



**WEST BENGAL STATE UNIVERSITY**  
B.Sc. Honours 4th Semester Examination, 2022

**BOTACOR08T-BOTANY (CC8)**

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.*

1. Answer the following questions in brief: 1×6 = 6
- (a) What is central dogma in molecular biology?
  - (b) What do you mean by rolling circle replication?
  - (c) Calculate the length of a 100 bp DNA molecule.
  - (d) What is the major function of snRNA?
  - (e) Tobacco Mosaic Virus (TMV) and Holmes Ribgrass Virus (HRV) produce symptoms of mottling and ring patterned spots in tobacco leaves, respectively. A virus is reconstructed using RNA from TMV and the protein coat from HRV. What will be the symptoms of infection in tobacco leaves by the reconstructed virus?
  - (f) State the difference between group I and group II introns.
2. Answer any *eight* questions from the following: 3×8 = 24
- (a) Why were  $^{32}\text{P}$  and  $^{35}\text{S}$  chosen for use in Hershey and Chase experiment? State the conclusion of this experiment. 1+2
  - (b) The genetic code is 'nearly universal'. Explain with example. 3
  - (c) Give a brief account of protein synthesis inhibitors. 3
  - (d) Eukaryotes require telomerases but prokaryotes do not. Explain. 3
  - (e) What is Shine-Dalgarno sequence? Which end of the mRNA molecule is translated first? If the DNA molecule given below is transcribed from left to right, what will be the sequences of the mRNA? 1+1+1
- 5' - AGACTTCAGGCTCAACGTGGT - 3'  
3' - TCTGAAGTCCGAGTTGCACCA - 5'
- (f) Briefly describe the roles of EF-Tu, EF-Ts, and EF-G play in bacterial translation. 3
  - (g) Mention the significance of alternative splicing. What are split genes? 2+1
  - (h) Compare the structural and functional properties of different DNA polymerase. 3

- (i) What do you mean by degeneracy of genetic code? Write a brief note on 'Wobble Hypothesis'. 1+2
- (j) Distinguish between prokaryotic and eukaryotic ribosomal subunits and their rRNA composition. 3
- (k) How does the replication of linear form of DNA in eukaryotic cell differ from that of circular DNA in bacteria? Mention the major functions of 'Kornberg enzyme'. 2+1
- (l) What do you mean by 'inducible' and 'repressible' operon. Cite example. 2+1
- (m) Distinguish between the holoenzyme and core enzyme of RNA polymerase in bacteria. What would be the effect on transcription if a bacterial cell do not possess sigma ( $\sigma$ ) factor? 2+1
3. Answer any *two* questions from the following: 5×2 = 10
- (a) Describe the triplet binding assay in deciphering genetic code. 5
- (b) What is Kozak sequence? Explain the process of aminoacylation of t-RNA with diagram. 1+4
- (c) What is gene silencing? Briefly discuss the role of RNA-induced Silencing Complex (RISC) in post transcriptional gene silencing. 1+4
- (d) How does lactose trigger the co-ordinate induction of the synthesis of  $\beta$ -galactosidase permease and transacetylase? Why the synthesis of these enzymes do not occur when glucose is also present in the medium? 3+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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