

BACHELOR OF SCIENCE IN B.SC. BIO-CHEMISTRY

First Year

S. No.	Subject	Maximum Marks	Exam Hours
1	Hindi I	100	3
2	Language (English) Paper I	100	3
3	Major Paper I Bio Molecules	100	3
4	Major Practical I	100	3
5	Allied Paper I Chemistry	100	3
6	Allied Chemistry Practical I	100	3

Second Year

S. No.	Subject	Maximum Marks	Exam Hours
7	Hindi II	100	3
8	Language (English) Paper II	100	3
9	Major Paper II Analytical methods in Biochemistry	100	3
10	Major Practical II	100	3
11	Allied Paper II Microbiology	100	3
12	Allied microbiology Practical II	100	3

Third Year

S. No.	Subject	Maximum Marks	Exam Hours
13	Major Paper III Enzymes and Intermediary Metabolism	100	3
14	Major Paper IV Nutritional biochemistry	100	3
15	Major Paper V Molecular biology	100	3
16	Major Paper VI Environmental Biochemistry	100	3
17	Major Paper VII Clinical Biochemistry	100	3
18	Major Practical III		

Paper – 1

HINDI- I

Paper – 2
ENGLISH PAPER – I

Detailed Text

PROSE

1. In Prison – Jawaharlal Nehru
2. What is Science? – George Orwell
3. On Marriages – Nirad Chaudari
4. The Luncheon – N. Somerset Maugham
5. The Mourners – V. S. Naipaul
6. The Plane Crash – Juliane Koepcke
7. Better Late – R.K. Narayan

POETRY

1. Polonius' Advice to his Son – William Shakespeare
2. Every Town a Home Town - Kaniyan Purkunran
3. The Village Schoolmaster – Oliver Goldsmith
4. The Solitary Reaper – William Wordsworth
5. On his Blindness – John Milton
6. The Tyger – William Blake

Non-Detailed

Text : THE GIFTS AND OTHER STORIES abridged and simplified by Anthony Toyne – Oxford University Press, 1997.

The following stories

1. The Gifts – O. Henry
2. The Two Friends – Guy de Maupassant
3. The Bear Hunt – Leo Tolstoy
4. The Goblins and the Grave Digger – Charles Dickens
5. The Nightingale and the Rose – Oscar Wilde

GRAMMER

1. Articles and Prepositions
2. Infinitives and Gerunds
3. Five basic sentence patterns (SV SVC, SVO, SVOO, SVOC(A))
4. Arranging the component parts so as to form a sentence
5. Language work at the end of all lessons
6. Language work at the end of all lessons
7. Question Tag, Active and Passive Voice
8. Degrees of Comparison

COMPOSITION

1. Letter Writing (Formal and Informal)
2. Developing the hints
3. Comprehension
4. Writing Telegram
5. Completion of a passage
6. Precis Writing

Paper - 3 BIOMOLECULES

UNIT –I Carbohydrates

Definition and importance of carbohydrates, classification, formulation of monosaccharides (formula of glucose- linear form and ring form, howarths projection formula). Properties of monosaccharides. Occurrence , chemistry and properties of sucrose, lactose,

maltose, cellobiose, polysaccharides,- energy storage polysaccharides-starch and glycogen, structural polysaccharides-cellulose, chitin.

UNIT-II Protein

Amino acid- structure and classifications- peptide structure. Chemical bonds involved in protein structure- peptide, disulfide, and hydrogen, hydrophobic and electrostatic. Protein-classification based on composition, solubility, shape and function. Primary, secondary, tertiary and quaternary structure of proteins.

UNIT-III Lipids

Definition and classification. Simple lipids- physical and chemical properties of fats. Compound lipids- structure and functions of phospholipids, glycolipids and lipoproteins. Derived lipids fatty acids, saturated and unsaturated fatty acids, essential fatty acids.

UNIT-IV Nucleic acid

Evidences that DNA is the genetic material composition of DNA and RNA .double helical structure of DNA. Denaturation and renaturation. Structure and roles of different types and messenger RNA.

UNIT-V Vitamins

Definitions,classification, fat soluble and water soluble vitamins- sources, structures, physiological functions and deficiency symptoms.

