



**WEST BENGAL STATE UNIVERSITY**  
B.Sc. Honours/Programme 3rd Semester Examination, 2021-22

**MCBHGE03T/MCBGCOR03T-MICROBIOLOGY (GE3/DSC3)**

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.  
Candidates should answer in their own words and adhere to the word limit as practicable.  
All symbols are of usual significance.*

**Question No.1 is compulsory and answer any *four* from the rest**

1. Answer any *four* questions from the following: 2×4 = 8
  - (a) In what respect is the formation of  $\lambda$  dgal transducing phage similar to the formation of F' ?
  - (b) What is the difference between missense and nonsense mutation?
  - (c) Name the structural genes present in lac operon.
  - (d) Why the strands in a double stranded DNA are arranged in antiparallel way?
  - (e) What is the significance of promoter sequence in prokaryotes?
  - (f) What is Shine-Dalgarno sequence?
  - (g) What do you mean by Multiple Cloning Site (MCS) of a cloning vector?
2.
  - (a) What is the difference between prokaryotic and eukaryotic transcription? 2
  - (b) Write a short note on Rho-dependent termination of transcription. 3
  - (c) Mention the role of sigma subunit of RNA polymerase. 2
  - (d) What is ribozyme? 1
3.
  - (a) Calculate the  $T_m$  of a 50 bp long ds DNA having 30% GC content. 2
  - (b) What is nucleosome? 2
  - (c) How does the negative supercoiling in a DNA supports its replication? 2
  - (d) Why T4 DNA ligase is preferred over *E. coli* DNA ligase during molecular cloning? 2
4.
  - (a) How does corepressor regulate lac operon? 3
  - (b) Write a short note on Type-II restriction endonuclease. 2

- (c) Who was the discoverer of conjugation? 1
- (d) Define the term 'Gratuitous Inducer' with reference to lac operon. 2
5. (a) All enzymes have their specific substrate, while, DNA polymerase accepts all the four dNTPs as its substrate. Explain the fact with respect to its substrate specifying. 2
- (b) What is the difference between transformation and transduction? 2
- (c) What is the difference between generalized and specialized transduction? 3
- (d) Who had first ever discovered that the mode of DNA replication is semi-conservative? 1
6. (a) Explain the mechanism of X-ray and mustard gas as mutagen.  $1\frac{1}{2} + 1\frac{1}{2}$
- (b) What is silent mutation? 2
- (c) What is intercalating agent? Give example. 2+1
7. (a) What is the role of amino acyl t-RNA synthetase and peptidyl transferase in translation? 4
- (b) What is the importance of stop codon in translation? 2
- (c) What do you mean by charging of t-RNA? 2
8. (a) Suppose you have started a PCR reaction with  $N$  number of DNA molecule. How many numbers of DNA would you expect after 'X' cycle of PCR reaction? 2
- (b) What is the significance of counter selection marker in  $Hfr \times F^-$  cross? 2
- (c) What is merodiploid? 2
- (d) What is the role of alkaline phosphatase in recombinant DNA technology? 2

**N.B. :** Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.

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