22BTU312N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Third Semester)

Branch – **BIOTECHNOLOGY**

MOLECULAR BIOLOGY

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Question No.		K Level	CO
1	Who is known as the father of Molecular Biology? a) Linus Carl Pauling b) James Watson c) Francis H Crick d) Mahlon B Hoagland	K1	CO1
2	The first X-ray diffraction patterns of DNA were taken in 1938 by -------. a) William Asbury b) Rosalind Franklin c) Francis H. Crick d) Linus Pauling	K2	CO 2
3	In the case of a circular DNA synthesis how many replication forks are observed? a) 1 b) 2 c) 3 d) 4	K1	CO 1
4	DNA helicase travels along --------. a) Leading strand template in 3'→5' direction b) Leading strand template in 5'→3' direction c) Lagging strand template in 3'→5' direction d) Lagging strand template in 5'→3' direction	K2	CO 2
5	How many reading frames are applicable in case of translation? a) 1 b) 2 c) 3 d) 4	K1	CO 1
6	The end of all tRNAs is --------. a) 5' ACC 3' b) 5' CCA 3' c) 3' CAC 5' d) 3' GAG 5'	K2	CO 2
7	siRNA are produced by --------. a) Transcription b) DNA damage c) RNA damage d) Enzymatic action	K1	CO 1
8	Which position of a codon is said to wobble? a) First b) Second c) Third d) Fourth	K2	CO 2
9	Which of the following mechanisms will remove uracil and incorporate the correct base? a) Direct repair b) Base excision repair c) Mismatch repair d) Nucleotide excision repair	K1	CO 1
10	An alteration in a nucleotide sequence that changes a triplet coding for an amino acid into a termination codon is ---------. a) Nonsense mutation b) Mutagenesis c) Mutation d) Mutagen	K2	CO 2

Cont...

SECTION - B (5 x 7 = 35)

Answer **ALL** Questions

ALL Questions Carry Equal Marks

11 a	Distinguish between positive and negative super coiling of DNA.	K3	CO 3
	(OR)		
11 b	Discuss the types of plasmids.		
12 a	State the role of DNA polymerases in replication.	K5	CO 5
	(OR)		
12 b	Describe the role of SS binding proteins in DNA replication.		
13 a	Explain the major components of transcriptional apparatus.	K3	CO 3
	(OR)		
13 b	How does *lac* operon regulate gene expression?		
14 a	Enlist the types and structure of RNA.	K2	CO 2
	(OR)		
14 b	Mention the characteristics of genetic code.		
15 a	Comment on base pair substitution.	K3	CO 3
	(OR)		
15 b	How is Holliday junction generated during replication?		

SECTION - C (3 x 10 = 30)

Answer any **THREE** Questions

ALL Questions Carry Equal Marks

16	Summarize different forms of DNA.	K4	CO 5
17	Analyze the mechanism of regulation of DNA replication.	K4	CO 4
18	Describe splicing mechanism in eukaryotes.	K4	CO 3
19	Explain the post translational modifications in eukaryotes.	K4	CO 2
20	Elucidate DNA repair mechanism.	K4	CO 3

Z-Z-Z END