References

1. Lehninger's principles of biochemistry(2000) by Nelson, David, Cox,M.Macmillan/worth,NY.
2. Fundamentals of Biochemistry(1999) by Donald voet, Judith G voet and charlotte w Pratt, John Wiley and sons, NY.
3. Biochemistry IIIrd (1994) by Lubert stryer, WH freeman and co., Sen. Francisco
4. Text book of biochemistry (1997) fourthedition, Thomas M. Devlin .A..Johr, Wiley, Inc., Publication. Newyork.
5. Fundamentals of Biochemistry(1997) by J.L.Jain.

Paper – 4
ALLIED CHEMISTRY
(INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY)

UNIT –I Chemical bonding

Molecular orbital theory, bonding, anti-bonding and non-bonding orbitals. Molecular orbitals. MO configuration of Hydrogen, Nitrogen, Oxygen, and fluorine. VSEPR theory shapes of BeCl_2 , water, NH_3 , SF_6 , PCl_5 , IF_7 AND XeF_6 . Industrial chemistry . Synthesis, properties and uses of silicones. Fertilizers : urea, ammonium sulfate, ammonium nitrate, NPK fertilizer, triple superphosphate. Pollution of air, water and soil sources.

UNIT- II Covalent bond

Orbital overlap, hybridization, geometry of organic molecules- methane, ethane, acetylene, benzene.

Aromatic compounds

Electrophilic substitution in benzene-mechanism of nitration, halogenation, alkylation, acylation, sulfonation, - isolation preparation of properties and structure of naphthalene. Dyes : classification azo-dyes, methyl orange, tri-phenyl methane dyes malachite green. Halohydrocarbons :Preparation and uses of CH_2Cl_2 , CHCl_3 , CCl_4 .

UNIT-III Energetics

Definition of first law of thermodynamics, types of systems. Reversible , irreversible, isothermic and adiabatic processes. Spontaneous process. Joule _Thomson effect. Enthalpy bond energy. Second law of thermodynamics. Carnot cycle and Carnot theorem. Thermodynamic scale

of temperature. Kinetics : Order and molecularity-measurement rates and order of reactions. Effect of temperature on the rate- concept of energy of activation.

UNIT-IV Metals

General methods of extraction of metals. Types of ores. Methods of ore dressing. Types of furnaces. Reduction methods, electrical methods. Types of refining Van Arkel Zone refining. Extraction of copper and uranium. Interhalogen compounds. Preparation, properties and uses of ICl, BrF₃, and IF₅. Basic properties of iodine

UNIT-V Stereoisomerism

Symmetry, elements of symmetry. Cause of optical activity, tartaric acid. Racemisation, resolution. R.S configuration, Geometric isomerism of maleic and fumaric acids. Keto –enol tautomerism of acetoacetic ester. Heterocycles. Preparation , properties and uses of Furan, thiophene, pyrrole and pyridine.

Reference books

1. Inorganic chemistry: P.L.Soni and Sathyaprakash
2. Inorganic chemistry : J.D.Lee
3. Organic chemistry : Bahl and Arun Bahl
4. Organic chemistry : I.L.Finar
5. Physical chemistry : Puri & Sharma
6. Physical chemistry : Gurdeep Raj
7. Physical chemistry : Lewis and Glasstone

BIOCHEMISTRY PRACTICAL – I

I Qualitative analysis of Biomolecules

- A Reactions of simple sugars including glucose. Fructose, galactose, pentose, maltose, sucrose, lactose, starch, glycogen and dextrin.
- B Analysis of aminoacids- tyrosine, tryptophan, methionine, arginine, cysteine, histidine.

- C Test for proteins.
- D test form lipids- Test for cholesterol.
- II Experiments involving titrimetric procedures.**
- A Estimation of amino acids by formal titratiar.
- B Estimation of ascorbic acid by titrimetric method using 2,6 dichlorophenal indophenol.
- C Estimation of reducing sugar by benedict's titrimetric method.
- D Estimation of CL by mohr's method in water and in urine.
- E Determination of acid number of an edible oil.
- F Determination of saponification value of edible oil.
- G Determination of iodine number of an edible oil.
- III Techniques (group experiments)**
- A Separation of sugar/amino acids by paper chromatography.
- B Separation of serum proteins by paper electrophoresis.

