

## MICROBIOLOGY & IMMUNOLOGY (MSCZO-604)

### Block I: Microbiology

#### Unit 1: Structure and Classification of Microbiology

- 1.1 Objectives
- 1.2 Introduction
- 1.3 History and importance of microbiology
- 1.4 Structures and classification of virus, bacteria and fungi
  - 1.4.1 Morphology and Physiology of Bacteria and Virus
    - 1.5.1 Chemical composition of virus & Bacteria
    - 1.5.2 Reproduction of virus & Bacteria
- 1.6 Summary
- 1.7 Terminal Questions and Answers

#### Unit 2: Techniques of Sterilization and Culture

- 2.1 Objectives
- 2.2 Introduction
- 2.3 Sterilization: Principles - dry heat, moist heat, filtration
  - 2.3.1 Tantalization, pasteurization
  - 2.3.2 Radiation - disinfection
- 2.4 Culture techniques - media preparation
  - 2.4.1 Aerobic and anaerobic culture techniques
- 2.5 Different Staining methods
- 2.6 Summary
- 2.7 Terminal Questions and Answers

#### Unit 3: Environmental Microbiology

- 3.1 Objectives
- 3.2 Introduction
- 3.3 Microbial ecology
  - 3.3.1 Role of microorganisms in the productivity of ecosystems
  - 3.3.2 Interactions between microorganisms and animals
- 3.4 Microbiology of Soil
  - 3.4.1 Types of microorganisms in soil
  - 3.4.2 Factors for microbial growth
  - 3.4.3 Soil enzymes
- 3.5 Microbiology of Water
  - 3.5.1 Microorganisms of water
  - 3.5.2 Microbiology of potable water
  - 3.5.3 Purification of water
  - 3.5.4 Microbiology of sewage & Bioremediation
- 3.6. Airborne diseases
- 3.7 Summary
- 3.8 Terminal Questions and Answers

#### Unit 4: Clinical Microbiology

- 4.1 Objectives
- 4.2 Introduction
- 4.3 Pathogenic microbes of bacterial, viral, fungal and protozoan diseases
- 4.4 Preventive measures of cure and control of microbial pathogens
- 4.5 Classifications, source and mode of action of Antibiotics
- 4.6 *Escherichia coli* and *Staphylococcus aureus* case studies, collection, identification and causative Agents
- 4.7 AIDS Virus
- 4.8 Summary

#### 4.9 Terminal Questions and Answers

### **Block 11: Immunology**

#### **Unit 5:** Introduction to immune system

- 5.1 Objectives
- 5.2 Introduction
- 5.3 Resistance and immunity
  - 5.3.1 Cellular immunity v/s humoral immunity
  - 5.3.2 Active v/s passive immunity
- 5.4 Summary
- 5.5 Terminal Questions and Answers

#### **Unit 6:** Application of immunological principles

- 6.1 Objectives
- 6.2 Introduction
- 6.3 Diagnostics
  - 6.3.1 Vidal test
  - 6.3.2 ELISA test
- 6.4 Vaccines
- 6.5 Active vs. passive immunity
- 6.6 Summary
- 6.7 Terminal Questions and Answers

#### **Unit 7:** Adjuvant

- 7.1 Objectives
- 7.2 Introduction
- 7.3 Characteristic and uses of ideal adjuvant
- 7.4 Natural and chemically defined adjuvant and their role on immunodulation
- 7.5 Summary
- 7.6 Terminal Questions and Answers

#### **Unit 8:** Antigen v/s Antibody

- 8.1 Objectives
- 8.2 Introduction
- 8.3 Antigenic determination
- 8.4 Haptens and antigenicity
- 8.5 Theories of antibody formation
- 8.6 Structure and classification of immunoglobulin's and their properties
- 8.7 immunoglobulin's synthesis at molecular level
- 8.8 Summary
- 8.9 Terminal Questions and Answers

#### **Unit 9:** *In vitro* & *In vivo* reactions

- 9.1 Objectives
- 9.2 Introduction
- 9.3 Phagocytosis
- 9.4 Precipitation and agglutination
- 9.5 Biological activity of complement fixation and cytolysis
- 9.6 Mechanism of *In vivo* reactions and hypersensitivity
- 9.7 Summary
- 9.8 Terminal Questions and Answers

