Name: **Enrolment No:**	

UPES

End Semester Examination, December 2024

Course: Immunology and ImmunoTechnology

Semester: 5th

Program: B. Tech Biotechnology — **Duration: 3 Hours**

Course Code: HSMB3026 — **Max. Marks: 100**

Instructions: Attempt all questions

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	What type of cell is responsible for antibody production?	**1.5**	**CO1**
Q 2	Name the process by which all blood cells, including immune cells, are formed.	**1.5**	**CO1**
Q 3	What are the two primary lymphoid organs in the immune system?	**1.5**	**CO1**
Q 4	What type of immunity is primarily mediated by antibodies?	**1.5**	**CO2**
Q 5	Which type of cytokines are involved in reducing inflammation?	**1.5**	**CO2**
Q 6	Name one key cell type involved in the innate immune system.	**1.5**	**CO2**
Q 7	Which type of T cell is mainly associated with helping B cells produce antibodies?	**1.5**	**CO3**
Q 8	What is the primary structural component of an antibody that binds to antigens?	**1.5**	**CO3**
Q 9	What is the process called that increases antibody diversity through changes in the variable region of B cells?	**1.5**	**CO4**
Q 10	Which molecule on antigen-presenting cells (APCs) presents antigens to T cells?	**1.5**	**CO4**
Q 11	Where does T cell maturation and selection primarily occur?	**1.5**	**CO3**
Q 12	What is the difference between positive and negative selection of T cells?	**1.5**	**CO3**
Q 13	Name a subtype of T cells involved in immune tolerance and suppression of autoimmunity.	**1.5**	**CO2**

Q 14	What is the purpose of a vaccine?	**1.5**	**CO4**
Q 15	What type of immune response is involved when the body mistakenly attacks its own tissues?	**1.5**	**CO3**
Q 16	Name one immune checkpoint protein that can inhibit T cell activation.	**1.5**	**CO4**
Q 17	What type of antibody is made by identical immune cells and targets one specific antigen?	**1.5**	**CO4**
Q 18	What is the main role of antibodies in diagnostic tests?	**1.5**	**CO3**
Q 19	Which technique is used to separate and sort cells based on their surface markers in immunology?	**1.5**	**CO3**
Q 20	Name one common assay used to detect the presence of antibodies in a sample.	**1.5**	**CO2**
	Section B **(4Qx5M=20 Marks)**		
Q 1	Explain the role of primary and secondary lymphoid organs in the development and function of the immune system.	**5**	**CO1**
Q 2	Differentiate between innate and adaptive immunity, providing two examples of cells or components involved in each.	**5**	**CO4**
Q 3	Discuss the role of pro-inflammatory and anti-inflammatory cytokines in immune regulation. *(2.5 marks)* Give one example of each type of cytokine. *(2.5 marks)*	**5**	**CO2**
Q 4	Explain the concept of clonal selection and expansion in adaptive immunity. *(2.5 marks)* Why is it crucial for effective immune response? *(2.5 marks)*	**5**	**CO2**
	Section C **(2Qx15M=30 Marks)**		
Q 1	Outline the process and significance of designing recombinant antibodies for therapeutic use.	**15**	**CO3**
Q2	Describe the principles and applications of ELISA in immunology.	**15**	**CO4**
	Section D **(2Qx10M=20 Marks)**		
Q 1	Explain how Western blotting (immunoblotting) works and one scenario where it would be used in immunology research.	**10**	**CO3**
Q2	What is the Major Histocompatibility Complex (MHC), and why is it important in immune responses?	**10**	**CO4**