ALLIED CHEMISTRY (PRACTICALS)

I .Titimetry

1. Estimation of sodium hydroxide using standard sodium carbonate
2. Estimation of hydrochloric acid- standard oxalic acid
3. Estimation of ferrous sulfate- standard ferrous sulfate
4. Estimation of oxalic acid- standard ferrous sulfate
5. Estimation of potassium permanganate- standard sodium hydroxide
6. Estimation of ferrous iron using diphenylamine as internal indicator

II Organic analysis

1. detection of elements nitrogen, sulfur and halogens.
2. Detection of aliphatic and aromatic compounds
3. Detection of whether saturated or unsaturated compounds
4. Preliminary tests and detection of functional groups for aldehydes, phenols, amines, aromatic acids, dicarboxylic acids, urea, ketones and benzamide.

SECOND YEAR

Paper – 5

HINDI- I

Paper – 6

ENGLISH PAPER – II

Detailed Text

PROSE

8. A Visit to India – Julian Huxley
9. University Days – James Thurber
10. I Have a Dream – Martin Luther King
11. The Story Teller – H.H. Munro (Saki)
12. George Bernard Shaw – Bertrand Russel
13. Only then shall we find Courage – Albert Einstein

POETRY

7. The Day is Done – Henry Wadsworth Longfellow
8. King Arthur's Farewell – Alfred Tennyson
9. O Captain! My Captain! – Walt Whitman
10. My Last Duchess – Robert Browning
11. Ode to a Nightingale – John Keats
12. Lochinvar –Walter Scott

Non-Detailed

A collection of One Act Plays -

1. Remember Ceasar – Gordon Daviot
2. The Proposal – Anotn Chekov
3. The Miracle Merchant – Saki
4. The Stepmother – Arnold Bennet
5. The Mahatma – Rama Sarma

GRAMMER

1. Relative Clauses
2. Conditional Sentences
3. Modal auxiliaries
4. Reported Speech
5. Transformation of Sentences
 - a. Affirmative, Negative and Interrogative Sentences
 - b. Simple, Compound and Complex Sentences
6. a,b,r clauses
7. Correction of Sentences based on
 - a. Subject, Verb and Concord
 - b. Tenses
 - c. Articles and Prepositions.
 - d. Question Tags

COMPOSITION

7. Paraphrasing
8. Dialogue Writing
9. Report Writing
10. Note Making
11. General Essay
12. Expansion of Idea.

ANALYTICAL METHODS IN BIOCHEMISTRY

UNIT-1

Acids and bases-Lewis concept of weight and bases titrable acidity pH, Henderson Hesselberg equation, buffer and pH of body fluids, Indicators, measurement of pH by hydrogen electrode and glass electrode, Zwitterions.

UNIT 11

The colloidal state: Size of colloidal particles different types of colloidal dispersion [solution, emulsions, gels] preparation of lyophilic and lyophobic colloids. Solution- protective colloids and gold coner number stability of colloids, precipitation, coagulation, flocculation, colloidal particles of milk. Properties of colloids. Osmotic phenomenon and osmoregulation in the body. Electroosmosis, Donnan membrane equilibrium, chemical composition and architecture of cells membranes.

UNIT 111 Centrifugation methods

Basic principles of sedimentation, centrifuges and rotors, preparative ultra centrifugation. Differential, density gradient, isopynic and equilibrium centrifugation. Svedberg constant, Analytical ultra centrifuge and their application in molecular weight determination of proteins and nucleic acids.

UNIT IV Chromatographic techniques

General properties of chromatography, preparation, packing of columns, adsorption and elution; fraction analysis and column efficiency. Ion exchange, gel and affinity chromatography. Thin layer chromatography HPLC, Paper chromatography and their types, principles and applications of Gas-liquid principles and applications of column chromatography.

UNIT V Electrophoretic technique;

Electrophoresis, Basic principles of paper and agarose electrophoresis, factors affecting the migration rate- electric field sample, buffer and supporting medium. Electrophoresis with Paper, SDS-PAGE. Immuno diffusion, immunoelectrophoresis. Tiselius moving boundary electrophoresis, isoelectric focussing.

UNIT VI Spectrophotometric methods:

Basic principles of electromagnetic radiation energy, wavelength, wave number, transmittance. Beer-Lambert law. Colorimetry and Spectrophotometry- Principles, instrumentation applications on enzyme analysis and kinetic analysis, protein structural studies and nucleic acid studies.

