

B.Sc. Semester - 5 (CBCS) Examination
Oct/Nov - 2024 (NEW COURSE)
Molecular Biology and Bio-Engineering(Core)

Time: 2:30 Hours**Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

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- Que.1(A) Objective type questions. (04)
1. State Mendel's Law of Segregation.
 2. What organism did Morgan use in his Genetic Experiments?
 3. What is the primary role of DNA as described in the Gene Concept?
 4. Name one model of DNA replication in Bacteria.
- Que.1(B) Answer in brief. (Any 1 out of 2) (03)
1. Briefly describe the significance of Morgan's experiments with *Drosophila*.
 2. Explain the concept of Genetic Units in terms of genetic structure and function.
- Que.1(C) Write a note on. (Any 1 out of 2) (07)
1. Discuss the structure of a Gene and the mechanisms involved in its regulation.
 2. Compare and contrast the θ model and rolling circle model of DNA replication in Bacteria.
- Que.2(A) Objective type questions. (04)
1. What is the role of ribosomes in Gene Expression?
 2. Name one type of Post-transcriptional Modification.
 3. Which operon model involves the regulation of Lactose Metabolism?
 4. What is a Gene Regulatory Protein?
- Que.2(B) Answer in brief. (Any 1 out of 2) (03)
1. Describe the significance of the genetic code in the process of Translation.
 2. Explain the three differences between Post-transcriptional and Post-translational Modifications.
- Que.2(C) Write a note on. (Any 1 out of 2) (07)
1. Discuss the regulation of the Lac Operon.
 2. Discuss the regulation of the Trp Operon.
- Que.3(A) Objective type questions. (04)
1. Define Homologous Recombination.
 2. What is Bacterial Transformation?
 3. Name one type of Transduction.
 4. What is a Transposable Genetic Element?
- Que.3(B) Answer in brief. (Any 1 out of 2) (03)
1. Describe the mechanism of transformation in *Streptococcus Pneumoniae*.
 2. Differentiate between Generalized and Specialized Transduction.
- Que.3(C) Write a note on. (Any 1 out of 2) (07)
1. Explain the mechanisms of DNA transfer in during Conjugation.
 2. Write short note on Transposable Genetic Elements.

- Que.4(A) Objective type questions. (04)
1. What is an Induced Mutation?
 2. Name one type of DNA Repair Mechanism.
 3. What is the purpose of the Ames Test?
 4. Define a Somatic Mutation.
- Que.4(B) Answer in brief. (Any 1 out of 2) (03)
1. Explain the concept of phenotypic lag in the context of Mutations.
 2. Describe the difference between Hypermorphic and Hypermorphic Mutations.
- Que.4(C) Write a note on. (Any 1 out of 2) (07)
1. Discuss the mechanisms of mismatch repair and excision repair in DNA.
 2. Compare physical, chemical, and biological mutagenesis in terms of their effects on DNA.
- Que.5(A) Objective type questions. (04)
1. What is the function of DNA ligase in Gene Cloning?
 2. Name one type of Restriction Endonuclease.
 3. What are adaptors and linkers used for in Genetic Engineering?
 4. What is an ideal feature of a vector used in Genetic Engineering?
- Que.5(B) Answer in brief. (Any 1 out of 2) (03)
1. Describe the role of plasmids in Genetic Engineering and provide an example.
 2. Explain the difference between a Genomic Library and a cDNA Library.
- Que.5(C) Write a note on. (Any 1 out of 2) (07)
1. Discuss the steps involved in Gene Cloning.
 2. Write detailed note on detection methods of Recombinant Molecule.
