



18048

**BRAINWARE UNIVERSITY****Term End Examination 2025-2026****Programme – M.Sc.(BT)-2024****Course Name – Immunobiology****Course Code - MBT30111****(Semester III)****LIBRARY****Brainware University
Barasat, Kolkata -700125****Full Marks : 60****Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A**(Multiple Choice Type Question)****1 x 15=15****1. Choose the correct alternative from the following :**

- (i) Identify T cells are the source of
- a) interleukin
 - b) interferon
 - c) lymphotoxin
 - d) all of these
- (ii) Identify which organism did Pasteur first use to vaccinate a group of sheep with a heat-attenuated strain to demonstrate immunity.
- a) Mycobacterium tuberculosis
 - b) Bacillus anthracis
 - c) Vibrio cholerae
 - d) Clostridium tetani
- (iii) Identify what PAMPs are on bacterial cells.
- a) Pathogen-associated pattern recognized by the Innate immune cells
 - b) Pathogen-associated pattern recognized by the Adaptive immune cells
 - c) Plasma cell-associated pattern recognized by Innate immune cells
 - d) Plasma cell-associated pattern recognized by adaptive immune cells
- (iv) Indicate which of the following components is NOT directly involved in the T cell-mediated cell killing.
- a) Granzymes
 - b) Perforins
 - c) FasL (Fas Ligand)
 - d) Antibodies
- (v) Indicate CD8 is a marker of
- a) B cells
 - b) T cells
 - c) Cytotoxic T cells
 - d) None of these
- (vi) Infer that if cell mediated immunity is carried out by..... while humoral immunity is mainly carried out by _____
- a) B cells/T cells
 - b) T cells/B cells
 - c) Antibodies/Antigens
 - d) Antibodies/Phagocytes
- (vii) Identify that immediate hypersensitivity is also known as__?
- a) Type I reaction
 - b) Type II reaction
 - c) Type III reaction
 - d) Type IV reaction

(viii) Determine that DNA vaccines:

- | | |
|--|---|
| a) Are relatively poor at stimulating cytotoxic T lymphocyte responses in mice | b) Are only effective if followed by a protein boost |
| c) Require cold storage in tropical countries | d) May have distinct advantages when preparing subunit vaccines against viruses which frequently alter their antigens |

(ix) Examine most antibodies are synthesized in

- | | |
|----------------------------|-------------------------------|
| a) central lymphoid organs | b) peripheral lymphoid organs |
| c) primary lymphoid organs | d) macrophages |

(x) Interpret that monoclonal antibodies recognize a single_:

- | | |
|------------|--------------|
| a) Antigen | b) Bacterium |
| c) Virus | d) Epitope |

(xi) Determine the Southern blotting technique depends on

- | | |
|---|---|
| a) similarities between the sequences of probe DNA and experimental DNA | b) similarities between the sequences of probe RNA and experimental RNA |
| c) similarities between the sequences of probe protein and experimental protein | d) the molecular mass of proteins |

(xii) Identify what is the primary immunological basis of hyperacute graft rejection?

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|----------------------|--|
| a) T-cell activation | b) Pre-existing antibodies against donor MHC |
| c) Cytokine storm | d) NK cell activity |

(xiii) Examine, the circulation of a two month old breast-fed baby will contain maternal:

- | | |
|--------|--------|
| a) IgA | b) IgD |
| c) IgM | d) IgE |

(xiv) Estimate, for vaccination against mycobacterial diseases such as tuberculosis, the most important facet of the immune response to be stimulated is:

- | | |
|----------------------|---|
| a) Cytotoxic T-cells | b) A high titer of antibody |
| c) Neutrophils | d) Macrophage-activating cell-mediated immunity |

(xv) Summarize, DNA vaccines:

- | | |
|--|---|
| a) Are relatively poor at stimulating cytotoxic T lymphocyte responses in mice | b) Are only effective if followed by a protein boost |
| c) Require cold storage in tropical countries | d) May have distinct advantages when preparing subunit vaccines against viruses which frequently alter their antigens |

Group-B

(Short Answer Type Questions)

3 x 5=15

2. State one key difference between an agglutination reaction and a precipitation reaction. (3)
3. Name different types of grafts used in transplantation. (3)
4. State the differences between innate and adaptive immunity. (3)
5. Human red blood cells are not nucleated and do not express any MHC molecules. Analyze how this property is beneficial for blood transfusions? (3)
6. Justify the process of reverse vaccinology. (3)

OR

Explain the principle of "Immunoblotting" and mention its uses. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Mention the structure and function of the two types of MHC molecules. (5)
8. Summarize the biological effects mediated by complement system (5)

9. Show a schematic diagram and explain the process of B-Cell Maturation, activation, and differentiation. (5)
10. Outline the major sequential steps involved in Western blotting, starting from a protein mixture (e.g., cell lysate) and ending with detection of a specific protein. (5)
11. Estimate how you can manufacture/produce polyclonal antibodies and assess with diagrams (5)
12. Assess the co-stimulatory signals that are required for full T-Cell activation. (5)

OR

Differentiate between positive and negative selection in T-cell maturation, explaining their significance in shaping the T-cell repertoire. How do these selection processes contribute to self-tolerance and MHC restriction? (5)

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