2½ Hours

Total Marks: 75

1. Attempt **all** questions.
2. **All questions** carry **equal** marks.
3. Draw **neat labelled diagrams** wherever necessary.
4. Use of **log tables** and **non-programmable calculators** is **allowed**.

Q.1 Select the correct alternative: (Any Fifteen) 15

1 Pattern recognition receptors (PRRs) are present on

a) Only B cells b) Only T cells c) Innate immune cells d) RBCs

2 The antibody involved in Type I hypersensitivity is

a) IgA b) IgM c) IgE d) IgG

3 The main effector cell in Type IV hypersensitivity is

a) B cell b) T cell c) Mast cell d) NK cell

4 Serum sickness is an example of

a) Type I b) Type II c) Type III d) Type IV

5 Which cell is most abundant in pus?

a) Macrophage b) Neutrophil c) Eosinophil d) Basophil

6 The production of IFN-γ by TH1 cells can inhibit the growth and proliferation of the TH2 T-cell subset. This is an example of what functional property?

a) Pleiotropy
b) Redundancy
c) Antagonism
d) Synergism

7 Antibody-dependent cellular cytotoxicity(ADCC) is triggered when the NK cell's Fc receptor binds to the Fc regions of _____ antibodies.

a) IgE
b) IgG
c) IgM
d) IgA

8 _____activate phagocytes and B lymphocytes through the action of piasma membrane proteins and by secreted cytokines.

a) CD4+ helper T cells

b) CD8+ cytotoxic T cells

c) CD2+ helper T cells

d)CD12+ cytotoxic T cells

9 The neonatal Fc receptor (FcRn) is unique because it

a) Mediates the destruction of helminth parasites.

b) Protects IgG antibodies from intracellular degradation, prolonging their half-life.

c) Is expressed on NK cells to initiate antibody-dependent cellular cytotoxicity.

d) Transports IgA across the intestinal epithelium.

10 Endotoxins from _____ stimulate macrophages to overproduce IL-1 and TNF-α that cause an often fatal form of bacterial septic shock.

a) gram positive bacteria

b) gram negative bacteria

c) mycoplasma.

d) Mycobacteria

11 Which cell type plays a key role in maintaining self-tolerance?

a) Memory T cells

b) Regulatory T cells (Tregs)

c) Natural killer cells

d) Plasma cells

12 Molecular mimicry refers to

a) Immune tolerance induced by self-antigens

b)Pathogen antigens resembling self-antigens leading to cross reactivity

c) Mutation of self-antigens into foreign antigens

d) Sequestration of antigens behind immune barriers

13 Which autoimmune disease is characterized by demyelination of neurons in the CNS?

a) SLE

b) Rheumatoid arthritis

c) Multiple sclerosis

d) Myasthenia gravis

14 Which type of hypersensitivity reaction is most involved in SLE?

a) Type I

b) Type II

c) Type III

d) Type IV

15 Which therapy involves removing circulating autoantibodies from blood?

a) Plasmapheresis

b) Radiotherapy

c) Chemotherapy

d) Antifungal therapy

16 ..... stem cells exhibit the highest capacity for differentiation of any cell in an entire organism.

a) Pluripotent b) Totipotent c) Multipotent d) Oligopotent

17 Adult stem cells are rare populations of.....cells.

a) Differentiated b) Non differentiated c) Divided d) Undivided

18 When hESCs are cultured in feeder free media, where feeder cells are replaced by.....inhibitory factors.

a) Leukemia b) Murine c) Embryonic d) Blastocyst

19 Embryonic stem cells are derived from.....primordial germ cells.

a) Totipotent b) Unipotent c) Multipotent d) Oligopotent

20 The germ layer cells are further differentiated into more specialised cells like.....

a) Cardiomyocytes b) Hepatocytes c) Neurons d) All the above

Q2A)	Define hypersensitivity I. Discuss its components with appropriate role in causing allergic reaction.	8
Q2B)	Describe the cardinal signs of inflammation and their underlying causes.	7
	OR	
Q2C)	Explain the mechanism of delayed-type hypersensitivity reactions.	8
Q2D)	Explain how immune complexes cause tissue injury in Type III hypersensitivity.	7
Q3A)	Explain how the various properties of cytokines enable distinct immune responses.	8
Q3B)	Give a brief account on properties of antibodies that determine effector functions.	7
	OR	
Q3C)	How do antibodies, like IgA and IgG, manage to work effectively in distinct body sites such as mucosal surfaces and the placenta?	8
Q3D)	Explain how naive $CD4^+$ cells differentiate into effector cells upon antigen stimulation.	7
Q4A)	Discuss T-cell central tolerance with a diagram.	8
Q4B)	Explain Type 1 diabetes mellitus as an autoimmune disease. Mention its symptoms, complications, and management.	7
	OR	
Q4C)	Write a detailed account of Systemic Lupus Erythematosus (SLE) including its treatment.	8
Q4D)	Explain immunosuppressive therapy used to treat autoimmune diseases.	7
Q5A)	Explain the types of stem cells on the basis of their origin.	8
Q5B)	Give a detailed account on characterization of human embryonic stem cells.	7
	OR	
Q5C)	Write the applications of regenerative medicine and their future development.	8
Q5D)	Describe the detailing about differentiation of embryonic stem cells.	7