PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION DECEMBER 2023
(Third Semester)
Branch - **BIOTECHNOLOGY**
MOLECULAR BIOLOGY

Time: 3 Hours **Max Marks: 50**

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1. What type of bond holds adjacent nucleotides together in DNA?
   (i) Peptide bond (ii) Phosphodiester bond
   (iii) Hydrogen bond (iv) Ionic bond
2. Which of the following enzymes remove supercoiling in replicating DNA ahead of the replication fork?
   (i) DNA polymerase (ii) Primase
   (iii) Topoisomerase (iv) Helicase
3. Which of the following is the function of sigma (σ) subunit in the RNA polymerase of *E.coli*?
   (i) It is essential for elongation of the RNA transcript
   (ii) It is essential for the recognition of and binding to the promoter sequence
   (iii) It is required for transcription termination
   (iv) It keeps the core complex from dissociating
4. Which of the following is considered as a start codon?
   (i) AUG (ii) GUG
   (iii) UAG (iv) AGG
5. In SOS repair system cleavage of LexA and UmuD is mediated by _____.
   (i) RecB (ii) RecC
   (iii) RecA (iv) UvrA

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6 a. How did the Hershey and Chase experiment prove that genetic material is DNA?

OR

b. List out the difference between B-DNA and Z-DNA.

7 a Bring out the enzymology of DNA replication.

OR

b How does telomerase helps to prevent the loss of genetic material during replication?

Cont....

8 a Analyze the steps involved in RNA splicing in eukaryotes.

OR

b. Outline the mechanism of attenuation in *Trp* operon.

9 a. Narrate the clover leaf structure of tRNA with suitable diagram.

OR

b Describe the mechanism and significance of Wobble hypothesis.

10 a How are mutagens are classified? Give examples of each class.

OR

b Outline the mechanism of nucleotide excision repair.

SECTION -C (30 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11 a With neat sketches explain the Watson and Crick model of DNA double helix.

OR

b. Discuss in detail the types and properties of plasmids.

12 a Illustrate the experiment that prove semiconservative mode of DNA replication.

OR

b Differentiate leading and lagging strand DNA synthesis.

13 a Analyze the steps involved in prokaryotic mRNA synthesis.

OR

B Discuss in detail the process of regulation of gene expression in *Lac* Operon.

14 a Elucidate the characteristics of genetic code.

OR

b Point out the differences between the prokaryotic and eukaryotic protein biosynthesis.

15 a Describe the mechanism of chemically induced mutations.

OR

B Summarize the Holliday junction model of recombination with suitable diagram.

Z-Z-Z END