



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 4th Semester Examination, 2023

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) State the components of nucleosome core.
- (b) What is ribozyme?
- (c) Name one inhibitor of protein synthesis.
- (d) What is TATA Box? Where is it located?
- (e) Why is a primer needed for initiation of DNA replication?
- (f) In a double stranded DNA molecule, the percentage of cytosine is 32. What would be the percentage of Adenine?

2. Answer any *eight* questions from the following:

3×8 = 24

- (a) To prove DNA as genetic material briefly describe the Avery-MacLeod-McCarty experiment (1944). 3
- (b) Why is Lac operon called an inducible operon? What is CAP in Lac operon? 2+1
- (c) Name different enzymes involved in the process of DNA replication. 3
- (d) Distinguish between B-DNA and Z-DNA. 3
- (e) Compare euchromatin and heterochromatin. 3
- (f) How does organelle DNA differ from chromosomal DNA? Mention the salient features of mtDNA. 2+1
- (g) Describe the process of Rho (ρ) dependent termination in prokaryotes. 3
- (h) What are the functions of Poly-A tail? Name the enzyme that synthesizes Poly-A tail. 2+1
- (i) What is Cot Curve? Mention the factors that control T_m . 1+2
- (j) What is RNA-editing? Mention the role of guide RNA in RNA editing mechanism. 1+2
- (k) Give a brief account of spliceosome mediated processing of mRNA. 3

- (l) Below in the sequence of a mRNA from a bacteria — 3
5' A U G G G C U C C A U C G G C G C A U A A 3'
- (i) How many amino acid long is the protein?
(ii) How many tRNAs will be required to make this protein?
(iii) What is the 4th Codon in the mRNA?
- (m) What is the role of amino-acyl-tRNA-synthetase in translation process? Briefly mention the function of different protein factors involved in initiation of translation. 1+2
3. Answer any *two* questions from the following: 5×2 = 10
- (a) Give a concise account of rolling circle mode of DNA replication. How are the formation of leading and lagging strands coordinated during replication process? 3+2
- (b) Describe the structure of tryptophan operon. How is trp operon regulated by attenuating transcription? What is an apoinducer? 2+2+1
- (c) Why DNA polymerases have 3' to 5' exonuclease activity? What would be the consequences of mutating this activity? Briefly describe an experiment to prove that DNA replication is semi-conservative in nature. 1+1+3
- (d) With suitable diagram briefly describe how initiation factors (IFs) help in the initiation process of translation in prokaryotes. What is the function of peptidyl transferase? 4+1

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