References

1. Principles and techniques of practical Biochemistry. Keith Wilson, Kenneth Walker H. Clouding 3rd edition 1992
2. An Introduction to practical Biochemistry 3rd edition (1998) David T Plummer
3. Physical Biochemistry (II ed. 1983) by Friefelder, WH Freeman and Co USA
4. Instrumental methods of chemical analysis. Sharma B.K. (1981) 11th edition
5. Introduction to Chromatography- V.K. Srivastava and K.K. Srivastava
6. Instrumental methods of analysis- Chatwal- Anand
7. Chromatography: A Laboratory handbook of Chromatographic and Electrophoretic methods (3rd ed 1975) by Erich Heftman, Vannstrand, Reinhold NY
8. Outlines of Biochemistry (1987) by Eric E Conn, P.K. Stumpf, G. Bruening and Ray H Doi, John Wiley and Sons NY

Paper - 8

ALLIED MICROBIOLOGY

UNIT I

Evolutionary trends in microbiology- taxonomy and classification of micro-organisms.
Outline classifications of bacteria, fungi, viruses and protozoan

UNIT II

Methods in microbiology- microscopy : light dark field : phase contrast : Fluorescence ;
Electron Microscope : stains and staining procedures. Simple , differential and special staining-

Methylene blue :Grams staining; Acid fast; Capsular staining. Lactophenol cotton blue staining. Sterilization and disinfection- Moist heat :Dry heat;- Radiation; filtration. Antibiotics; Antiseptics; Antibiotic Sensitivity test.

UNIT III

Microbial anatomy and physiology : ultra structure of bacteria (E.Coli) and spore formation cell layers- inclusions- Pili- flagella. Structure of virus (Bacteriophage)- Lytic and lysogenic cycle. Structure of fungal cell (Yeast and Penicillium). Spores and reproduction. Nutritional requirements of bacteria. Micro- Macro nutrients. Nutritional types. Growth – Growth curve- Batch continuous. Synchronous culture techniques of culture media- liquid, solid- media.

UNIT IV

Microbial ecology : types of soil microorganisms. Symbiotic microorganisms. Rhizobium and N₂ fixation, Rhizosphere; Phyllosphere; mycorrhiza; Bio- fertilizers Bio pesticides;- microbes in air- Air sample and sampling devices- Microbes in water and sewage. BOD-COD. Outline of sewage treatment process composting.

UNIT V

Food and dairy microbiology. Sources of food contamination. Microbes involved in spoilage. Methods in food preservation. Food poisoning- botulism- bacterial flora of milk and milk –milk borne diseases

UNIT VI

Medical microbiology; introduction pathogen pathogenicity virulence, immunity, types- vaccination. Modes of disease transmission. Air water, content. Food;- causative agents bacteria- fungi- viruses. Protozoa- study of causative, tuberculosis, cholera, typhoid, AIDS, rabies, malaria. Zoonotic and nosocomial infections on outline.

References

1. Fundamentals of Microbiology, Martin Frobisher, 915 edition, W.B.Saunders, London 1974
2. Text book of microbiology by W Burrows, W.B.Saunders, 20th edition 1978
3. Fundamental Principles of Bacteriology by A.J.Salle Tata McGraw Hill 5th edition 1986
4. General Microbiology R.F.Boyd.2nd edition. Times mirror/ Mosby college publishers
5. Moat AG and JW Foster 1988 Microbial Physiology 2nd John Wiley and sons
6. Fundamentals of immunology R.S.Wieser Lea and Febiger Philadelphia 1971
7. Essential Immunology , Ivon Roitt 1985 ELBS London 6th edition
8. Review of Medical Microbiology- Jaweta F Melnick, 19th Ed 1991, Large Med. Publication Maruman co Ltd.
9. Text book of Microbiology. Ananthanarayanan R and Jayaram Panikar, Orient Longmans 1986 3rd Edn.
10. Medical Parasitology . Chatterjee, Calcutta 1994
11. Parasitology. Chandler and Reed 1978.
12. Parasitic Zoonoses. S.C Parija 1990 A.I.T.B.S.New Delhi
13. General Virology Luria 2nd edition John Wiley and sons London 1977
14. Textbook of Virology; Rhodes and Van Rooyen 6th edition Churchill Livingston 1978
15. Mitchell R 1974 Introduction to Environmental Microbiology -Prentice Hall Inc Englewood Cliffs New Jersey
16. Alexander M 1997 Introduction to Soil Microbiology NY John Wiley and sons
17. Subba Rao. N S 1995 Soil Microorganisms and Plant Growth. Oxford and IBH publishing co Pvt. Ltd.
18. Food Microbiology W C Frazier 3 rd edition ,1978, McGraw Hill, 1968.
19. Microbiology of Food E. W. Tanner Ganard Press
20. Casida J. E. 1968: Industrial Microbiology Wiley Eastern

BIOCHEMISTRY PRACTICALS III.

