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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2026

B.Tech-IV Semester (BT)

Course Code (Credits): 25B11BT413 (3)

Max. Marks: 25

Course Name: Immunology

Course Instructor: Dr. Abhishek Chaudhary

Max. Time: 1.5 Hour

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculators is not allowed

Q.No	Question	CO	Marks
Q1	<p>Although the five immunoglobulin isotypes share many common structural features, the differences in their structures affect their biological activities.</p> <ol style="list-style-type: none"> Draw a schematic diagram of a typical IgG molecule and label each of the following parts: H chains, L chains, interchain disulfide bonds, intrachain disulfide bonds, hinge, Fab, Fc, and all the domains. Indicate which domains are involved in antigen binding. How would you have to modify the diagram of IgG to depict an IgA molecule isolated from saliva? How would you have to modify the diagram of IgG to depict serum IgM 	CO-2	4+1+1
Q2	<p>According to the clonal selection theory, all the immunoglobulin molecules on a single B cell have the same antigenic specificity. Explain why the presence of both IgM and IgD on the same B cell does not violate the unispecificity implied by clonal selection. Also explain Hapten and its significance in immunology</p>	CO-3	3+2
Q3	<p>You prepare an immunotoxin by conjugating diphtheria toxin with a monoclonal antibody (mAb) specific for a tumor antigen.</p> <ol style="list-style-type: none"> If this immunotoxin is injected into an animal, will any normal cells be killed? Explain. If the antibody part of the immunotoxin is degraded so that the toxin is released, will normal cells be killed? Explain 	CO-2	5
Q4	<p>Adaptive immunity has evolved in vertebrates but they have also retained innate immunity. What would be the disadvantages of having only an adaptive immune system? Comment on how possession of both types of immunity enhances protection against infection.</p>	CO-1	3

Q5	<p>The process of variable-region gene rearrangement produces mature, immunocompetent B cells. each such cell is committed to produce antibody with a binding site encoded by the particular sequence of its rearranged V genes.</p> <p>a. What do you understand by gene organization? Describe the molecular mechanism of VDJ recombination using suitable diagram</p> <p>b. Justify the statement “The steps in variable-region gene rearrangement occur in an ordered sequence, but they are random events that result in the random determination of B-cell specificity”</p>	CO-3	6
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JUTT TEST-2 EXAMINATION- March-2026