AT–340

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

3S : MICROBIOLOGY

(Molecular Biology and Genetic Engineering)

Time : Three Hours] [Maximum Marks : 80

Note :— (1) **ALL** questions are compulsory.

(2) Draw well labelled diagrams wherever necessary.

1. (A) Fill in the blanks :

(i) The mode of DNA replication is _____.

(ii) The genetic unit of function is called as _____.

(iii) Agrobacterium tumefaciens is used to transfer transgene in _____.

(iv) Enzyme that synthesises RNA from DNA template is called as _____. 2

(B) Choose the correct alternative :

(i) Out of 64 codons in genetic code _____ codons are chain termination codons.

(a) 61 (b) 3

(c) 1 (d) 6

(ii) Bam HI enzyme is obtained from _____.

(a) Bacillus subtilis (b) Pseudomonas putida

(c) Bacillus amyloliquifaciens (d) Escherichia coli

(iii) BT cotton possess _____ transgene.

(a) Bacillus thuringensis (b) Bacillus subtilis

(c) Bacillus amyloliquifaciens (d) None of the above

(iv) Restriction endonucleases are _____.

(a) Joining enzyme (b) Cutting enzyme

(c) Polymerizing enzyme (d) None of the above 2

(C) Answer in one sentence :

(i) What are GM plants ?

(ii) What is silent mutation ?

(iii) What is Hfr ?

(iv) What is primer ? 4

2. (a) Describe the mechanism of DNA replication with enzymes involved in it. 12

OR

(b) Describe the transcription and translation event of protein synthesis. 12

3. (a) Describe genetic suppression. 4

(b) Describe induced mutation by nitrous oxide. 4

(c) Give schematic diagram of Lac operon. 4

OR

(d) Describe in brief physical mutagens. 4

(e) Define silent mutation, muton and nonsense mutation. 4

(f) Give schematic diagram of Trp operon. 4

4. (a) What is transduction ? Describe in detail mechanism of generalized transduction. 12

OR

(b) Explain Lederberg and Tatum experiment. Describe in detail conjugation between F^+ and F^- cells. 12

5. (a) Briefly describe the basic technique of genetic engineering. 4

(b) Explain in brief restriction enzymes. 4

(c) Briefly describe p^{BR322} cloning vector. 4

OR

(d) Explain in brief enzyme topoisomerases. 4

(e) Explain with suitable example role of bacteriophages as cloning vector. 4

(f) Describe the ideal characteristics of vector. 4

6. Explain the following :

(a) DNA sequencing. 4

(b) Gene library. 4

(c) Southern hybridization. 4

OR

(d) Agarose gel electrophoresis. 4

(e) Gene mapping. 4

(f) PCR. 4

7. (a) What is gene therapy ? Describe its applications. 4

(b) How hepatitis vaccine is produced using recombinant DNA technology ? 4

(c) Describe Bt cotton as transgenic plant. 4

OR

(d) Describe in brief DNA probes for disease diagnosis. 4

(e) Describe in brief biotechnological aspect of Insulin production. 4

(f) Explain in brief role of genetically engineered microbes in pollution control. 4