

19/05/2025

Printing Pages : 2

Paper Code: MSC-MB-203

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(SVSU:2024-25/R)

Enrollment No.

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MSc Microbiology

II Semester / I Year Examination

SUB: MICROBIAL IMMUNOLOGY-MSC-MB-203

[Time : 03:00 Hours]

[Max. Marks : 70]

Note : 1. Attempt all the questions as per given instructions.

1. Multiple Choice Questions (MCQs) [01×15=15]

I. What is the concept of graft rejection in transplantation?

- A) The immune system recognizes and attacks the transplanted tissue.
- B) The body accepts the transplant without immune response.
- C) The immune system repairs the transplanted organ.
- D) The transplanted tissue becomes part of the host without resistance.

II. Which of the following is NOT a primary organ of the immune system?

- A) Bone marrow B) Spleen C) Thymus D) Lymph node

III. What is the role of cytotoxic T lymphocytes (CTLs)?

- A) They assist B-cells in antibody production.
- B) They destroy infected or cancerous cells.
- C) They produce antibodies

IV. Which of the following is true regarding haptens?

- A) Haptens are complete antigens by themselves.
- B) Haptens can elicit an immune response only when bound to a larger molecule.
- C) Haptens are part of the complement system.
- D) Haptens are large proteins that activate T-cells.

V. What role do adjuvants play in immunology?

- A) They destroy pathogens.
- B) They enhance the immune response to an antigen.
- C) They reduce inflammation.
- D) They act as antibodies.

VI. Which of the following are responsible for producing antibodies?

- A) T lymphocytes B) B lymphocytes C) Macrophages D) Dendritic cells

VII. What is the result of antigen-antibody interactions?

- A) The antigen is destroyed.
- B) The immune system is inhibited.
- C) Antibodies bind and neutralize antigens.
- D) The antigen undergoes mutation.

VIII. What is the primary function of affinity maturation?

- a. To improve the ability of antibodies to bind to antigens
- b. To decrease the response to pathogens
- c. To regenerate damaged immune cells
- d. To induce somatic hypermutation in TCR genes

IX. Which of the following describes somatic hypermutation?

- A) Genetic recombination in TCR genes Random mutation in immunoglobulin genes to increase
- B) affinity
- C) Clonal expansion of T lymphocytes
- D) Mutation of major histocompatibility complex genes

X. What is V(D)J recombination responsible for?

- A) Producing antigen-binding sites in antibodies
- B) Generating diversity in TCR and immunoglobulin genes
- C) Inactivating antigens
- D) Stimulating B-cell proliferation

XI. Which of the following best describes the function of MHC molecules?

- a. They protect the body from pathogens.
- b. They present antigen fragments to T-cells.
- c. They stimulate the production of antibodies.
- d. They regulate the complement system.

XII. What is an antigen?

- A) A molecule that activates the immune system
- B) A protein that protects against infection
- C) A type of immune cell
- D) A hormone involved in immune response

XIII. Which of the following is an example of an immunological disorder?

- A) Rheumatoid arthritis
- B) Influenza
- C) Tuberculosis
- D) Malaria

XIV. What is immunological memory?

- A) The body's ability to recognize and respond more quickly to a previously encountered antigen.
- B) The production of antibodies by plasma cells.
- C) The inhibition of immune responses after recovery from infection.
- D) The ability to recognize pathogens that the body has never encountered.

XV. What is the process called in which blood cells are formed?

- A) Hemostasis
- B) Hematopoiesis
- C) Immunoprecipitation
- D) Phagocytosis

2. Answer in long (any three)

[10×3=30]

- I. What is immunotherapy? How play important role in the treatment of cancer? How do monoclonal antibodies and immune checkpoint inhibitors work to enhance immunity?
- II. Describe the structure of immunoglobulin genes. How does recombination contribute to the diversity of antibodies in B cells?
- III. Describe the major primary and secondary lymphoid organs involved in the immune system. What are their roles in immune development and function?
- IV. What is gene diversification, and how does this process differ from mutations in other genes in the body?

