

Department of Biochemistry
Govt. Holkar Science College, Indore (M.P.)

Scheme of Marks for B.Sc. Biochemistry (2018-2019)

Year	Theory/ Practical	Examination Scheme		
		External	Internal	Total
I year	Biomolecules	40	10	50
	Biophysical and Biochemical Technique	40	10	50
	Practical I	50	-	50
II year	Enzymology	40	10	50
	Intermediary metabolism	40	10	50
	Practical II	50	-	50
III year	Molecular Biology	40	10	50
	Nutritional, Clinical and Environmental Biochemistry	40	10	50
	Practical III	50	-	50

Board of Studies

S.No.	Name	Designation	Signature
1.	Dr. A. Bafna	Chairman	
2.	Dr. Purnima Dey Sarkar	VC Member	
3.	Prof. R.S. Gupta	Subject Expert	
4.	Prof. R.S. Maheshwari	Subject Expert	
5.	Mr. Rohan Gupta	Representative from Industry	
6.	Prof. A. R. Batham	Member	
7.	Mrs. Tasneem Rangwala	Member	
8.	Mr. Deepak Choudhary	Member	
9.	Dr. Bhavna Sharma	Member	
10.	Miss Ojal Sohni	Alumini	

Scheme of Marks for B.Sc. Semester system Biochemistry (2018-2019)

Year	Semester	Theory/ Practical	Examination Scheme		
			External	Internal	Total
B. Sc. III year	V Semester	Metabolism	85	15	100
		Practical V	50	-	50
	VI Semester	Immunology, Clinical and Nutritional Biochemistry	85	15	100
		Practical VI	50	-	50

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B.Sc. III Year (Biochemistry 2018-2019)

PAPER –V

MOLECULAR BIOLOGY

Max. Marks: 40 (For regular Students)

Max. Marks: 50 (For Private Students)

Unit I

Basic Concept of Genetic Information: Nucleic acids as genetic information carriers, experimental evidences; Central dogma: current version and reverse transcription.

Primary structure of nucleic acids and their properties. Salient features of eukaryotic, Prokaryotic and viral genome. Basic concept about the secondary structure of nucleic acid, 5'-3' direction anti-parallel strands, base composition, base equivalence, base pairing and base-stacking in DNA.

Structure Levels of DNA: Watson and Crick model, A, B and Z types of DNA, major and minor grooves, chirality of DNA, tertiary structure of DNA.

Structure and properties of RNA: Classes of RNA, secondary and tertiary structures.

Unit II

DNA replication in prokaryotes; conservative, semi-conservative and dispersive types, experimental evidence for semi-conservative replication.

DNA polymerases, other enzyme and protein factors involved in replication.

Mechanism of replication. Inhibitors of DNA replication.

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Unit III

Transcription in prokaryotes and eukaryotes: RNA polymerase, promoters, initiation, elongation and termination of RNA synthesis, inhibitors of transcription; Reverse transcriptase.

Post- transcriptional processing of RNA in eukaryotes.

Unit IV

Genetic code: Basic feature of genetic code, biological significance of degeneracy. Wobble hypothesis.

Mechanisms of translation in prokaryotes: Ribosome structure, A and P sites, charged tRNA, f-met-tRNA, initiation codon, Shine-Dalgarno consensus sequence, formation of 70S initiation complex, role of EF- Tu, EF-Ts, EF-G and GTP, non-sense codons and release factors.

Regulation of gene expression in prokaryotes: Enzyme induction and repression, operon concept (*lac* operon, *trp* operon).

Unit V

Mutation: Molecular basis of mutation, types of mutation (insertion, deletion, transition, transversion, frame-shift, suppresser sensitive, germinal and somatic, backward and forward mutations, dominant and recessive mutations, spontaneous and induced mutation).

Mutagenicity testing: Correlation of mutagenicity and carcinogenicity: Ames testing, random and site-directed mutagenesis.

DNA damage and repair mechanisms.

Recombinant DNA Technology: Restriction endonucleases, brief discussion of step in DNA cloning. Applications of recombinant DNA technology.

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PAPER VI
NUTRITION, CLINICAL & ENVIROMENTAL
BIOCHEMISTRY

Max. Marks: 40 (For regular Students)

Max. Marks: 50 (For Private Students)

Unit I

Nutrition and dietary habits: Introduction and definition of foods and nutrition.

