

**6/H-64 (vii) (Syllabus-2015)**

**2 0 2 2**

**( May/June )**

**BIOCHEMISTRY**

**( Honours )**

**( Microbiology and Immunology )**

**[ BCHEM-601 ]**

**Marks : 56**

**Time : 3 hours**

*The figures in the margin indicate full marks  
for the questions*

**Answer four questions, taking two from each Part.**

**PART—A**

1. (a) Why is the five kingdom classification no longer accepted by microbiologist? 3
- (b) How many domains were suggested in Carl Woese phylogenetic classification scheme? Name these domains and explain how the relationship in his universal phylogenetic tree were determined. 1+3+2=6
- (c) Discuss molecular characteristics used in classification of microorganisms. 5

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2. (a) What is 'microbial growth'? How do bacteria reproduce? 1+2=3
- (b) What do you mean by diauxic growth? 2
- (c) Discuss the distinguishing features of gram-positive and gram-negative bacteria. 5
- (d) Discuss the reasons for the decline in cell numbers during the death phase of growth in batch culture. 4
3. (a) Why is MacConkey agar both a selective and a differential medium? 3
- (b) What is bacterial conjugation and how was it discovered? 6
- (c) Define transformation and transduction. 3
- (d) What is a plasmid? 2

PART—B

4. Answer the following questions : 2×7=14
- (a) The two types of immunity are innate and adaptive. What cells mediate the innate immunity?
- (b) Adaptive immunity is composed of two responses. What cells mediate each response?
- (c) What are the two main functions of innate immunity?

( 3 )

- (d) Which two immune processes does IgE mediate?
- (e) In Type I hypersensitivity reactions, allergens (i.e antigen) are presented to Th2. The activated Th2 cells then released IL-4, IL-5 and IL-13. Describe the function of each of these cytokines in Type I reaction.
- (f) Antibodies or immunoglobulins are synthesized by B-cells. What general functions do they perform?
- (g) What are the two classes of MHC? Which sets of HLA genes are associated with each class?
5. (a) What are hematopoietic stem cells? 3
- (b) Define hematopoiesis. 2
- (c) What are antigens, immunogens and haptens? 6
- (d) Differentiate between humoral immunity and cell-mediated immunity. 3
6. (a) Explain any *three* of the following : 3×3=9
- (i) Cytokines
- (ii) Interferons
- (iii) Chemokines
- (iv) T-lymphocytes
- (v) Antigen-presenting cells

(b) Discuss any one of the following : 5

(i) Monoclonal antibodies and its application in biology

(ii) Features that distinguish between B-lymphocytes and T-lymphocytes

(iii) The immunological significance of phagocytes

7. (a) What is autoimmunity? What are the major factors that contribute to the development of autoimmunity? 3+4=7

(b) What is a vaccine? What are different types of vaccines? 2+5=7

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