

This question paper contains 3 printed pages]

Roll No.

S. No. of Question Paper : **9839**

Unique Paper Code: 3183010019

Name of the Paper : **Immune Response to Infection and Diseases**

Name of the Course : **B.Sc. (H) Biomedical Sciences (NEP-UGCF-2022)**Semester **VII**

Type of Paper : **Discipline Specific Elective (DSE)**

Duration : 2 Hours **Maximum Marks : 60**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *five* questions in all.

Give illustrations and examples wherever required.

Subparts of the questions should be attempted together.

1. (a) Assertion and Reason (any *three*) :

$$3 \times 2 = 6$$

Choose

(A) Both A and R are true and R is the correct explanation;

(B) Both A and R are true but R is not the correct explanation;

(C) A is true, R is false;

(D) A is false, R is true

P.T.O.

- (i) **Assertion :** $\gamma\delta$ T_H cells can recognize antigens without MHC presentation.

Reason : $\gamma\delta$ TCRs can recognise sugars on certain microbes.

- (ii) **Assertion :** Allelic exclusion ensures that each T-cell expresses a single type of TCR.

Reason : Both alleles of TCR genes are rearranged simultaneously to increase diversity.

- (iii) **Assertion :** NK cells can kill virus-infected cells without prior sensitization.

Reason : They recognize cells with decreased or absent MHC class I molecules.

- (iv) **Assertion :** Epinephrine is used to treat anaphylactic reactions

Reason : It blocks IgE production by B-cells.

- (b) Hypothetical Problems (any three) : 3×2=6

- (i) A 15-year-old boy develops wheezing and swelling within minutes of exposing to dust and pollen grains.

Which antibody and effector cells are responsible ?

- (ii) A newborn develops hemolytic disease due to Rh incompatibility.

Which antibody mediates red blood cell destruction ?

- (iii) A Serum sickness occurs after administration of foreign antiserum.

What immune mechanism causes tissue damage in this condition ?

- (iv) Class switching in B-cells changes the antibody isotype.

Give one consequence of class switching on immune function.

2. (a) Differentiate between tumor-specific antigens and tumor-associated antigens.
(b) Explain *one* example of monoclonal antibody therapy used in cancer immunotherapy. 6,6
3. (a) Explain the various strategies employed by viruses to evade the host immune response.
(b) Illustrate how failure of central and peripheral tolerance contributes to autoimmunity. 6,6
4. (a) Explain the process of V(D) J recombination in the generation of B-cell receptor diversity.
(b) Describe the immune response against *Mycobacterium tuberculosis*. How does this immune response lead to the formation of granulomas in the infected tissue ? 6,6
5. (a) Explain the concept of somatic hypermutation and its significance in the adaptive immune response.
(b) Describe the mechanism of any *one* organ specific autoimmune disease. 6,6
6. (a) Explain the mechanism of Delayed-Type hypersensitivity and name at least *two* diseases in which this type of hypersensitivity plays a major role.
(b) Discuss the interplay between innate and adaptive immune responses in the recognition, activation and elimination of pathogenic microorganisms. 6,6

(a) The following is a list of the names of the persons who have been appointed to the various committees of the Board of Directors of the Corporation.

The Board of Directors of the Corporation has appointed the following persons to the various committees of the Board:

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