Name:

Enrolment No:

UPES

End Semester Examination, December 2023

Course: Immunology and ImmunoTechnology

Semester : 5th

Program: B. Tech Biotechnology

Duration : 3 Hours

Course Code: HSMB 3026 **Max. Marks: 100**

Instructions: Attempt all the questions

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	What is the primary principle behind immuno-diffusion assays?	1.5	CO3
Q 2	What does the term "enzyme-linked" signify in ELISA?	1.5	CO3
Q 3	What is the purpose of transferring proteins to a membrane in immuno-blotting?	1.5	CO3
Q 4	What is the main advantage of ELISPOT in immunological research?	1.5	CO2
Q 5	How is immuno-histochemistry used in studying tissues?	1.5	CO2
Q 6	What is a key difference between polyclonal and monoclonal antibodies**?**	1.5	CO1
Q 7	How is the production of monoclonal antibodies typically initiated?	1.5	CO1
Q 8	In immuno-precipitation, what is the purpose of using antibodies coupled to beads?	1.5	CO1
Q 9	What is the key limitation of single radial immuno-diffusion?	1.5	CO3
Q 10	What are the two main types of ELISA, based on the detection method?	1.5	CO2
Q 11	In Western blotting, what is the purpose of the secondary antibody?	1.5	CO2

Q 12	What type of vaccine typically contains inactivated or weakened forms of the pathogen?	**1.5**	**CO3**
Q 13	What is the advantage of using fluorescent labels in immuno-histochemistry?	**1.5**	**CO2**
Q 14	What information can flow cytometry provide about a cell population?	**1.5**	**CO2**
Q 15	How does FACS sorting physically separate cells?	**1.5**	**CO2**
Q 16	What is cross-linking in immuno-precipitation?	**1.5**	**CO1**
Q 17	What is the main goal of immune checkpoint blockade therapy?	**1.5**	**CO1**
Q 18	How does the sandwich ELISA work?	**1.5**	**CO3**
Q 19	Which immune checkpoint is known for its role in suppressing T-cell activity and is targeted in cancer immunotherapy?	**1.5**	**CO3**
Q 20	What is the advantage of using recombinant antibodies in comparison to traditional antibodies?	**1.5**	**CO2**
Section B (4Qx5M=20 Marks)			
Q 1	Explain the principles of double immunodiffusion and how it differs from single radial immunodiffusion. Provide an example of a scenario where double immunodiffusion might be more advantageous.	**5**	**CO3**
Q 2	Describe the steps involved in a sandwich ELISA, emphasizing its application in detecting and quantifying specific proteins. Discuss potential challenges and solutions in optimizing sensitivity.	**5**	**CO3**
Q 3	Illustrate the Western blotting process, detailing the purpose of each step from sample preparation to detection. Discuss common troubleshooting issues and strategies for overcoming them.	**5**	**CO3**
Q 4	Explain the principle behind the ELISPOT assay and its application in quantifying cytokine-secreting cells. Discuss	**5**	**CO2**

	the advantages and limitations of ELISPOT compared to other immunological techniques.		
Section C (2Qx15M=30 Marks)			
Q 1	Discuss the steps involved in immuno-histochemistry and its application in visualizing specific proteins within tissues. How can antibody validation and antigen retrieval impact the success of an immuno-histochemical experiment?	**15**	**CO1**
Q 2	Describe the immuno-precipitation process and its role in isolating specific proteins from complex mixtures. Discuss considerations for choosing suitable antibodies and potential challenges in immuno-precipitation experiments.	**15**	**CO3**
Section D (2Qx10M=20 Marks)			
Q 1	Compare and contrast the mechanisms of action of PD1 and CTLA4 inhibitors in cancer immunotherapy. Discuss potential side effects associated with blocking these checkpoints.	**10**	**CO2**
Q 2	Explore the steps involved in the design of recombinant antibodies using phage display technology. How does this method contribute to the development of therapeutic antibodies?	**10**	**CO3**