

B.Sc. Semester - 5 (Remedial) (CBCS) Examination
March/April-2023(Old 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.

Q.1(A) Answer the following : (any one out of two) (07)

1. Explain Mendel's Law of Segregation.
2. Explain 'elongation' during DNA replication in bacteria.

Q.1(B) Attempt any one (out of two) : (04)

1. What is a cistron? Distinguish between the terms monocistronic and polycistronic.
2. Discuss DNA as genetic material.

Q.1(C) Attempt any three (out of five) (03)

1. What is the function of helicase during replication?
2. Define a gene.
3. True or false : Introns encode essential molecules.
4. True or false : Eukaryotic and prokaryotic DNA polymerases are same structurally.
5. State the ratio that leads to Law of independent assortment in Mendel's experiments.

Q.2(A) Answer the following : (any one out of two) (07)

1. Explain positive control of *lac* operon.
2. Write on properties of genetic code.

Q.2(B) Attempt any one (out of two) : (04)

1. Discuss in brief : Types of gene regulation
2. Write on structure of ribosome in a eukaryotic cell.

Q.2(C) Attempt any three (out of five) (03)

1. Name the structural genes in *ara* operon.
2. True or false: In case of bacteria, transcription and translation can occur simultaneously.
3. True or false : Capping and tailing of RNA occurs in eukaryotes.
4. During translation, what is the role of t-RNA?
5. State function of peptidyl transferase.

Q.3(A) Answer the following : (any one out of two) (07)

1. Explain specialized transduction.
2. Explain resolution of Holliday junction.

Q.3(B) Attempt any one (out of two) : (04)

1. Explain formation of Hfr strain.
2. Explain artificial competence.

Q.3(C) Attempt any three (out of five) (03)

1. True or false : Insertion sequences always have drug resistance markers.
2. True or false : Transposase is encoded only by transposons and not by insertion sequences.
3. State two possible roles of natural transformation.
4. Who discovered conjugation in bacteria?
5. Who discovered transposable elements?

Q.4(A) Answer the following : (any one out of two) (07)

1. Explain mismatch repair.
2. Discuss Ames' test and its application.

Q.4(B) Attempt any one (out of two) : (04)

1. Explain mechanism of base analog as a mutagen.
2. Explain phenotypic lag.

Q.4(C) Attempt any three (out of five) (03)

1. State two reasons of spontaneous mutations.
2. What is photoreaction?
3. Name two biological mutagens.
4. What effect does uv radiation exert on DNA molecule?
5. True or false : Rate of induced mutation is always higher than spontaneous mutation.

Q.5(A) Answer the following : (any one out of two) (07)

1. Explain site directed mutagenesis.
2. Discuss BAC as a vector.

Q.5(B) Attempt any one (out of two) : (04)

1. Explain in brief role of colony hybridization.
2. Discuss applications of genetic engineering.

Q.5(C) Attempt any three (out of five) (03)

1. Name two methods applied to transfect/introduce novel genes into animals.
2. What is the function of molecular chaperons?
3. The source of Ti Plasmid is bacterium
4. True or false : Isolation of DNA from plant cells is more complex than that from bacteria.
5. True or false : Genetically engineered yeasts can be used to produce medicinal plant products.
