

B.Sc. Semester - 5 (CBCS) Examination**Oct/Nov. - 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.
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- Que.1(A) Answer the following. (any one out of two) (07)
1. DNA replication in prokaryotes.
 2. Short note on Mendel's experiment with its Laws.
- Que.1(B) Attempt any one. (out of two) (04)
1. Explain: Gene structure and architecture.
 2. Discuss: Gene Cistron relationship in Prokaryotes and Eukaryotes.
- Que.1(C) Attempt any three. (out of five) (03)
1. Define: Replication.
 2. Explain: Recessive Gene
 3. Write the first law of inheritance.
 4. Watson and Crick is known as the "Father of Genetics". (True/False)
 5. If heterozygous tall plant is crossed with a homozygous tall plant, then the number of plants with dwarf height is..... (0 , 1 , 2).
- Que.2(A) Answer the following. (any one out of two) (07)
1. Short note on: Regulation of lac operon.
 2. Discuss in detail: post Transcription modifications.
- Que.2(B) Attempt any one. (out of two) (04)
1. Short note on: Transcriptional regulation.
 2. Describe in short: Levels of gene expression and regulation.
- Que.2(C) Attempt any three. (out of five) (03)
1. Define: Genetic code.
 2. Explain: Transcription.
 3. Write any two reaction post translational modifications.
 4. Eukaryotic entities translation takes place in the _____. (Nucleus, Cytoplasm)
 5. Which enzyme brings about hydrolysis of lactose to glucose and galactose in Lac operon?
- Que.3(A) Answer the following. (any one out of two) (07)
1. Explain in brief: Transformation.
 2. Explain in detail: Transposable genetic elements.
- Que.3(B) Attempt any one. (out of two) (04)
1. Short note on Generalized transduction.
 2. Write the brief about Site specific recombination and Illegitimate recombination.
- Que.3(C) Attempt any three. (out of five) (03)
1. Define: Transformation.
 2. Explain: Abortive Transduction.
 3. Write any two methods of Artificial transformation.
 4. Genetic recombination occurs between homologous chromosomes. (True/False).
 5. The transfer of genes from one cell to another by a bacteriophage is known as _____.
- Que.4(A) Answer the following. (any one out of two) (07)
1. Explain: Chemical and physical Mutagenesis.
 2. Short note on: Recombinational repair and SOS repair.

- Que.4(B) Attempt any one. (out of two) (04)
1. Short note on mismatch repair.
 2. Explain in short: Biochemical basis of mutation.
- Que.4(C) Attempt any three. (out of five) (03)
1. Explain: Mutation rate
 2. What is Phenotypic lag?
 3. Define: Mutagenic agent.
 4. Write two names of physical mutagenic agent.
 5. _____ is the main enzyme that plays a major role in formation of thymine dimer? (DNA photolyase, DNA ligase)
- Que.5(A) Answer the following. (any one out of two) (07)
1. Discuss: Molecular Chaperon.
 2. Write various steps of genetic manipulations of prokaryotes.
- Que.5(B) Attempt any one. (out of two) (04)
1. Give the short note on pBR322.
 2. Write the applications of genetic engineering.
- Que.5(C) Attempt any three. (out of five) (03)
1. Explain: Cosmid.
 2. Full form of YAC.
 3. Define: Genetic engineering.
 4. Protein engineering can be potentially used in the furniture industries. (True / False)
 5. Enzyme required for polymerase chain reaction is _____.
(Taq polymerase, PCR polymerase)
