31. Microbiology

B.Sc. Microbiology-I **Total Mark: 100**

Appendix 'A'

(Outlines of Tests)

Paper-A:	Fundamentals of Microbiology (Written)	:	70 Marks
Paper-B:	Practical	:	30 Marks

For Colleges B.Sc. (General)

Questions paper will include 40 percent objective and 60 percent subjective. To keep the standard of education in case of subjective part question will have 2-3 parts.

Appendix 'B'

(Syllabi and Courses of Reading)

Paper-A: Fundamentals of Microbiology **70 Marks**

1. Fundamentals of Microbiology:

1. Microorganisms and their respective place in the living world.
2. Historical development of Microbiology (contributions of Leeuwenhoek. Louis Pastur, Robert Koch, Edward Jenner and Alexander Flemming) and its scope.
3. Microscopy: an outline to the principles and applications of compound Microscope.
4. Detailed morphology and arrangement of bacterial cell.
5. Differentiation between pro-and eukaryotic cell/cells.
6. Growth, nutrition (nutritional requirement and nutritional types ; sources of energy, C, N, H, O, S, P, H_2 O. trace elements and growth factors), reproduction and methods of cultivation of bacteria (culture media & physical requirements for growth).
7. General methods of study of micro-organisms- Techniques for Isolation, purification and characterization.
8. Nomenclature and basis of classification of bacteria.
9. Basic properties of fungi and protozoa.
10. A brief introduction to structure and cultivation of viruses.

2. Fundamentals of Control:

1. Control of microorganisms by physical and chemical agents.
2. Antibiotics and chemotherapeutic agents: their mode of action of microorganisms.

3. Bacterial Genetics:

1. Structure and chemical composition and replication of nucleic acid. Role of RNA, DNA in protein synthesis (an outline).
2. Mutation and variation.

3. Genetical intermixing of bacteria including transformation, transudation and conjugation.
4. An introduction to genetic engineering.

4. Microbial Metabolism:

1. Introduction to metabolism and role of phosphorus in energy transfer. Glycol sis and T.C.A. cycle.

5. Applied Microbiology:

1. Microbiology of water and wastewaters. Water as a source of infection. Methods of water purification and supply.
2. Treatment of disposal and treatment of sewage.
3. Introduction to food and dairy microbiology. Methods of food preservation.
4. Differentiation between food intoxication and food infections.
5. Microbiology of soil with particular reference to nitrogen cycle.
6. Microbiology of air.

Paper-B: List of Practical 30 Marks

1. An introduction to the compound microscopy.
2. Staining Procedure: Simple staining, Gram's staining, Acid-fast staining, cell-wall staining, capsule staining, spore staining and spirochete staining. Study of cell motility by hanging drop preparation.
3. Preparation and sterilization of bacteriological media.
4. *Pure culture study of* E.coli, Enterobacter aerogenes, staph. Aureus and B. Subtilis.
5. Analysis of milk, water, food and soil by standard plate count technique (SPC) and / or most probable number techniques (MPN).
6. Microbiological analysis of air. Microscopic study of fungi isolated from air.
7. Effects of heat, pH, temperature, Osmotic pressure, Antibiotics and disinfectants on bacterial growth.
8. Differentiation between

Recommended Books:

1. J.G. Holt N.R. Krieg, P.H.A., Sneath, J.T. Staley and S.T. Williams. Bergey's Manual of Determinative Bacteriology, Ninth edition, Williams and Wilkins, 1994.
2. Batizing, Barry L.. Microbiology; An introduction, Brook/Cole Canda Thomson Cearning, 2002.

3. Jauquelyn G. Black., Microbiology, 5th Edition, Wilegand Sons Inc. 2003.
4. Johnson, Microbiology and Immunology, 4th Ed. Lifhin Cott William & Wilpis, 2002.
5. M. Gilligan., Micro array Data; Case in Medical Microbiology and infections, ASM press Washington D. C, 2003.
6. Robbert A. Pollack, Laboratory Exercise in Microbiology, John Wiley and Sons Inc, 2003.