(3 hours) **(Total Marks : 100)**

Instructions to the candidates, if any:-

1) All the questions are compulsory. Choice is internal.
2) Figures to the right indicate full marks.
3) All questions carry equal marks.
4) Draw flowcharts /diagrams wherever necessary.

Q1A) Fill in the blanks: (**any three**) **3**

i) Adaptive immunity is _____ line of defence
ii) ____ cells are responsible for cell mediated immune response
iii) _____ is a primary lymphoid organ
iv) Kuffer cells are a type of _____

Q1B) Define and explain **any one** of the following: **3**

i) Effector Cells
ii) Passive immunity

Q1C) Write a detailed note on **any one** : **6**

i) Cells of immune system
ii) Cytokines

Q1D) Attempt **any one**: **8**

i) Elaborate on barriers of innate immune response.
ii) Discuss the different secondary lymphoid organs.

Q2A) Fill in the blanks: (**any three**) **3**

i) Antibodies are _____ in nature
ii) There are ____ types of heavy chains
iii) Kappa is a type of _____ chain
iv) The first secreted antibody is _____

Q2B) In an antibody molecule explain the role of **any one** of the following: **3**

i) Disulphide linkages
ii) Hinge region

Q2C) Write a detailed note on **any one** : **6**

i) Types of peptide chains in an antibody
ii) Factors affecting antigenicity

Q2D) Answer **any one** of the following: **8**

i) Discuss the mechanism of VDJ gene rearrangement
ii) Explain in detail with the aid of a labelled diagram the structure of an antibody.

Q3A) Fill in the blanks: **(any three)** **3**

i) Glycogen Storage I disorder is inherited as an autosomal ____ trait
ii) Thalassemia is a defect in _____ protein
iii) Patients with Tay Sachs disease generally die by ____ years of age.
iv) In ferritin, iron is in _____ oxidation state.

Q3B) Define and explain **any one** term: **3**

i) Von Gierke disease (ii) Inborn error of metabolism

Q3C) Write a short note on **any one**: **6**

i) Thalassemia (ii) Tay Sach's disease

Q3D) In detail answer **any one**: **8**

i) Discuss the causes, biochemical changes and symptoms of atherosclerosis.
ii) Write an informative note of sickle cell anaemia.

Q4A) Fill in the blanks: (**any three**) **3**

i) Cancer cells show _____ nuclear-cytoplasmic ratio.
ii) _____ are cancers of epithelial cells.
iii) The shape of cells which have lost control of cell division is generally _____.
iv) _____ radiations are carcinogenic.

Q4B) Define **any one**: **3**

i) Sarcoma
ii) Tumour

Q4C) Write detailed notes on **any one**: **6**

i) Ames Test (ii) Oncogenes

Q4D) Answer in detail **any one**: **8**

i) Discuss the treatment modalities that can be used for controlling cancer.
ii) Describe the causes of cancer.

Q5 A) Write notes on**:** **16**

i) Clonal selection theory.

OR

i) Phagocytes.
ii) Biological functions mediated by antibodies.

OR

ii) Digestion of antibody by pepsin
iii) Albinism

OR

iii) Iron deficiency anaemia
iv) Cellular changes occurring in a cancer cell

OR

iv) Malignant and benign tumours

Q5B) State true or false: **(any four)** **4**

i) NK cells are a type of granulocytes.

ii) Innate immunity takes around a week to develop.

iii) Effector B-Cells are called CTL

iv) In sickle cell anaemia, Glutamic acid at 16^{th} position is replaced by valine.

v) UV light is used for cancer therapy.

vi) Na^{+} ions play a role in pathophysiology of hypertension

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