

2022

MICROBIOLOGY — HONOURS

Paper : CC-13

(Immunology)

Full Marks : 50

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Answer **question no. 1** and **any three** questions from the rest.

1. Answer **any ten** questions :

2×10

- (a) What is anergy? How does it occur?
- (b) How is nude mice different from SCID mice?
- (c) Where does initial activation of B cells and T cells take place?
- (d) Explain the difference between a monocyte and a macrophage.
- (e) Where are the CDR region located on the antibody molecule and what are their functions?
- (f) What is the role of opsonin?
- (g) Define 'Atopy'.
- (h) What are 'Abzymes'?
- (i) Define 'allotypic determinants' of immunoglobulins.
- (j) Does all (HGPRT⁻) myeloma cell requires hypoxanthine for growth? — Explain.
- (k) Why ELISA is less specific than western blot?
- (l) Explain the difference between the terms antigen presenting cells and target cells.
- (m) Differentiate endocytosis and phagocytosis.
- (n) Briefly state the role of anaphylatoxin.
- (o) Graves' disease is an example of autoimmune disorder. Explain the statement.

2. (a) Briefly explain the mechanisms of action of the following complement regulatory proteins :

- (i) C1 inhibitor (CI Inh)
- (ii) Factor H
- (iii) Homologous restriction factor (HRF)
- (iv) Decay accelerating factor (DAF).

(b) Would you expect a C1 or C3 complement deficiency to be more serious clinically? Explain your answer. (2×4)+(1+1)

Please Turn Over

3. (a) What is Hinge region in antibody structure? Name the amino acids present in hinge region. Write down the importance of hinge region.
(b) Draw and describe the structure of IgM. Why serum IgM cannot activate complement by itself?
(2+2+2)+(2½+1½)
4. (a) Define the term intracellular pathogen. Give example. How the intracellular pathogen can survive within macrophage?
(b) What type of drugs are effective for the treatment of Type I hypersensitivity?
(c) Differentiate B cell and T cell epitopes. (2+3)+3+2
5. (a) What happens when IgG is treated with papain and pepsin separately?
(b) Briefly outline the ELISA test for HIV infection indicating which antigen and antibody are used.
(c) Agglutination inhibition provides a highly sensitive assay to detect small quantities of antigen. Explain.
(2+2)+3+3
6. (a) Draw a schematic diagram of a IgA molecule present in saliva and label the following—
I. H & L chains
II. Inter and Intrachain disulfide bonds
III. Fab & Fc
IV. Domains involved in antigen binding.
(b) How NK cells lacking T cell receptors can recognize infected cells?
(c) What is the mechanism used by NK cells to kill target cells?
(d) From what precursor cells do NK cells arise? 4+2+3+1
7. (a) What is the advantage of using ELISPOT versus a standard sandwich ELISA?
(b) Assume antibody X and antibody Y both react with an epitope Z. Furthermore, assume that antibody X has a K_a 5 times greater than that of antibody Y. What will be the strength of the monovalent reaction of antibody X with epitope Z in comparison with the avidity of antibody Y for an antigen with multiple copies of epitope Z?
(c) Describe the use of immunotoxin as therapeutic agent.
(d) Name the three types of professional APC. For each type indicate whether it expresses class II MHC molecules and co-stimulatory signal constitutively or must be activated before doing so.
1½+2+2½+(1½+2½)
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