सत्यं विद्यागतम्

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 Tm. 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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