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AS–1416

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

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) Enzyme that synthesises RNA using DNA template is called as _____.

(ii) The mode of DNA replication is _____.

(iii) _____ DNA polymerase is used for amplification of DNA using PCR.

(iv) The initiation codon for protein synthesis is _____. 2

(B) Choose correct alternative :

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

(a) 4 (b) 61

(c) 3 (d) 2

(ii) Lac Z gene of Lac operon codes for :

(a) Alpha galactosidase (b) Beta-galactosidase

(c) Transacetylase (d) Galactoside Permease

(iii) _____ is a bacteriophage vector.

(a) pUC 19 (b) pBR 322

(c) λgt 11 (d) None of the three

(iv) Size of DNA fragment is analysed by :

(a) Southern blotting (b) Gel electrophoresis

(c) Paper electrophoresis (d) Gel chromatography 2

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

(i) What is transduction ?

(ii) What is Bt cotton ?

(iii) What are nucleases ?

(iv) What is silent mutation ? 4

2. (a) Describe the role of any four enzymes in DNA replication. 4

(b) Define the terms muton, recon and cistron and transcription. 4

(c) Describe the concept of gene within gene with example. 4

OR

(d) Describe the mechanism of light DNA repair. 4

(e) Describe the role of tRNA and mRNA in the process of protein synthesis. 4

(f) Describe the concept of split genes. 4

3. Describe the structural organization and functioning of Lac operon in detail. 12

OR

Describe the mutagenic action of X-rays, UV rays, 5 bromouracil and acridinedyes in detail. 12

4. Explain the following in brief :

(a) Davis U tube experiment for conjugation. 4

(b) Htr × f^- conjugation. 4

(c) Griffith experiment. 4

OR

(d) Mechanism of transformation. 4

(e) $f^+ \times f^-$ conjugation. 4

(f) Generalized transduction. 4

5. What are vectors ? Describe in detail ideal characters of plasmid vectors with example. 12

OR

What are restriction endonucleases ? Explain in detail the nomenclature of restriction endonucleases and the action of type II enzymes with examples. 12

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6. Explain the following in brief :

(a) Southern blotting technique 4

(b) Method of PCR 4

(c) Agarose gel electrophoresis. 4

OR

(d) Colony hybridization 4

(e) Genomic library 4

(f) Antibiotic resistance marker genes. 4

7. (a) How hepatitis vaccine is produced using recombinant DNA technology ? 4

(b) Describe diagnosis of any one disease with DNA probes. 4

(c) Describe Bt-cotton as transgenic plant. 4

OR

(d) Briefly describe the biotechnological strategy for recombinant insulin production. 4

(e) How strains are improved for industrial product ? Briefly describe any one method. 4

(f) Describe in brief approaches of gene therapy. 4

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