

B.Sc MICROBIOLOGY (CBCS) SYLLABUS
SECOND YEAR – SEMESTER- IV
W.E.F. 2016 - 17

MBT- 401 IMMUNOLOGY AND MEDICAL MICROBIOLOGY

TOTAL HOURS: 48

CREDITS: 4

UNIT-I

No. of hours: 10

Types of immunity – innate and acquired; active and passive; humoral and cell-mediated immunity.
 Primary and secondary organs of immune system – thymus, bursa fabricus, bone marrow, spleen and lymph nodes.
 Cells of immune system.
 Identification and function of B and T lymphocytes, null cells, monocytes, macrophages, neutrophils, basophils and eosinophils.

UNIT-II

No. of hours: 10

Antigens – types, chemical nature, antigenic determinants, haptens.
 Factors affecting antigenicity.
 Antibodies – basic structure, types, properties and functions of immunoglobulins.
 Types of antigen-antibody reactions - Agglutination, Precipitation, Neutralization, complement fixation, blood groups.
 Labeled antibody based techniques – ELISA, RIA and Immunofluorescence. Polyclonal and monoclonal antibodies – production and applications.
 Concept of hypersensitivity and Autoimmunity.

UNIT-III

No. of hours: 10

Normal flora of human body.
 Host pathogen interactions: infection, invasion, pathogen, pathogenicity, virulence and opportunistic infection.
 General account on nosocomial infection.
 General principles of diagnostic microbiology- collection, transport and processing of clinical samples.
 General methods of laboratory diagnosis - cultural, biochemical, serological and molecular methods.

UNIT-IV

No. of hours: 8

Antibacterial Agents- Penicillin, Streptomycin and Tetracycline.
 Antifungal agents – Amphotericin B, Griseofulvin
 Antiviral substances - Amantadine and Acyclovir
 Tests for antimicrobial susceptibility.
 Brief account on antibiotic resistance in bacteria - Methicillin-resistant *Staphylococcus aureus* (MRSA).
 Vaccines – Natural and recombinant.

UNIT-V

No. of hours: 10

General account on microbial diseases – causal organism, pathogenesis, epidemiology, diagnosis, prevention and control-

Bacterial diseases – Tuberculosis and Typhoid

Fungal disease – Candidiasis.

Protozoal disease – Malaria.

Viral Diseases - Hepatitis- B and AIDS

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1. Identification of human blood groups.
2. Separation of serum from the blood sample (demonstration).
3. Estimation of blood haemoglobin-Hemoglobinometer/Cyanometenoglobin (CMG) method.
4. Total Leukocyte Count of the given blood sample.
5. Differential Leukocyte Count of the given blood sample.
6. Immunodiffusion by Ouchterlony method.
7. Identify bacteria (*E. coli*, *Pseudomonas*, *Staphylococcus*, *Bacillus*) on the basis of cultural, morphological and biochemical characteristics: IMViC, urease production and catalase tests
8. Isolation of bacterial flora of skin by swab method.
9. Antibacterial sensitivity by Kirby-Bauer method
10. Study the symptoms of the diseases with the help of photographs: Anthrax, Polio, Chicken pox, HBV, HIV, TB, Dermatomycoses (ring worms)
11. Study the various stages of malarial parasite in RBCs using permanent mounts.

SUGGESTED READING

- Abbas AK, Lichtman AH, Pillai S. (2007). **Cellular and Molecular Immunology**. 6th edition Saunders Publication, Philadelphia.
- Ananthanarayan R. and Paniker C.K.J. (2009) **Textbook of Microbiology**. 8th edition, University Press Publication
- Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013) Jawetz, Melnick and Adelberg's **Medical Microbiology**. 26th edition. McGraw Hill Publication
- Delves P, Martin S, Burton D, Roitt IM. (2006). Roitt's **Essential Immunology**. 11th edition Wiley-Blackwell Scientific Publication, Oxford.
- Goering R., Dockrell H., Zuckerman M. and Wakelin D. (2007) Mims' **Medical Microbiology**. 4th edition. Elsevier
- Goldsby RA, Kindt TJ, Osborne BA. (2007). Kuby's **Immunology**. 6th edition W.H. Freeman and Company, New York.
- Jawetz, Melnick and Adelberg's **Medical Microbiology**. 26th edition. McGraw Hill
- Microbiology. 4th edition. Elsevier Publication
- Richard C and Geiffrey S. (2009). **Immunology**. 6th edition. Wiley Blackwell Publication.
- Wiley JM, Sherwood LM, and Woolverton CJ. (2013) Prescott, Harley and Klein's **Microbiology**. 9th edition. McGraw Hill Higher Education

SUBJECT:: B.Sc., MICROBIOLOGY (CBCS) MODEL QUESTION PAPER
SECOND YEAR – SEMESTER IV

MBT-401 : IMMUNOLOGY AND MEDICAL MICROBIOLOGY

Max marks -75

Time 3 hrs

SECTION-A

ANSWER ANY FIVE OF THE FOLLOWING

5 x 5 = 25 marks

Draw labeled diagrams wherever necessary

1. CMI functions
2. Eosinophils function
3. ELISA principle and applications
4. Define Nosocomial infections
5. Define Virulence and Opportunistic infections
6. Role of Pencillin
7. Attenuated vaccine means
8. Function of Acyclovir

SECTION- B

ANSWER ANY FIVE OF THE FOLLOWING

5 x 10 = 50 marks

Draw labeled diagrams wherever necessary

9. a) Classify the and Write about the functions of Primary lymphoid organs.
Or
b) Differentiate the function innate and acquired immunity.
10. a) Write the factors affecting the antigenicity mechanism with suitable examples.
Or
b) List out the functions of B and T lymphocytes.
11. a) Classify the antibodies and explain with diagrammatic representation.
Or
b) List out various antigen and antibody reactions and write their principle in detail.
12. a) Discuss various types of host pathogen interactions with suitable examples.
Or
b) Explain the biochemical methods used in laboratory diagnosis of microbial diseases.
13. a) Discuss various tests used for antimicrobial susceptibility in the laboratories
Or
b) What is a vaccine? Classify the types of vaccines and write their applications in detail.

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