Fat soluble vitamins (A, D, E and K) , water soluble vitamins (B and C); Minerals (Ca, Fe and iodine) and their biological functions.

Basic food groups: energy giving foods, body building foods and protective food.

Composition of balanced diet, recommended dietary allowances (RDA) for average Indian, locally available foods, inexpensive quality foods and food stuffs rich in more than one nutrients. Balance vegetarian and non-vegetarian diets, emphasis on nutritional adequacy.

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Unit II

Nutritive and calorific value of foods: Basic concept of energy expenditure, units of energy, measurement of energy expenditure by direct or indirect calorimetry, calculation of non-protein RQ with respect to carbohydrate and lipids. Determination of heat production of the diet.

The basal metabolism and methods of measuring basal metabolic rate (BMR); energy requirements during growth, pregnancy, lactation and various physical activities. Calculation of energy expenditure of average man and woman.

Specific dynamic action (SDA) of foods, nutrition value of various kinds of foods generally used by Indian population, planning of dietary regimes for infants, during pregnancy and old age. Protein calories malnutrition (Kwashiorkor and Marasmus). Human milk and its virtues, breast v/s formulated milk feeding.

Unit III

Clinical biochemistry: Basic concept, definition and its scope in diagnosis; a brief review of units and abbreviation used in expressing concentrations and standard solution.

Quality control; Manual vs automation in clinical laboratory.

Collection and preservation of biological fluids (blood, serum, plasma, urine and CSF).

Importance of biochemical analysis of blood, urine and CSF; Normal values for important constituents (in SI unit) in blood (plasma/serum), CSF and urine.

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Unit IV

Clinical enzymology: Definition of functional and non-functional plasma enzyme.

Isozymes and diagnostic tests.

Enzyme pattern in health and diseases with special mention of plasma lipase, amylase, cholinesterase, alkaline and acid phosphates, SGOT, SGPT, LDH and CPK; Functional tests of liver and kidney.

Disease related to metabolism: Hypo- and hyper-glycemia, lipid malabsorption and steatorrhea, sphingolipidosis; role of lipoproteins.

Inborn errors of amino acid metabolism- alkaptonuria, phenylketonuria, albinism, gout and hyperuricemia.

Unit V

Air pollution: Suspended particulate matter, compounds of carbon, sulphur, nitrogen and their interactions, methods of estimation of biotic and abiotic pollutants, their effect on human health.

Water pollution: major pollutants from domestic, agricultural and industrial wastes, effects of pollutants on plants and animals, treatment of domestic and industrial wastes, solid-wastes and their treatment.

Soil pollution: Types and causes

Dr. A. Bafna	Prof. A. R. Batham
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PRACTICAL- III
(Based on Paper V and VI)

1. Extraction of DNA and its estimation by diphenylamine method.
2. Effect of temperature on the viscosity of DNA using Ostwald's viscometer.
3. Extraction of RNA and its estimation by Orcinol method.
4. Estimation of haemoglobin.
5. Estimation of calcium in serum & urine.
6. Estimation of phosphorus in serum & urine.
7. Estimation of creatinine in plasma and urine.
8. Estimation of immunoglobulins by precipitation with saturated ammonium sulphate.
9. Estimation of SGOT and SGPT.
10. Enumeration of bacteria from air, water and soil.

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List of Recommended Books for IIIrd year Biochemistry (Theory & Practical)

1. Chatterjea M.N. and Shinde, R. *Textbook of Medical Biochemistry*. Jaypee Brothers, Medical publishers
2. Zubay, Parson and Vance. *Principles of Biochemistry*. W.M.C. Brown publishers
3. Gupta S.N. *Biochemistry*. Rastogi publications
4. Berg, Tymoczko and Stryer. *Biochemistry*. Freeman Publishers
5. Powar C.B. and Chatwal. *Biochemistry*. Himalaya Publishing House
6. Swarup, Pathak and Arora. *Laboratory Techniques Modern Biology*. Kalyani Publishers.
7. Sadasivam s. and Manickam A. *Biochemical Methods*. New Age International Publishers
8. R.C Gupta and S. Bhargava. *Practical Biochemistry*. CBS Publishers & Distributors
9. Plummer D.T. *An Introduction to Practical Biochemistry*. Tata McGraw Hills Publishing Company.
10. Tilak S.T. Aerobiology *Vaijanti Prakashan*, Aurangabad
11. Mahapatra P.K. *Textbook of Environmental Microbiology: A laboratory Manual*

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