AU–145

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

5S : BIOCHEMISTRY

(Molecular Biology and Biotechnology)

Time : Three Hours] [Maximum Marks : 80

N.B. :— (1) All questions are compulsory and carry equal marks except question no. **1** which carries 8 marks.

(2) Draw neat and labelled diagrams wherever necessary.

1. (a) Fill in the blanks :

(i) RNA which is component of ribosomes is known as _____. ½

(ii) The DNA strand which is synthesized discontinuously is known as _____. ½

(iii) The process of transcription begins near _____. ½

(iv) _____ are known as molecular scissors. ½

(b) Choose the correct alternative :

(i) First amino acid added during protein synthesis in bacteria is :

(A) Formylmethionine (B) Methionine

(C) Glycine (D) Isoleucine ½

(ii) DNA molecule having sequence of alternating purine and pyrimidines adopts which of the following conformation ?

(A) A-DNA (B) B-DNA

(C) D-DNA (D) Z-DNA ½

(iii) Lac 2 gene in lac operon codes for :

(A) β-galactosidase (B) Transacetylase

(C) Permease (D) Lactase ½

(iv) What are the main constituents of culture for animal cell growth ?

(A) Glucose and Glutamine (B) Growth factor

(C) Cytokines (D) All of these ½

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

(i) What are primary cell cultures ? 1

(ii) What is totipotency ? 1

(iii) What is codon ? 1

(iv) What is enzyme induction ? 1

2. (a) Discuss Griffith Experiment. 4

(b) Define buoyant density and explain its relation with GC content. 4

(c) Write in brief about r-RNA. 4

OR

(p) Explain Base stacking and Base equivalence in DNA. 4

(q) Explain structure and function of t-RNA. 4

(r) Write in brief about A, B and Z-DNA. 4

3. (a) Discuss the role of DNA polymerase III holoenzyme in DNA replication. 4

(b) Explain the role of DNA polymerase-I and DNA ligase in replication of DNA. 4

(c) What are promoters ? Explain initiation of transcription in bacteria. 4

OR

(p) Discuss inhibitors of transcription. 4

(q) Explain termination of transcription. 4

(r) Explain features of ori c and discuss initiation of replication in E. coli. 4

4. (a) Discuss the role of initiation factors in process of translation. 4

(b) Explain elongation of translation. 4

(c) Explain regulation of Lac operon by repressor and catabolite activating protein. 4

OR

(p) Discuss role of attenuator in regulating tryptophan operon. 4

(q) Explain any four features of genetic code. 4

(r) What are release factors ? Explain their role in termination of transcription. 4

5. What is recombinant DNA technology ? Explain with one example restriction endonuclease and vectors. 12

OR

Describe Maxam-Gilbert method of DNA sequencing and add a note on Southern Blotting. 12

6. (a) Discuss primary and secondary cell culture. 4

(b) Explain history of animal cell culture. 4

(c) Write about importance of growth factors of serum. 4

OR

(p) Explain origin and characteristic of any two commonly used cell lines. 4

(q) Explain any four applications of animal cell culture. 4

(r) Discuss growth kinetics of cell in culture. 4

7. Explain in vitro pollination and fertilization and add a note on application of tissue culture. 12

OR

Define suspension culture. Briefly describe the different types of suspension cultures and techniques for estimation of culture growth and viability of cells. 12