B.Sc. (Part—III) Semester–V Examination

5S : BIOCHEMISTRY

(Molecular Biology and Biotechnology)

Time : Three Hours] [Maximum Marks : 80

Note :— (1) All questions are compulsory and carry equal marks except Q. No. **1** which carries **8** marks.

(2) Draw neat labelled diagram wherever necessary.

1. (A) Fill in the blanks :

(i) _____ amino acid does not take part in α-helix formation. ½

(ii) In DNA, the complementary base of adenine is _____. ½

(iii) Cyclie AMP can be formed from _____. ½

(iv) The DNA strand which is synthesized in fragments during replication is known as _____. ½

(B) Choose correct alternative :

(i) Substitution of an adenine base by guanine in DNA is known as :

(a) Transposition (b) Transition

(c) Transversion (d) Frameshift mutation ½

(ii) Insertion of a base in gene can cause :

(a) Change in reading frame

(b) Garbled amino acid sequence in the encoded protein

(c) Premature termination of translation

(d) All of the above ½

(iii) DNA polymerase-I was discovered by :

(a) Khoorana (b) Marshal Nirenberg

(c) Arthur Kornburg (d) Ramchandaran ½

(iv) In mammals, synthesis of mRNA is catalysed by :

(a) RNA polymerase I (b) RNA polymerase II

(c) RNA polymerase III (d) RNA polymerase IV ½

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

(i) Define genome. 1

(ii) What is t-RNA ? 1

(iii) What is cell culture ? 1

(iv) Define cell suspension. 1

2. Discuss about Central Dogma of Molecular Genetic-Current version in detail. 12

OR

Describe in detail the Watson and Crick model of DNA. What are A, B and Z types ? 12

3. Discuss the following in short :
   (a) Replication – prokaryotes conservation. 4
   (b) Semiconservative type. 4
   (c) Dispersive type. 4

OR

   (p) DNA polymerase. 4
   (q) Mechanism of Replication. 4
   (r) Inhibitors of DNA Replication. 4

4. Discuss the following :
   (a) Genetic code. 4
   (b) Wobble hypothesis. 4
   (c) Ribosome structure. 4

OR

   (p) Formation of 70S initiation complex. 4
   (q) Nonsense codons and release factor. 4
   (r) Lac operon. 4

5. Describe in detail the rDNA technology. Add a note on vectors. 12

OR

   What do you mean by Nucleic acid hybridization ? Discuss in detail. 12

6. Write in short about :
   (a) History of development of cell cultures. 4
   (b) Growth factors in serum. 4
   (c) Primary and secondary cell cultures. 4

OR

   (p) Transformed animal cells. 4
   (q) Establishment of continuous cell lines. 4
   (r) Growth kinetics of cell in culture. 4

7. (a) Describe media preparation for plant tissue culture. 4
   (b) What is Totipotency ? 4
   (c) Discuss practical application of tissue culture. 4

OR

   (p) Describe induction of callus. 4
   (q) How ovary and ovule cultures are performed ? 4
   (r) Describe in vitro pollination and fertilization. 4