3. Answer in short (any five)

[5×5=25]

- I. What is lymphoid organ? Mention their function.
- II. What is hematopoiesis?
- III. Give the short notes on TCR gene.
- IV. What is the process of immunoglobulin gene expression in B cells?
- V. Discuss the concept of graft rejection.
- VI. How immunological memory formed?
- VII. Describe the three activation pathways of the complement system and how they contribute to immune defense.

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Program: M.Sc. Microbiology

II Semester / Ist YEAR Examination

Subject Code: —MSC-MB-204

Subject Name- Microbial Genetics and Molecular Biology

[Time : 03:00 Hours]

[Max. Marks : 70]

Note: 1. Attempt all the questions as per given instructions.

1. Multiple Choice Questions (MCQs)

[01×15=15]

- I What type of protein helps package eukaryotic DNA into a compact form?
A) Actin B) Histones C) Tubulin D) DNA polymerase
- II In which direction does RNA polymerase synthesize RNA?
A) 3' to 5' B) 5' to 3' C) 3' to 3' D) 5' to 5'
- III The primary structure responsible for organizing prokaryotic DNA into a compact form is:
A) Chromatin B) Nucleosome
C) Nucleoid-associated proteins (NAPs) D) Nuclear envelope
- IV In eukaryotic cells, DNA wraps around histone proteins to form:
A) Nucleosomes B) Nucleoid C) Plasmids D) Ribosomes
- V In eukaryotic cells, where does transcription occur?
A) Cytoplasm B) Ribosome C) Nucleus D) Mitochondria
- VI What happens during RNA processing in eukaryotes?
A) Introns are removed, and exons are joined
B) The RNA strand is immediately translated
C) DNA is converted into RNA
D) Ribosomes attach to the DNA
- VII Which enzyme is responsible for transcription?
A) DNA polymerase B) RNA polymerase C) Helicase D) Ligase
- VIII Which of the following RNA types carries the genetic code from DNA to the ribosome?
A) tRNA B) mRNA C) rRNA D) miRNA
- IX What is the function of the promoter region in transcription?
A) It signals where DNA replication should start
B) It codes for proteins
C) It signals where transcription should begin
D) It terminates transcription
- X Which structure in eukaryotic chromosomes prevents the loss of genetic information during replication?
A) Centromere B) Telomere C) Nucleosome D) Plasmid

- XI** What is *in vitro* transcription?
 A) The synthesis of RNA within a living cell
 B) The process of converting DNA into RNA outside a living system
 C) The replication of DNA using RNA polymerase
 D) The translation of mRNA into protein
- XII** What is the primary purpose of transcription in a cell?
 A) To replicate DNA
 B) To synthesize proteins directly
 C) To produce an RNA copy of a gene
 D) To translate mRNA into a protein
- XIII** What is the main goal of translation?
 A) To replace words with their synonyms
 B) To convert text from one language to another while preserving meaning
 C) To make a text sound more poetic
 D) To simplify complex language
- XIV** Which one is not a Stop Codon-
 A) UAA B) UAG C) UGA D) AUG
- XV** In eukaryotic cells, chromosomes are organized within:
 A) The cytoplasm B) The nucleoid
 C) The nucleus D) The plasma membrane

2. Answer in long (any three) [10×3=30]

- I** What are the key structural components of plasmids? How do they contribute to plasmid function and replication?
- II** Describe the detailed steps involved in the process of transcription in prokaryotic and eukaryotic cells.
- III** Describe the detailed-on regulation of gene expression in prokaryotes and Eukaryotes.
- IV** Explain the structure of nucleic acids (DNA and RNA) and discuss their significance as genetic material.

V What are Transformations? Explain about structure of Plasmid

3. Answer in short (any five) [5×5=25]

- I** Differentiate between Transformation and Transduction.
- II** Give a short note on RNA Polymerase.
- III** What is the Difference between mutation and crossing over?
- IV** Give a short note on Protein Folding.
- V** What is the DNA replication?
- VI** Discuss about Conjugation ?
- VII** Write short notes structure of Plasmid.