

B.Sc. Semester - 5 (CBCS) Examination**Oct/Nov. - 2021(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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- Q.1(A) **Answer the following questions in details. (Any One Out of Two)** (07)
1. Write a note on the mechanism of prokaryotic replication in detail.
 2. Discuss the experiments which prove “DNA as Universal genetic material”.
- Q.1(B) **Answer the following questions in Brief. (Any One Out of Two)** (04)
1. State Mendel’s Law of segregation and Law of independent assortment. Discuss them in brief citing suitable example.
 2. Enlist name of two scientists who contributed in the field of genetic and state their contribution.
- Q.1(C) **Answer the following question shortly. (Any Three Out of Five)** (03)
1. Define: Gene
 2. Enlist the name of replication models found in prokaryotes.
 3. What is cistron?
 4. Which measuring unit is used to represent the Distance between two genes on the same chromosome?
 5. Draw Punnet square for monohybrid cross.
- Q.2(A) **Answer the following questions in details. (Any One Out of Two)** (07)
1. Discuss in detail the phenomena of mRNA synthesis from DNA in prokaryotes.
 2. Describe in detail the event of protein synthesis in prokaryotes.
- Q.2(B) **Answer the following questions in Brief. (Any One Out of Two)** (04)
1. Draw and label the structure of Lac operon. Discuss the regulation of Lac operon in detail.
 2. Discuss characteristics of Genetic code in brief.
- Q.2(C) **Answer the following question shortly. (Any Three Out of Five)** (03)
1. State the composition of prokaryotic ribosome.
 2. Enlist post transcriptional gene regulation mechanisms.
 3. Enlist post translational modifications.
 4. What is tRNA charging in translation?
 5. Draw and label the structure of anabolic operon.
- Q.3(A) **Answer the following questions in details. (Any One Out of Two)** (07)
1. Write a detail note on plasmid mediated gene transfer in Gram negative bacteria.
 2. Discuss in detail the phenomena of transformation in terms of its competence development, DNA uptake and its role.
- Q.3(B) **Answer the following questions in Brief. (Any One Out of Two)** (04)
1. Discuss the mechanism and significance of homologous recombination.
 2. Describe in brief mechanism of virus mediated gene transfer in prokaryotes.

- Q.3(C) **Answer the following question shortly. (Any Three Out of Five)** (03)
1. Define: Prophage
 2. State the difference between conjugative and mobilizable plasmid.
 3. What are transposable elements?
 4. What is abortive transduction?
 5. Enlist the name of techniques used for artificial transformation.
- Q.4(A) **Answer the following questions in details. (Any One Out of Two)** (07)
1. Discuss in detail induced point mutation.
 2. Write a detail note on SOS repair and Mismatch repair.
- Q.4(B) **Answer the following questions in Brief. (Any One Out of Two)** (04)
1. Write a detail note on Chemical mutagenic agent in terms of its mode of action.
 2. Discuss in detail Spontaneous frameshift mutation.
- Q.4(C) **Answer the following question shortly. (Any Three Out of Five)** (03)
1. Define: Pseudo reversion
 2. Which enzyme plays key role during photo-reactivation?
 3. Define: Nonsense mutation
 4. What is phenotypic lag?
 5. Enlist name of two physical mutagenic agents.
- Q.5(A) **Answer the following questions in details. (Any One Out of Two)** (07)
1. Discuss in detail Bacteriophage as cloning vector.
 2. Write a detail note on Site-directed mutagenesis as tool for genetic engineering.
- Q.5(B) **Answer the following questions in Brief. (Any One Out of Two)** (04)
1. Write a brief note on genetic manipulation of plant cells citing suitable example.
 2. Discuss colony hybridization as tool for screening recombinant cells.
- Q.5(C) **Answer the following question shortly. (Any Three Out of Five)** (03)
1. State the functions of molecular chaperons
 2. Enlist minimum four applications of genetic engineering.
 3. What is cosmid?
 4. State the name of marker genes present in pBR322.
 5. State the difference between cloning vector BAC and YAC.