Colorimetry

1. Estimation of pentose- bials method
2. Estimation of fructose- selivanoff's method

3. Estimation of urea- dam method
4. Estimation of protein- lowry's method
5. Estimation of bilirubin- Diazomethod
6. Estimation of cholesterol- Zaks method
7. Estimation of glucose- Anthrone method
8. Estimation of phosphorus- Fiske Subbarow method

Enzyme assay

1. Salivary amylase- collection of saliva, studying the effects of pH, temperature, substrate concentration
2. Assay of urea in horse gram extract, effect of pH and substrate concentration.

ALLIED MICROBIOLOGY PRACTICAL

1. Handling of light microscopes
2. Handling and maintenance of autoclave, hot air oven incubator, centrifuge etc
3. Sterilization of culture media and glassware.
4. Culture media liquid and solid media preparation
5. Streak plate and anaerobic culture techniques
6. Hanging drop and Lactophenol cotton blue wet mount methods
7. Simple staining- gram staining and capsular staining
8. Enumeration of microorganisms from air by open plate method
9. Calculation of r/s ratio
10. Study of Phyllosphere organisms
11. Study spoilage of vegetables and fruits
12. Antibiotic sensitivity tests
13. Identification of organisms(slide mount)
 - A) Penicillium
 - B) Aspergillus
 - C) Candida
 - D) Rhizopus

- E) Mucor
- F) Fusarium
- G) Staphylococci
- H) E. Coli
- I) Plasmodium

THIRD YEAR

Paper - 9

ENZYMES AND INTERMEDIARY METABOLISM

UNIT-I Enzymes

Introduction , classification of enzymes according to the international union of biochemistry. Mechanism of enzyme action. The Michaelis and Menten equation- Lineweaver-Burk equation. Eadie-Hofstee plot. Enzyme inhibition-Mechanism of competitive, Uncompetitive and Non-competitive inhibition.

UNIT-II Bioenergetics

Free energy and the laws of thermodynamics; Role of high energy compounds as energy currency of the cells. Biological oxidation, electron transport chain and oxidative phosphorylation. Inhibitors and uncouplers of oxidative phosphorylation. Transport of reducing potentials in mitochondria (shuttle System).

UNIT III Carbohydrate metabolism

Glycolysis, TCA cycle, synthesis and degradation of glycogen, glyoxylate cycle, gluconeogenesis, HMP shunt. Interconversion of galactose, fructose and glucose.

UNIT-IV Lipid metabolism

Biosynthesis and degradation of triacylglycerol. Fatty acid oxidation and biosynthesis. Synthesis and degradation of phospholipids. Formation and utilization of ketone bodies. Biosynthesis of cholesterol and breakdown

UNIT V Protein and nucleic acid

Degradation of proteins, oxidative, non-oxidative deamination, transamination and decarboxylation of aminoacids. Urea cycle and creatinine formation. Biosynthesis of purine and pyrimidines. Breakdown of nucleic acid.

References

1. Fundamentals of Enzymology(II Ed) by Nicholas C Price and Lewis Stevens, Oxford Univ. Press.
2. Biochemistry (3rd) by Lubert Stryer, WH Freeman and Co, San Francisco
3. Enzymes (3rd 1979) Dixon M and Webb, E.C, Longmans London
4. Enzyme structure and function by S Blackburn, Marcel Dekker, Inc, NY
5. Lehninger's Principles of Biochemistry (2000) by Nelson, David L and Cox M M Macmillan/worth NY
6. Biochemistry , Harper, Murry K Robert et al 1988 21st Edition
7. Biochemistry (fourth edition 1996) by Geoffrey L Zubay, McGraw hill
8. Fundamentals of Biochemistry (1999) by Donald Volt Judith G Voet and Charlotte W Pratt, John Willey and sons NY.

