

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, JUNE 2022

SECOND YEAR [BATCH 2020-23]

ZOOLOGY (HONOURS)

Paper : VIII [CC8]

Date : 21/06/2022

Time : 11 am – 1 pm

Full Marks : 50

Answer **any five** questions:

[5×2]

1. a) Mention the roles of the structural genes of lac operon in *E.coli*.
- b) What is the mode of inheritance of the 'Royal disease'?
- c) What is the source of energy for peptide bond formation?
- d) What are Okazaki Fragments?
- e) Write down the salient features of a malignant tumor.
- f) What are Processivity and Fidelity of DNA Polymerases?
- g) What are the main differences between LINE and SINE?
- h) State the role of eRNA in eukaryotic transcription.

Answer **any four** question :

[4×10]

2. a) What are homologous and site-specific recombinations?
- b) What are the enzymes involved in homologous recombination in *E.coli*? Mention their roles.
- c) Describe the process of 30S initiation complex formation in prokaryotic translation.
- d) What is Shine-Dalgarno sequence? [2+(1+2)+3+2]
3. a) What is peptide anticodon?
- b) Draw and describe the structure of a tRNA.
- c) Comment on the nature of genetic code.
- d) What is peptidyl transferase reaction? Where does it occur? [2+3+2+(2+1)]
4. a) "In bacteria, the proper promoter recognition by the Sigma factor gets initiated with the base flipping at the consensus region" – explain with a neat diagram.
- b) Illustrate with a figure how the 7-methyl guanosine gets added to the 5' end of pre-mRNA. [(3+2)+(3+2)]
5. a) What are Chargaff's Rules? How are Nucleotides and Nucleosides different?
- b) Write down the main features of the 'Watson-Crick Model'.
- c) Define C value. What is C-value paradox? What is 'hyperchromic shift'? [4+3+3]
6. a) What is 'Proof-reading activity' of DNA polymerases? What are the different DNA polymerases involved during Eukaryotic DNA replication? Mention their roles.
- b) What is Telomerase? Why Telomerase is important during eukaryotic DNA replication?
- c) What will happen if 'Gain of function mutation' and 'loss of function mutation' happen to Oncogenes and tumour suppressor genes? [4+3+3]

7. a) What are Transposons? Differentiate Composite and Non-composite Transposons.
b) What is target site duplication? How can IS element cause a target site duplication?
c) What are P elements? 'There are two possible results of *Ac* transposition, depending on whether the target DNA has replicated or not' - What are the possible results? [4+3+3]
8. a) With a labelled diagram, mention the steps of UvrABC system mediated DNA repair in bacteria.
b) Why histone acetylation is significant in dosage compensation of a male fruit fly?
c) Add a note on bacterial SOS repair system.
d) What is CpG island? Mention its significance. [3+2+3+2]

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