Total No. of Questions: 22

Enrollment No : _____

MEDICAPS UNIVERSITY

Faculty of Science

End Semester Examination May 2025

BT3CO10 Immunology

Programme	:	B.Sc.	**Branch/Specialisation**	:	BT
Duration	:	3 hours	**Maximum Marks**	:	60

Note: *All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary. Notations and symbols have their usual meaning.*

Section 1 (Answer all question(s))

Marks CO BL

Q1. Which of the following molecules are responsible for the specificity of the immune response? **1 1 1**

- ○ Antibodies
- ○ T-cell receptors
- ◉ Both (A) and (B)
- ○ Complement proteins

Q2. Which of the following cells is most responsible for killing virus-infected cells? **1 1 1**

- ○ B cells
- ◉ T cytotoxic cells (CD8+ T cells)
- ○ Helper T cells (CD4+ T cells)
- ○ Monocytes

Q3. Which of the following statements best describes the concept of "self and non-self" recognition in the immune system? **1 1 1**

- ○ The immune system targets cells of the body to eliminate them
- ◉ The immune system recognizes and attacks foreign antigens while ignoring self-antigens
- ○ The immune system only reacts to bacterial antigens
- ○ The immune system cannot distinguish between self and non-self

Q4. Which of the following is a feature of the humoral immune response? **1 1 1**

- ○ Activation of T cells to destroy infected cells
- ◉ Production of antibodies by plasma cells
- ○ Suppression of immune responses
- ○ Activation of phagocytosis

Q5. Haptens are: **1 1 1**

- ○ Full-sized antigens that can induce an immune response
- ◉ Small molecules that cannot induce an immune response alone but can when attached to a carrier protein
- ○ Antibodies that bind to antigens
- ○ Non-protein substances that act as adjuvants

Q6. Which class of immunoglobulin is primarily responsible for the body's first defense against infections and is the largest antibody in the bloodstream? **1 1 1**

- ◉ IgM
- ○ IgG
- ○ IgA
- ○ IgE

Q7. Which of the following is true about MHC class I molecules? **1 1 1**

- ○ They present antigens to CD4+ T cells
- ◉ They are found on the surface of all nucleated cells
- ○ They primarily bind to bacterial antigens
- ○ They are associated with helper T cells

Q8. MHC class II molecules are primarily expressed on which of the following cell types? **1 1 1**

- ○ Red blood cells
- ○ Neutrophils
- ◉ Antigen-presenting cells (APCs) like dendritic cells, macrophages, and B cells
- ○ Cytotoxic T cells

Q9. Which of the following is the main function of the complement system? **1 1 1**

- ○ To enhance the production of antibodies
- ◉ To promote phagocytosis and inflammation
- ○ To neutralize viral particles
- ○ To regulate the immune system

Q10. Which of the following best describes type IV hypersensitivity? **1 1 1**

- ○ It involves IgE antibodies binding to mast cells
- ◉ It is mediated by T cells rather than antibodies.
- ○ It results in the formation of immune complexes that deposit in tissues.
- ○ It involves the activation of the complement system leading to inflammation.

Section 2 (Answer all question(s))

Marks CO BL

Q11. What are the key differences between B cells and T cells in the immune system? **2 2 2**

Rubric	Marks
Any two differences	2

Q12. What are the primary and secondary lymphoid organs? What roles do they play in immune responses? **3 1 1**

Rubric	Marks
Definition of primary and secondary lymphoid organs	1
Role of primary and secondary lymphoid organs	2

Q13. (a) Discuss the role of phagocytosis and inflammation in pathogen clearance. **5 2 2**

Rubric	Marks
Definition	1
Diagrammatic Representation	2
brief explanation	2

(OR)

(b) Briefly describe the journey of vaccine discovery in immunology.

Rubric	Marks
serological stories of vaccines discovery	3
Reference of atleast 3 scientists	2

Section 3 (Answer all question(s))

Marks CO BL

Q14. Describe the role of helper T cells in the immune response. **2 2 2**

Rubric	Marks
T-helper cells role in B cells activation	1
T-helper cells role in T cells activation	1

Q15. (a) How does the interaction between antigen-presenting cells (APCs) and T cells contribute to the activation of the adaptive immune response? **8 2 3**

Rubric	Marks
Explain antigen-presenting cells (APCs)	3
T cells reaction on APC	2
Diagrammatic Representation	3

(OR)

(b) Discuss the role of suppressor T-cells (regulatory T-cells) in maintaining immune system balance. How do they prevent overactivation of the immune response and the development of autoimmune diseases?

Rubric	Marks
Definition & Explanation T Reg Cells	2
Action for supression	2
Diagrammatic Representation	4

Section 4 (Answer all question(s))

Marks CO BL

Q16. What are adjuvants? What is their role in immunology? **3 2 2**

Rubric	Marks
Definition	1
Role in Immunity	2

Q17. (a) Describe the roles of the variable and constant regions of antibodies. **7 4 4**

Rubric	Marks
Antibody description	1
Explanation of variable and constant regions of antibodies.	3
Diagrammatic Representation	3

(OR)

(b) What are the different classes of immunoglobulins? What are their primary functions in the immune system?

Rubric	Marks
classification	2
Function	2
Diagrammatic Representation	3

Section 5 (Answer all question(s))

Marks CO BL

Q18. What are the differences between Class I and Class II MHC molecules in terms of structure and function? **4 2 2**

Rubric	Marks
Difference	2
Diagram	2

Q19. (a) Describe the concept of antigen processing and presentation. How do MHC molecules present antigenic peptides to T cells? **6 2 2**

Rubric	Marks
APC	2
MHC Presentation	2
Diagrammatic Representation	2

(OR)

(b) Explain the general organization of the Major Histocompatibility Complex (MHC) in humans.

Rubric	Marks
MHC Definition	2
organisation explanation	4

Section 6 (Answer any 2 question(s))

Marks CO BL

Q20. Describe Type I hypersensitivity. How do IgE antibodies contribute to allergic reactions? **5 2 2**

Rubric	Marks
Definition	2
IgE role in allergic reactions	2
Diagrammatic Representation	1

Q21. What is the role of mast cells and histamine release in Type I hypersensitivity? **5 2 2**

Rubric	Marks
Role of mast cell	2.5
Role of histamine	2.5

Q22. Explain the role of macrophages and T cells in inflammation. **5 2 2**

Rubric	Marks
role of macrophages in inflammation.	2.5
role of macrophages T cells in inflammation.	2.5

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