

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2022  
(First Semester)

Branch – BIOTECHNOLOGY

MOLECULAR BIOLOGY

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (5 x 1 = 5)

1. Which enzyme relaxes the supercoiling of DNA?  
(i) Topoisomerase (ii) DNA Polymerase  
(iii) RNA Polymerase (iv) RNase H
2. Which antibiotic affect the DNA replication of bacteria?  
(i) Quinolones (ii) Streptomycin  
(iii) Penicillin (iv) Tetracycline
3. When tryptophan is present in the cell, \_\_\_\_\_ tryptophan molecules bind to the trp repressor, which changes shape to bind to the trp operator.  
(i) three (ii) two  
(iii) four (iv) five
4. Which codon codes for methionine?  
(i) UAA (ii) UAG  
(iii) AUG (iv) UGA
5. Who discovered SOS repair of DNA?  
(i) Albert Einstein (ii) Miroslav Radman  
(iii) Har Gobind Khorana (iv) Arthur Kornberg

SECTION - B (15 Marks)

Answer ALL Questions

ALL questions carry EQUAL marks (5 x 3 = 15)

6. a) Discuss the types of anti-oncogenes that are present in the human cells.  
OR  
b) Illustrate the structure and chemical components of DNA.
7. a) Explain the various enzymes that involved in the DNA replication of prokaryotes.  
OR  
b) Determine the action of antibiotics that inhibit the DNA replication in a eukaryote.
8. a) Sketch the important genes that are involved in the *Lac* operon. How it each functions?  
OR  
b) Illustrate the structure and function of tRNA.
9. a) Construct the Genetic codon table and write its corresponding codons.  
OR  
b) How are ribozymes differ from enzymes?
10. a) "Transposon mutagenesis is essential for the study of bacterial pathogenicity and biology". Justify the statement.  
OR  
b) Assume if there are no excision DNA repair mechanism, what will happen?

Cont...

**SECTION -C (30 Marks)**

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 6 = 30)

11. a) Compare and contrast repetitive & non-repetitive DNA sequences.  
OR  
b) Elucidate the spatial organization of chromosomes.
12. a) Categorize the events that occurs in the specialized transduction of phages.  
OR  
b) Enumerate the different steps involved in the eukaryotic DNA replication.
13. a) Construct the genetic structure of *Trp* operon. What activates it? What happens when tryptophan is present?  
OR  
b) Elucidate the process involved in the environmental regulation of eukaryotic gene transcription.
14. a) Differentiate microRNA, siRNA and snRNA.  
OR  
b) How the proteins are exported, targeted and secreted within the cells?
15. a) Illustrate the homologous recombination of DNA. What is its outcome?  
OR  
b) Classify the different types of mutation.

Z-Z-Z

END