Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt
    of this question paper.

2. Attempt any **five** questions.

3. **All** questions carry equal marks.

1. (a) Define the following (**any nine**) :   (2×9=18)

    (i) Polycistronic transcription

    (ii) Catenation

    (iii) Ribozyme

(iv) Okazaki fragments

(v) Split genes

(vi) Replicators

(vii) Linker DNA

(viii) Replicon

(ix) Ori C

(x) Transcription bubble

(xi) Pribnow box

2. (a) Differentiate between the following (**any four**) :
$$(4 \times 4 = 16)$$

(i) Topoisomerase type I and type II

(ii) DNA polymerase I and DNA polymerase III

(iii) Prokaryotic promoter and Eukaryotic promoter

(iv) GTFs and Transcription factors

(v) Z and A type of DNA

(b) Give any one role/significance of the following :
$$(1 \times 2 = 2)$$

(i) DNA ligase

(ii) Rho

3. (a) Explain Meselson and Stahl's experiment demonstrating semiconservative nature of DNA replication. (6)

   (b) What is linking number? Explain with suitable examples diagrammatically. Calculate the linking number of a covalently closed circular DNA of 16000 base pairs having 08 negative supercoils. (4+3=7)

   (c) What is denaturation of DNA? Explain various factors which influence the denaturation and how it changes the properties of DNA. (5)

4. (a) Give a detailed account of structure of DNA organization in prokaryotes. (3.5)

   (b) Expand and give significance of the following (**any five**) : (2×5=10)

   ARS, ORC, TBP, TFIID, TERT, C_0t value

   (c) Describe the contribution of the following scientists : (1.5×3=4.5)

   (i) Elizabeth H. Blackburn

   (ii) Arthur Kornberg

   (iii) Rosalind Franklin

5.   (a) Name any five types of proteins/enzymes involved in DNA replication fork in prokaryotes.   (5)

   (b) Draw the structure of tRNA. Name any two unusual bases present in tRNA.   (3+2=5)

   (c) How the fidelity is maintained at various levels during replication.   (5)

   (d) Define processivity of DNA polymerase enzyme. Explain its significance.   (3)

6.   (a) Write short note on (**any four**) :   (4×4=16)

      (i) Nucleosomes

      (ii) RNA polymerases in Eukaryotes

      (iii) D loop replication

      (iv) Mechanism of origin activation in prokaryotes

      (v) Termination of transcription in prokaryotes

   (b) What are telomeric repeats? Mention their role.   (2)