AU–124

B.Sc. (Part—II) Semester—IV Examination

4S : BIOINFORMATICS

(Fundamentals of Molecular Biology and Immune System)

Time : Three Hours] [Maximum Marks : 80

Note :— (1) All questions are compulsory.

(2) Draw well labelled diagram wherever necessary.

1. (A) Fill in the blanks :

(i) _____ is an enzyme responsible for strand separation during DNA replication.

(ii) In DNA double helical model pyrimidine on strand always pair with _____ on the other strand.

(iii) B and T cells are produced by stem cells that are formed in _____.

(iv) _____ cells mature in the thymus. 2

(B) Choose correct alternative :

(i) DNA polymerase involved in replication process of prokaryotes :

(a) DNA polymerase I (b) DNA polymerase II

(c) DNA polymerase III (d) DNA polymerase IV

(ii) The process of translation takes place in :

(a) Nucleus (b) Nucleolus

(c) Peroxisome (d) Cytoplasm

(iii) B cells are activated by :

(a) Complement (b) Antigen

(c) Antibody (d) Interferon

(iv) Cell mediated immunity is carried out by :

(a) Paratope (b) Epitope

(c) Hapten (d) Antibodies 2

(C) Answer in **one sentence** each :

(i) Role of topoisomerase in DNA replication process.

(ii) Define hapten.

(iii) Sedimentation coefficient of larger and smaller subunit of ribosomes in prokaryotes.

(iv) Define Epitope. 4

2. What are different forms of DNA ? Compare them with respect to axial rise, tilt of bp, helical pitch and sugar puckering. 12

OR

Describe in detail the process of DNA replication in prokaryotes. 12

3. Explain :

(a) Sangers method of DNA sequencing. 4

(b) Applications of comparative genomics. 4

(c) Gene regulation in prokaryotes. 4

OR

(p) Genome analysis. 4

(q) Structure of eukaryotic gene. 4

(r) Applications of structural genomics. 4

4. Describe :

(a) Charging of t-RNA in prokaryotes. 4

(b) Elongation factors in prokaryotes. 4

(c) Regulation of translation in prokaryotes. 4

OR

(p) Initiation of translation in Eukaryotes. 4

(q) Termination of translation in prokaryotes. 4

(r) Transcription factors. 4

5. What is immune system ? Explain in detail organs and cells of immune system and their function. 12

OR

Define antibodies. Describe in detail various types of antibodies with respect to their structure and function. 12

6. Explain :

(a) Major histocompatibility complex 4

(b) Lymphokines 4

(c) Macrophages. 4

OR

(p) Vaccines 4

(q) Activated killer cells 4

(r) Type of immunity developed by infectious diseases. 4

7. Explain :

(a) T-Lymphatic response 4

(b) What are interferons ? Give their applications. 4

(c) Different classes of immunoglobulins. 4

OR

(p) What are interleukins ? Give their applications. 4

(q) B-Lymphatic response. 4

(r) Any one theory of antigen-antibody reactions. 4