

**2023-24**

**Time - 3 hours**

**Full Marks - 60**

*Answer all groups as per instructions.*

*Figures in the right hand margin indicate marks.*

*Candidates are required to answer  
in their own words as far as practicable.*

*Draw labelled diagrams wherever necessary.*

**GROUP - A**

1. Fill in the blanks. (all) [1 × 8]
- (a) Pieces of DNA segments formed on lagging strand of DNA are called \_\_\_\_\_.
- (b) \_\_\_\_\_ are enzymes that detect damaged bases in DNA molecule and remove them.
- (c) RITS stands for \_\_\_\_\_.
- (d) In \_\_\_\_\_ a single gene can encode two or more related proteins.
- (e) Methylation of DNA is correlated with \_\_\_\_\_ transcriptional activity of genes.

[ 2 ]

- (f) In Eukaryotes, m-RNA contains codes of a single gene, hence it is called \_\_\_\_\_.
- (g) \_\_\_\_\_ is the DNA sequence capable of binding to repressor to prevent transcription.
- (h) DNA molecule makes complete turn after every \_\_\_\_\_ base pair.

**GROUP - B**

2. Answer any eight of the following within two or three sentences each. [1½ × 8]

- (a) What is the function of RNA polymerase ?
- (b) What is mi RNA ?
- (c) What are the transcription factors in Prokaryotes ?
- (d) What is processivity ?
- (e) Define Klenow fragment.
- (f) How fidelity of protein synthesis is maintained ?
- (g) How gene silencing occurs in Eukaryotes ?
- (h) What is TATA box ?
- (i) What is the role of RNA in DNA replication ?
- (j) Define exon.

[ 3 ]

**GROUP - C**

3. Write notes on any eight of the following within 75 words each. [2 × 8]

- (a) Mismatch repair
- (b) RNA Priming
- (c) Synthesis of m-RNA
- (d) Wobble Hypothesis
- (e) RNA interference
- (f) RNA editing
- (g) Replication of circular DNA
- (h) Elongation of Polypeptide Chain
- (i) Gene silencing
- (j) Semi-discontinuous replication

**GROUP - D**

4. Answer any four of the following within 500 words each. [6 × 4]

- (a) Describe DNA replication in Prokaryotes.
- (b) Give a detailed account of replication of telomeres.

[ 4 ]

- (c) Describe briefly Ribosome structure and assembly in Prokaryotes.
- (d) Explain mechanism of transcription in Prokaryotes.
- (e) Describe DNA replication in Eukaryotes.
- (f) Describe the principle of transcriptional regulation in Prokaryotes with example from lac operon.
- (g) Describe transcription regulation in Eukaryotes.