

B.Sc. 5th Semester (Honours) Examination, 2023 (CBCS)

Subject : Zoology

Course : CC-XI

(Molecular Biology)

Time : 2 Hours

Full Marks : 40

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

Group-A

1. Answer *any five* questions of the following:

2×5=10

- (a) Mention any two major differences between B-DNA and Z-DNA.
- (b) What is the key importance of DNA primase in DNA replication in prokaryotes?
- (c) What could have happened if there were no General Transcription Factors (GTFs) in an eukaryotic cell?
- (d) What is the importance of Shine-Dalgarno sequence in prokaryotic protein translation process?
- (e) Define gene silencing.
- (f) Why do cells carry out SOS repair in spite of its propensity toward error?
- (g) Why the 'housekeeping genes' are so named?
- (h) What is meant by repressible operon?

Group-B

2. Answer *any two* questions of the following:

5×2=10

- (a) Explain the mechanism of Nucleotide excision repair of pyrimidine dimer or other damage induced distortions of DNA. 5
- (b) What are self-splicing introns? Comment on RNA world hypothesis in terms of self-splicing introns. 3+2
- (c) What is telomere? What is the speciality of telomeric replication? 1+4
- (d) What is 'genetic code'? Add a short note on Wobble Hypothesis. 3+2

Group-C

3. Answer *any two* questions of the following:

10×2=20

- (a) What is transcription? Describe the process on initiation of transcription in bacteria. What are the key differences between transcriptional mechanisms of prokaryotes and eukaryotes? 1+5+4

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- (b) What are the different levels at which gene expressions can be controlled in eukaryotes? Differentiate between activators and repressors. In which particular situation an enhancer can be called as silencer element? Opine on the combinatorial gene regulation process. 2+2+2+4
- (c) How Avery's transformation experiment led us to believe that DNA is the genetic material of organisms? What was the contribution of Rosalind Franklin in determining DNA structure? Describe Watson and Crick Model of DNA structure with suitable diagram. 4+2+4
- (d) Define DNA sequencing and state its importance. What are the ingredients of Sanger sequencing? Describe the process of Sanger sequencing. 2+2+6
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