Session 2019-20

B.Sc. – I

MICROBIOLOGY

PAPER – I

GENERAL MICROBIOLOGY AND BASIC TECHNIQUE

Max. M. – 50; Min. M. – 17

Unit – 1: Fundamental, History and Development

Introduction to major groups of microorganisms and fields of microbiology, Historical development, contributions of pioneers (Louis Pasteur, Edward Jenner, Anton Von Leewenhoeck, Alexander Flemmimng), Beneficial and Harmful microbes and its role in daily life.

Unit – 2: Basic Microbial Techniques

Methods of studying microorganisms, Sterilization technique(Physical and Chemical), Isolation and pure culture technique (Streaking, Waksman serial dilution and plating), Cultivation, maintenance and preservation of pure cultures, culture media and conditions for microbial growth, Staining technique (simple staining, differential staining (Gram staining) negative staining and acid fast staining.

Unit –3: Virology and Bacteriology

Diversity of microbial world, Principle and classification of Viruses and bacteria, Structure, Multiplication and Economic importance of Viruses (TMV, Influenza, T4 phage), Structure and functional organization of Bacteria, cell wall of Gram positive and Gram negative bacteria, Economic importance of bacteria.

Unit – 4: Mycology

General characteristics and classification of Fungi, Structure and reproduction of fungi (Rhizopus, Penicillium, Aspergillus, Yeast and Agaricus), Common fungal diseases of crops (Late and Early Blight, Smut of Rice, Tikka disease of groundnut, Red Rot of Sugarcane), Structure, Reproduction and Economic Importance of Lichens.

Unit – 5: Phycology

General characteristics and classification of algae and Protozoa, General account and Economic Importance of Cyanobacteria (Microcystis, Oscillitoria, Nostoc and Anabaena), and Protozao (Amoeba, Paramoecium, Euglina and Plasmodium).

Name and Signatures

Chairperson/ HOD- Dr. Pragya Kulkarni	**Departmental members**
Subject Expert - Dr. Amia Ekka	**1. Mrs. Rekha Gupta**
Subject Expert - Dr. K.K.Patel	**Student Nominee**
VC Nominee - Dr. Ajay Manhar	**1. Ku. Rimjhim Meshram**

DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. There shall be three sections (Section A, B, and C) in each theory paper.
2. Section A shall contain very short answer type questions (One or two line answer) or objective type questions (fill in the blank). **(not multiple choice questions)** Altogether 10 questions will be set from the entire syllabus, and shall be compulsory. **(1X10 = 10)**
3. Section B shall contain short answer type questions with the maximum limit of 150 words. Altogether 10 questions to be set i. e. Two from each unit with the internal choice. The candidates are required to solve one from each unit. (**3X5 = 15)**
4. Section C shall contain long answer/ descriptive type questions. The students are required to answer precisely and the answer should not exceed the maximum limit of 350 words. Altogether 10 questions to be set i. e. Two from each unit with the internal choice. The candidates are required to solve one from each unit. (**5X5 = 25)**
5. The students are required to study the content mentioned in the curriculum exhaustively.

Marking Scheme

M.M.	Section A	Section B	Section C
50	01 X 10 = 10	03X 5 = 15	05 X 5 = 25

Recommended Books

1. General Microbiology I & II - C.B. Powar and H. F. Daginawala , Himalaya Publishing House Bombay.
2. A text book of Microbiology, R.C. Dubey and D.K. Maheshwari, S. Chand and Company Ltd., New Delhi.
3. Microbiology: Fundamentals and Applications, S.S. Purohit, Students Edition, Jodhpur.
4. Microbiology, Pelczar J., and Chan, Tata McGRAW-Hill Edition.
5. General Microbiology, Stanier R.Y. and Ingraham J.L.,Macmillan Press Ltd.

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Subject Expert - Dr. K.K.Patel	**Student Nominee**
External member - Mr. Ajay Manhar	**2. Ku. Rimjhim Meshram**

Session 2019-20

B.Sc. – I

MICROBIOLOGY

PAPER – II

BIOCHEMISTRY AND PHYSIOLOGY

Max. M. – 50; Min. M. - 17

Unit – 1: Carbohydrates and Proteins

Structure, classification and properties of carbohydrates, Monosaccharides, Oligosaccharides and Polysaccharides, Structure, classification and properties of Proteins, Amino acids, Peptides and Proteins (Primary, Secondary, Tertiary and Quaternary).

Unit – 2: Lipids and Nucleic Acids

Structure, classification and properties of Lipids, Saturated and Unsaturated fatty acids, Structure, and properties of nucleotides, Structure and forms of DNA, Replication of DNA, Types, Structure and functions of RNA.

Unit – 3: Enzymes

Structure, Nomenclature, classification and properties of Enzymes, Mechanism of Enzyme action, Enzyme kinetics, Michaelis Menten equation and derivation, Enzyme inhibition, Lineweaver Burk Plot (LB Plot), Co enzyme and their role, Allosteric Enzymes and Isoenzyme, Extracellular enzymes and their role.

Unit – 4: Microbial Metabolism

Bacterial Photsynethesia and Chemosynthesis: Glycolysis, TCA cycle and Oxidative Phosophorylation, Anarobic catabolism of glucose, Fat biosynthesis, Alpha and Beta oxidation of fatty acids, Deamination, transamination and Urea cycle.

Unit – 5: Growth Physiology and Transport System

Bacterial cell division, Genome replication and growth phases, Conditions for growth, Plasme membrane and Transport system, Types of Transport (Active and Passive), diffusion (Simple and Facilitated), concept of Uniport, Antiport and Symport.

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VC Nominee - Dr. Ajay Manhar	**2. Ku. Rimjhim Meshram**

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3. Biochemistry, Powar C.B. and Chatwal, Himalaya Pub.
4. A text book of Microbiology – R.C. Dubey and D.K. Maheshwari, S. Chand and Company Ltd., New Delhi.
5. Microbiology : Fundamentals and Applications – S.S. Purohit, Students Edition, Jodhpur.

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B.Sc. Part I
Microbiology
List of Practical Exercises
Session 2019-20

1. Basic rules of Microbiology Laboratory
2. Study of Common Glass wares and their Cleaning
3. Study of common Tools
4. Study of common Instruments : Microscope, Autoclave, Laminar air flow, Incubator, Hot air oven
5. Preparation of Culture Media for culturing Bacteria and Fungi
6. Preparation of Agar deep tubes, Agar Slants and Agar plates (Pouring and Plating)
7. Primary isolation of bacteria and fungi by Pour Plate and Spread Plate Methods
8. Preparation of Pure Culture by Streak Plate method
9. Study of Colony Counter and enumeration of bacterial colonies by serial dilution and plate method
10. Study of bacteria by simple and differential (Gram- Staining)
11. Study the macroscopic and microscopic features of given microbial cultures (Bacteria, Fungi, Cyanobacteria, Lichen)
12. Measurement of microorganisms (micrometry) and camera Lucida drawing of isolates
13. General and specific qualitative test for Carbohydrates (Glucose and Starch), Lipids, Proteins and Amino acids
14. Demonstration of Amylase production by microorganisms

Marking Scheme

1A Instrument	1B Culture Technique	2 Biochemical Test	3 Staining method	4 Spotting (1-5)	5 Viva-Voce	6 Sessional	Total
05	05	05	10	10	05	10	50

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