Paper - 10

NUTRITIONAL BIOCHEMISTRY

UNIT I

Food factors for human beings and their requirements. Calorific value of food , obesity, respiratory quotients, specific dynamic action and BMR. Measurements of BMR and factors affecting the same. Dietary requirements for infants and children in pregnancy and lactation, adults and in old age.

UNIT II

Fat and water soluble vitamins, daily human requirements, sources and vitamin deficiency states. Mineral metabolism with reference to iron , calcium, phosphorous , sodium, potassium and iodine. Trace elements in nutrition

UNIT III

Electrolyte concentration of body fluids acid base regulation. Concepts of metabolism and respiratory acidosis and alkalosis. Assessment of nutritional status – anthropometry biochemical and chemical methods

UNIT IV

Protein content of diets of people different parts of India , essential amino acids , biological value of proteins, fish proteins, plant proteins and single cell proteins. Protein malnutrition and under nutrition, protein diet implementation by nutrition noon meal distribution to children

UNIT V

Role of diet and nutrition in the prevention and treatment of diseases. Dental caries, Fluorosis, renal failure. Cancer, atherosclerosis, liver disease and rheumatic disorders. Inherited metabolic disorders. Phenylketonuria, Galactosemia, gout, diabetic mellitus and peptic ulcer.

References

1. Modern Nutrition in Health and Diseases by Whol and Good Hart
2. Textbook of Biochemistry – R.Swaminathan
3. Human Nutrition and Dietics – S.Davidson and J.R.Passmore. ELBS.Zurich
4. Principles of Internal Medicine – Harrison vol. I and II

5. Textbook of Medical Physiology - Guyton
6. Human Nutrition and Dietetics _ J.S.Garrow EPT James
7. Nutrition- Principles and application in Health Promotion. Carwl Jean West Simtor, Merrily Forbescrowley. J.B.Lippincoh company. London 1980
8. Textbook of Biochemistry- G.P.Talwar
9. General Physiology- A Mariakuttikan & N.Arumugam

Paper - 11

MOLECULAR BIOLOGY

UNIT I

Replication- evidences for the concept of DNA as the genetic material. Experimental proof for semi conservative methods, replication by rolling circle model, DNA directed RNA polymerases, factors involved in replication, okazaki fragments and DNA ligases. Mechanism of replication. Inhibitors of DNA replication. Replication in eukaryotic DNA

UNIT II

Transcription in prokaryotes-DNA directed RNA polymerases, initiation, elongation, termination of RNA synthesis, inhibitors of transcriptions, RNA replicase, reverse transcriptase , post transcriptional processing if RNA in eukaryotes. Regulation of gene expression in prokaryotes- enzyme induction and repression operon concept, Lac operon, Trp operon.

UNIT III

Translation- mechanism of translation structure.and composition of prokaryotic and eukaryotic ribosomes. Action of amino acids, initiation elongation, termination and post translation processing inhibitors of protein biosynthesis.

UNIT IV

Genetic code- elucidation of genetic code, wobble base pairing, mapping of gene
Mutation-DNA damage b UV, alkaline agents, cross linkers, mechanisms of repair. Molecular basis of mutation, types of mutation (e.g. transition, transversion, frame shift, deletion, suppressor, sensitive, germinal, somatic, backward and forward mutation. True reversion and suppression, dominant recessive mutations, spontaneous and induced mutations

UNIT V

Molecular biology of cancer : character of cancer, the molecular biology of cancer. Role of oncogenes and tumor, suppressor genes in cancer. Molecular Cytogenetics.

References

1. Cell and Molecular Biology(3rd edition)- Gerald Karp. John Wiley & Sons INC, New york 2002
2. Principles of Genetics – Snustad (3rd Edition) John Wiley 2003
3. An Introduction to Genetic Analysis(7th edition) Anthony J F Griffith, W,H Freeman New York
4. Genetics – Peter J Russel(4th edition) HarperCollins College Publishers
5. Genes vii Benjamin Tewin 1997 Oxford University Press Molecular Biology Watson
6. Principles of Biochemistry- a Lehninger
7. Biochemistry – Harper
8. Outlines of Biochemistry – Conn. and Stumpf.
9. Molecular Biology of the Gene(4th edition 1987) J.D.Watson N H Hopkins,J W Roberts, J.P.Stertz, A M Weiner freeman, San Francisco

