

Seest No. _____
[90/93/103]

SARDAR PATEL UNIVERSITY
M.Sc. (3rd Semester) Examination (CBCS)
Microbiology/Biotechnology/Biochemistry
PS03EMIC21/PS03EBIT21/PS03EBIC21 – Advanced Immunology

No. of Printed Pages : 3

Date: 05/01/2021 (Tuesday)
Time: 02:00 – 04:00 pm

Max Marks: 70

- Q.1. A. Select the most appropriate answer from the following (MCQs) 1×8
- I. Immunoprecipitation does NOT
 - a. Allow characterization of molecules bound to cells
 - b. Take place in gel matrices
 - c. Work well in solution
 - d. Require the use of a monoclonal antibody
 - II. All of the following concerning **agglutination reactions** are true EXCEPT
 - a. They are used only with red blood cells
 - b. They only detect molecules on the surface of cells
 - c. They require a high degree of expertise to interpret
 - d. They should be done with titrations of antibodies
 - III. **Type I hypersensitivity** can be blocked using:
 - a. Histamine
 - b. An IgA myeloma
 - c. A myeloma protein of mixed antibody class
 - d. Sodium cromoglycate
 - IV. In case of Goodpasture syndrome autoantibodies are generated against
 - a. Basement membrane in glomeruli
 - b. Acetylcholine receptor
 - c. Thyroid stimulating hormone (TSH) receptor
 - d. Intrinsic factor in GI track
 - V. Immuno based technique used for separation of cell population is
 - a. Flow cytometry
 - b. FACS
 - c. RIA
 - d. Western blotting
 - VI. The **immunosuppressive drug** which probably attacks DNA by alkylation and cross-linking is:
 - a. Azathioprine
 - b. Cyclophosphamide
 - c. Cyclosporine
 - d. Rapamycin
 - VII. A diagnostic marker for tumors of the colon is:
 - a. Alpha-fetoprotein
 - b. Carcinoembryonic antigen (CEA)
 - c. The presence of Reed-Sternberg cells
 - d. EBV-related antigens
 - VIII. **Di George syndrome** results from a defect in:
 - a. Purine nucleoside phosphorylase
 - b. WASP
 - c. Thymic development
 - d. DNA repair

Q.1.B. For questions (I - XIII), do as directed:

Indicate whether each of the following statements is true or false (I to IV) 1×4

- I. B cells are highly motile cells, programmed to respond against chemo-attractant signals
- II. CTLA-4 blocks co-stimulation and therefore leads to T-cell activation.
- III. The advantage of subunit vaccine such as Hepatitis B and Pertussis is that specific antigens lower the chance of adverse reactions.
- IV. Central tolerance occurs in secondary lymphoid organs, where many self-reactive lymphocytes are eliminated before they can mature.

Answer in one word or one sentence (V to VIII) 1×4

- V. Name the autoimmune disease an individual produces auto-antibodies and sensitized T_H1 cells that are specific for thyroid antigens.
- VI. Which type of hypersensitivity is defined as, "Sensitized T cells (T_H1 , T_H2 and others) release cytokines that activate macrophages or T_c cells, which mediate direct cellular damage"?
- VII. Which technique uses antibodies to identify protein bands following gel electrophoresis?
- VIII. The most distinctive property of a mature T cell is that its TCR recognizes peptide antigens only when combined with self-MHC molecules. What term best describes this phenomenon?

Fill in the blanks (IX to XII) 1×4

- IX. _____ antigens stimulate antibody production in the absence of T-cell help.
- X. Monocytes differentiate into _____ kind of phagocytic cells.
- XI. Lipopolysaccharide (LPS) from Gram-negative bacteria is a _____ activator of murine B-cells.
- XII. _____ is example of Type III hypersensitive reaction.

XIII Match the following 1×4

Column A	Column B
(a) Immunosuppressant	(1) Vasodilation and increased permeability
(b) Superantigens	(2) Hyper IgM syndrome
(c) Plasmoblasts	(3) Azothioprine
(d) Histamine	(4) Polyclonal T cell activation
	(5) Differentiated B cells that have begun to secrete antibodies.

- Q.2** Attempt **any seven** of the following and describe in brief **2×7**
- I.** Monoclonal antibodies
 - II.** Live attenuated vaccine
 - III.** Self-Tolerance
 - IV.** T-Cell Activation
 - V.** Briefly explain active and passive immunization
 - VI.** What is the role of notch ligand in early T cell development?
 - VII.** Give examples of costimulatory and coinhibitory signals in T-Cell Activation
 - VIII.** Cancer immunotherapy
 - IX.** Autoimmunity
- Q.3** Give a detailed account on **Hybridoma Technology** and applications of Monoclonal Antibodies. **08**
- OR**
- Write a note on **bivalent antibodies**, bispecific antibodies, scFv and dsFv antibodies produced by antibody engineering. **08**
- Q.4** Discuss **T-cell maturation** and the **thymic selection of T-cell** in detail. **08**
- OR**
- Give a diagrammatic overview of **B-Cell development** that begins in the bone marrow and is completed in the periphery. Enlist various transcription factors involved in B-cell development. **08**
- Q.5** What is/are **immunological basis of graft rejection**? Discuss clinical manifestations of graft rejection. **08**
- OR**
- Write a short note on **Type-I hypersensitivity reaction**. **08**
- Q.6** What is **primary immunodeficiency**? Discuss any two human immunodeficiency diseases and underlying genetic defect. **08**
- OR**
- Write a note on **primary and secondary immunodeficiency**. **08**

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