**Time: 2½ Hours** **Total Marks: 75**

**NOTE:**

1. **Attempt all questions.**
2. **Draw neat labeled diagrams wherever necessary.**
3. **For Q.2, Q.3, Q.4, and Q.5 attempt A and B OR C and D.**

**Q 1 Multiple choice questions: (Any Fifteen)** **15**

1. What is the primary function of type I interferons in viral infections?
   a) Stimulate antibody production b) Inhibit viral replication
   c) Enhance phagocytosis d) Activate complement system

2. Which of the following is localized Type III Hypersensitivity Reaction?
   a) Arthus Reaction b) Contact dermatitis c) erythroblastosis fetalis d)Anaphylaxis

3. What type of cells are primarily involved in phagocytosis of microbes?
   a) Neutrophils and macrophages b) mast cells c) T lymphocytes d) B lymphocytes

4. What is a common manifestation of type IV hypersensitivity?
   a) Asthma b) Contact dermatitis c) Food allergies d) Type 1 diabetes

5. What is the major component of mast-cell granules that is released during type I hypersensitivity?
   a) Histamine b) sugars c) IgE d) Proteins

6. Which of the following is NOT a functional category of cytokines?
   a) Pro-inflammatory cytokines b) Chemokines c) Antibodies
   d) Colony-stimulating factors

7. Which of these cytokines is considered anti-inflammatory?
   a) IL-1 b) IL-2 c) IL-10 d) IFN-α

8. The term "pleiotropy" in cytokine function refers to the ability of a single cytokine to
   a) Act on multiple cell types with different effects. b) Be produced by only one cell type. c) Inhibit other cytokines. d) Function only in the bloodstream.

9. The principal class of antibodies produced in mucosal tissues is _____.
   a) IgA b) IgD c) IgC d) IgE

10. A mutation in the gamma chain of cytokine receptors leads to a condition called
a) Severe combined immunodeficiency (SCID) b) Rheumatoid arthritis
c) Lupus d) Asthma

11. If mechanisms to prevent immune responses to self-antigens fail, it leads to
a) hypersensitivity b) autoimmunity c) graft rejection d) both a &b

12. Negative selection is done for lymphocytes in primary lymphoid organs that
a) interact weakly with self-antigens displayed by MHC
b) interact strongly with self-antigens displayed by MHC
c) do not interact with self-antigens displayed by MHC
d) do not need an MHC presentation

13. T cell anergy can be induced by
a) loss of ability to transmit activating signals
b) T cells preferentially engage inhibitory signals
c) both
d) neither

14. $T_{REG}$ cells express the transcription factor
a) PD -1 b) CTLA-4 c)FoxP3+ d)FoxP2+

15. Peripheral tolerance in B cells can be brought about by
a) anergy b)apoptosis c)suppression by Treg cells d)all three

16. A stem cell is an unspecialized and .....cell which is capable of self renewal and cell division.
a) Differentiated b) Undifferentiated c) Proliferated d) Non proliferated

17. .....stem cells exhibit the highest capacity for differentiation of any cell in an entire organism.
a) Totipotent b) Pluripotent c) Multipotent d) Oligopotent

18. Embryonic stem cells are collected from the inner cell mass of pre-implantation .....days after fertilization.
a) 2 - 4 b) 3 - 5 c) 4 - 6 d) 5 - 7

19. ..... stem cells are derived from the inner cell mass of the blastocyst which is obtained after 4 - 6 days after fertilization.
a) Embryonic b)Human embryonic c) Mouse embryonic d) Murine embryonic

20. As embryonic stem cells differentiate, their functional specification prevails and pluripotency.....
a) Increases b) Decreases c) Remains constant d) Remarkably increases

**Q 2A** Explain antibody-mediated hypersensitivity reactions giving suitable examples **08**

**Q 2B** How does innate immunity stimulate adaptive immune responses? Add a note on the regulation of Innate Immune Responses **07**

**OR**

**Q 2C** What do you mean by inflammation? How do leukocytes migrate from the blood into tissues? **08**

**Q 2D** Explain delayed hypersensitivity reactions with respect to phases and their detection. **07**

**Q 3 A** Describe the general properties of cytokines. What factors influence their production in the immune system? **08**

**Q 3 B** Explain the process of T-cell differentiation, outlining the main steps involved. **07**

**OR**

**Q 3 C** How do cytokines function as autocrine, paracrine, and endocrine signals in the immune system? Provide examples of each type of signaling. **08**

**Q 3 D** Explain how antibodies can function at special anatomic sites, such as mucosal surfaces. **07**

**Q 4A** Elaborate on T cell Central Tolerance with a diagram. **08**

**Q 4B** Explain the development of the autoimmune disease SLE. **07**

**OR**

**Q 4C** Describe B cell Central Tolerance with a diagram. **08**

**Q 4D** Explain the development of Myasthenia gravis. **07**

**Q 5A** Give an account of stem cells and their types. **08**

**Q 5B** Write a detailed note on pluripotency and pluripotent stem cells. **07**

**OR**

**Q 5C** Give an account of regenerative medicine. **08**

**Q 5D** Explain the future regenerative medicine development and its therapeutic applications. **07**

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