Paper - 12

ENVIRONMENTAL BIOCHEMISTRY

UNIT I

Ecosystem- definition, structure. Types of ecosystem, dynamics of ecosystem- energy, primary productions, secondary production, food chain, food web, Trophic levels, energy flow, ecological pyramid of numbers, pyramid of biomass. Pyramid of energy, inverted pyramids. Biogeochemical cycles

UNIT II

Environmental pollution- definition pollutants, classifications of pollutants, sources and biological effects on human health.(air, water, noise and thermal pollution. Control of air, water, noise and thermal pollution. Assessment of pollution(BOD,COD,coliform texts)

UNITS III

Toxicology- toxic chemical in the environment. Biochemical effects of arsenic cd, hg,ph,co,pan and polychlorinated biphenyl and other organic compounds, pesticides, soaps and detergents. Biohazards detoxification mechanisms

UNIT IV

Radiation ecology- definition, radioactive elements, radiation, sources of radiation natural radiation and man made radiation. Types of radiation-electromagnetic radiation and particulate radiation or atomic radiation. Atom bomb internal and external emissions. Sources of ionizing radiation, natural radiation and artificial radiation. Biological effects of radiation, control of radioactive pollution.

UNIT V

Molecular basis of various mutation and their role in evolution. Environmental mutogenesis and toxicity testing.Biodiversity- Plant Biodiversity and Animal Biodiversity.

References

1. Environmental Science- Daniel B Bothkin Edward a Keller. John Willey and sons
2. A Textbook of Environmental Chemistry and Pollution Control- S Dara
3. Concepts of Ecology- N.Arumugam

4. Basic Environmental Toxicology (1994) by Lorriss G Corkerhem and Barbara S S Shane Corp Press Inc
5. Principles of Medicinal Chemistry 4th edition William O Foye and David A Williams
6. Review of Medical Physiology 12th edition 1985- Ganong W F Lange medical publications.

Paper – 13

CLINICAL BIOCHEMISTRY

UNIT I

Collection of biological samples, anticoagulants preservatives for urine, physical examinations of urine. Tests for urinary normal and abnormal constituents. Blood glucose- fasting and post prandial levels- glucose tolerance test- abnormalities in Diabetes mellitus, Galactosemia and Fructoseurea.

UNIT II

Gastric function and fractional test meal, differentiation of digestive and absorptive disfunction in Stoutorrhea. Tests in pancreatic disease. Composition of pancreatic juice, functions of pancreas, determination of enzymes in serum and urine, Steatorrhea

UNIT III

Functions of liver , metabolism of bilirubin, gall stones, jaundice- classification, causes and differential diagnosis. Tests in liver and biliary tract diseases. Determination of serum enzymes in liver disorders.

UNIT IV

Kidney function tests clearance creatinine, urea and phenol red tests, urea uric acid, creatinine and protein levels in plasma

UNITS V

Inborn errors of metabolism with reference to Fancon's Syndrome, Phenyl Ketonuria, Van-Gierke's disease, Cystinuria, Galactosimmia, Albinism. Calcium and phosphorous laboratory diagnostic test for hypo and hyper parathyroidism, tetany, rickets, renal failure and bone disease, iron deficiency and tests for anemia.

References

1. Clinical biochemistry- Zilver and Pannell
2. Clinical biochemistry- Hoffman
3. Lecture notes on clinical biochemistry- L.G Whitby
4. Biochemistry with clinical correction- Davlin
5. Textbook of biochemistry- R Swaminathan
6. Inborn errors of metabolism- Duncan
7. Practical clinical biochemistry- Harold Varley Vol I
8. Review of medical physiology- William F Ganong 19th Ed(1997) prentice hall international

BIOCHEMISTRY PRACTICALS III

Urine analysis

1. Qualitative analysis for normal and abnormal constituents in urine

Serum analysis

1. Estimation of protein by Biuret and Lowry methods
2. Determination of A/G ratio in serum
3. Estimation of blood Glucose by folin- Wu and nelson- somogyi methods
4. Estimation of free/total cholesterol
5. Estimation of creatine/creatinine

6. Estimation of transaminases
7. Estimation of alkaline phosphatase
8. Estimation of RNA-Bial's method

Hematology

1. Estimation of Haemoglobin
2. Enumeration of RBC/WBC
3. Differential count
4. Determination of blood grouping
5. ESR and PCV