement.
15. Preparation of standard graph of protein by colorimetric measurement.
16. Unidimensional paper chromatography of amino acids.
17. Unidimensional paper chromatography of sugars.
18. Unidimensional paper chromatography of unknown amino acid mixture.
19. Separation of chlorophyll by ascending chromatography.
20. Study of permanent slides & specimens as per theory paper I, II & III

REFERENCES:

1. Practical Biochemistry by Plummer Tata MacGraw-Hill.
2. Experimental physiology & Biochemistry by Chanda, Jaypee publication.
3. Experimental Microbiology vol. I & II by Patel Aditya publication.

S. Y. B. Sc.**BIOSCIENCE Semester IV****Paper - I Elementary Physiology****Unit : I Blood**

1. Blood constituent-Blood plasma, serum.
2. Types & functions of blood cells – RBC, WBC, Thrombocyte.
3. Structure, functions & types of hemoglobin, Abnormal Hb.
4. Transport of Oxygen & Carbon dioxide.

Unit : II Blood coagulation & Blood pressure.

1. Introduction to Homeostasis
2. Blood coagulation mechanism.
3. Blood pressure - Systolic, diastolic.
4. Measurement of blood pressure.

Unit : III Temperature Regulation.

1. Normal human body temperature.
2. Heat exchange between body & environment.
3. Central mechanism regulates body temperature.
4. Osmoregulation in human body.

Unit : IV Tissues

1. Introduction, types, classification of tissues.
2. Types of Epithelial tissue.
3. Connective tissue.
4. Muscles & Nerve tissues.

REFERENCES:

1. Practical Hematology by Davis.
2. Physiological basis of medical practice by Best & Taylor, B. I. Waverly Publications.
3. Anatomy & Physiology for Nurses by Smith.
4. The Living body by Best & Taylor, B.I. Publications.

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S. Y. B. Sc.**BIOSCIENCE Semester IV****Paper - II Basic Immunology****Unit : I Introduction to immunology**

1. Introduction to immune system.
2. Cells & tissues of immune system.
3. Organs of immune system.
4. Immune response. Primary, Secondary

Unit : II Immunity.

1. Definition, types.
2. Innate immunity: Species, Racial, Individual.
3. Acquired immunity: Active & Passive.
4. Herd Immunity.

Unit : III Host defense mechanism.

1. Physical barrier – skin, mucus membrane.
2. Chemical barrier.
3. Phagocytosis, inflammation, Interferon etc.
4. Specific defense.

Unit : IV Antigen & Antibody.

1. Antigen – Definition, classification, properties.
2. Types of Antigen, Antigenic specificity.
3. Antibody, Immunoglobulin, Basic structure of immunoglobulin.
4. Types of Immunoglobulin – A, M, G, D, E.

REFERENCES:

1. Prescott, Harley, and Klein's Microbiology Wiley, J., & Sherwood, L. (2007), 7Ed., McGraw-Hill Science.
2. An introduction to Immunology by Rao.
3. Modern Immunology by Dasgupta, Jaypee publication.
4. Microbiology by Pelzar Tata McGraw-Hill

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S. Y. B. Sc.**BIOSCIENCE Semester IV****Paper - III Elementary Microbiology****Unit : I Bacterial cell structure & functions.**

1. Bacterial cell wall, Cell wall Free State, bacterial membrane.
2. Bacterial flagella, structure & motility.
3. Bacterial endospore, Ribosome.
4. Bacterial capsule, Pilli, intracytoplasmic granules.

Unit : II Bacterial Nutrition.

1. Nutritional requirement & types of bacteria.
2. Culture media – Types, application
3. Isolation techniques.
4. Anaerobic cultivation, preservation & maintenance

Unit : III Micobial Growth.

1. Introduction to microbioal growth.
2. Generation time, growth curve.
3. Factors affecting growth.
4. Measurement of growth

Unit : IV Introduction to medical microbiology

1. Introduction to Normal flora – Resident, temporary flora.
2. Microbial flora of human body, their importance.
3. Entry of pathogen, infection & types, virulance, factors effecting virulance, attenuation exaltation.
4. Types of pathological condition, types of diseases

REFERENCES:

1. Prescott, Harley, and Klein's Microbiology Wiley, J., & Sherwood, L. (2007), 7Ed., McGraw-Hill Science/Engineering/Math.
2. Microbiology by Pelzar, Chan, Krieg, Tata McGraw Hill pub. New York
3. Text book of Medical Microbiology by Anantnarayan, Tata McGraw Hill publication.
4. Elementary Microbiology by Dr. H. A. Modi, Ekta prakashan.

S. Y. B. Sc.**BIOSCIENCE Semester IV****Practicals (Paper – I, II & III)**

1. Demonstration of laboratory apparatus.
2. Cleaning & preparation of glassware for sterilization.
3. Spirochete staining by Fontana's method
4. Cell-wall staining by Chance's/Ringer's method
5. Capsule staining by Maneval's method.
6. Endospore staining by Dorner's method. Acid-fast staining by ZNCF method.
7. Volutin granule staining.
8. Preparation of culture media.
9. Preparation of biochemical media.
10. Effect of some physical agents on bacterial growth.
11. Effect of some chemical agents on bacterial growth.
12. Determination of blood groups.
13. RBC counting.
14. WBC counting.
15. Differential counts (DC).
16. Estimation of haemoglobin by Sahli's method.
17. 17 Preparation of hemin crystals.
18. Measurement of blood pressure.
19. Determination of clotting time by capillary method.
20. Study of permanent slides & specimens as per theory paper V.

REFERENCES:

1. Practical Haematology by Davis.
2. Experimental physiology & Biochemistry by Chanda, Jaypee publication.
3. Experimental Microbiology vol. I & II by Patel Aditya publication.

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