

B.Sc. Semester - 5 (Remedial) (CBCS) Examination
March/April-2022(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 (Any one out of two) (07)**
- i. Briefly describe the process of DNA Replication in *E.coli*.
 - ii. Describe Mendel's law of segregation with suitable example.
- Q.1(B) Attempt any one (Out of two) (04)**
- i. Why is DNA said to be semiconservative?
 - ii. Define recessive, dominant, homozygous and heterozygous alleles.
- Q.1(C) Attempt any three (Out of five) (03)**
- i. The law of _____ states that factors controlling different characteristics are inherited independently of each other. Fill in the blank.
 - ii. What is the function of DNA topoisomerase?
 - iii. What is significance of histones?
 - iv. What is primosome?
 - v. Define cistron
- Q.2(A) Answer the following (Any one out of two) (07)**
- i. Describe in details about post transcriptional modification in mRNA.
 - ii. Give a brief account on origin and evolution of genetic code.
- Q.2(B) Attempt any one (Out of two) (04)**
- i. Write a short note on mechanism of *lac operon*
 - ii. Give a brief account on initiation of protein synthesis
- Q.2(C) Attempt any three (Out of five) (03)**
- i. Write significance of sigma factor.
 - ii. Define TATA box.
 - iii. What is function of promoter?
 - iv. Mention two stop codons.
 - v. State the functions of rRNA
- Q.3(A) Answer the following (Any one out of two) (07)**
- i. Describe in details – Generalized transduction.
 - ii. Discuss: transfer of genes between Hfr X F⁻ strains
- Q.3(B) Attempt any one (Out of two) (04)**
- i. Write a short note on transposons.
 - ii. Describe in brief homologous recombination.

- Q.3(C) **Attempt any three (Out of five)** (03)
- What is conjugation?
 - Define Competent cells
 - The enzyme that catalyzes the transposition is known as _____.
 - Genetic recombination between bacterial cells is first demonstrated by _____.
 - Specialized transduction is mediated by _____ phages.
- Q.4(A) **Answer the following (Any one out of two)** (07)
- Describe in detail about excision repair mechanism with suitable diagram.
 - Explain in brief: 5-bromouracil as chemical mutagen
- Q.4(B) **Attempt any one (Out of two)** (04)
- Write a short note on transversion and transition mutation.
 - Give brief account on Ames test.
- Q.4(C) **Attempt any three (Out of five)** (03)
- What are AP sites?
 - Define mutation.
 - What is silent mutation?
 - In a mutational event, when adenine is replaced by guanine, it is a case of _____ point mutation.
 - Mutation is a major source of evolution. True or false.
- Q.5(A) **Answer the following (Any one out of two)** (07)
- Write a detailed account on molecular chaperon
 - Discuss site-directed mutagenesis.
- Q.5(B) **Attempt any one (Out of two)** (04)
- Discuss in brief about BACs.
 - Write a short note on pBR322.
- Q.5 (C) **Attempt any three (Out of five)** (03)
- The acronym pUC stands for _____.
 - Name any one plant virus used as vector.
 - What is cosmid?
 - Plasmid DNA replicates by _____ mechanism.
 - Which organism was the first to be successfully modified via the techniques of genetic engineering?
