647510 **BSCmbeCC5030** **Seat No :_____**

B.Sc. Semester - 5 (Remedial) (*CBCS*) Examination
Feb/Mar. -2021 (OLD COURSE)
MOLECULAR BIOLOGY AND BIO- ENGINEERING (CORE)

Time: 1:30 Hours **Marks: 42**

Instructions:

1. Figures to the right indicate marks.
2. There are five questions in the question paper.
3. Answer any three of the following questions.

Q-I a. **Answer <u>Any One</u> of the following:** **(07)**

1. Write a short note on Mendelian Laws of Inheritance.

2. DNA is the universal genetic material- Justify the statement.

Q-I b. **Attempt <u>Any One</u> of the following:** **(04)**

1. Write a brief note on prokaryotic replication fork.

2. Comment on the prokaryotic gene structure.

Q-I c. **Attempt <u>Any Three</u> of the following:** **(03)**

1. Define gene.

2. What is recessive allele?

3. What is the function of primase in DNA replication?

4. Which is polycistronic mRNA?

5. What was the conclusion of Griffith's experiment?

Q-II a. **Answer <u>Any One</u> of the following:** **(07)**

1. Describe the regulatory aspects of *lac* operon.

2. Explain the mechanism of prokaryotic transcription process.

Q-II b. **Attempt <u>Any One</u> of the following:** **(04)**

1. Write a brief note on initiation of the prokaryotic translation process.

2. Comment on the structural and functional aspects of prokaryotic ribosome.

Q-II c. **Attempt <u>Any Three</u> of the following:** **(03)**

1. Give an example of operon which is regulated by attenuational control.

2. Which molecule is the natural inducer of *lac* operon?

3. Which protein decides the specificity of the prokaryotic RNA polymerase?

4. Which codon is used as start codon in prokaryotic translation process?

5. Which amino acid is carried by prokaryotic initiator tRNA molecule?

Q-III a. **Answer <u>Any One</u> of the following:** **(07)**

1. What is Recombination? Describe Homologous recombination.

2. Describe the process of gene transfer among prokaryotes involving uptake of naked DNA from the extra cellular environment.

Q- III b. **Attempt <u>Any One</u> of the following:** **(04)**

1. Write a brief note on Generalized transduction.

2. Describe briefly the mechanism of conjugal gene transfer among Gram negative bacteria.

Q-III c. **Attempt <u>Any Three</u> of the following:** **(03)**

1. What are jumping genes?

2. Which protein is used in pillus formation?

3. What are conjugative plasmids?

4. Give an example of specialised transducing bacteriophage for *E. coli.*

5. Name the gene transfer mechanism among prokaryotes mediated through bacteriophage.

Q-IV a. **Answer <u>Any One</u> of the following:** **(07)**

1. Write a note on chemical mutagens and their mode of action.

2. Describe any two DNA repair mechanisms in prokaryotes.

Q-IV b. Attempt <u>Any One</u> of the following: (04)

1. Explain briefly the phenotypic effects of mutation.
2. Write a note on Ames test.

Q-IV c. Attempt <u>Any Three</u> of the following: (03)

1. Define mutation.
2. What is the rate of spontaneous mutation in prokaryotes?
3. Give two examples of physical mutagens.
4. What is phenotypic lag?
5. What is transition mutation?

Q-V a. Answer <u>Any One</u> of the following: (07)

1. Describe the method for isolation of DNA from bacteria.
2. Describe the strategies used for insertion of DNA molecules in a vector?

Q-V b. Attempt <u>Any One</u> of the following: (04)

1. Write a brief note on aims and applications of genetic engineering.
2. Briefly describe the salient features of pBR322 that makes it an ideal vector for gene manipulation.

Q-V c. Attempt <u>Any Three</u> of the following: (03)

1. What are phagmids?
2. What are molecular chaperones?
3. Give full form of BAC.
4. What is site directed mutagenesis?
5. Give examples of vectors used for manipulation of *E. coli* cells.

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