22BTU416N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2025
(Fourth Semester)

Branch - **BIOTECHNOLOGY**

RECOMBINANT DNA TECHNOLOGY

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	The RNA strand in the RNA-DNA hybrid is removed by ----- enzyme a) Restriction enzyme b) RNase-H c) Nuclease d) DNA polymerase	K1	CO1
	2	The enzyme that adds mononucleotide triphosphates to 3'OH group of a DNA fragment is ---------- a) Polynucleotide kinase b) Alkaline phosphatase c) Terminal nucleotidyl transferase d) DNase I	K2	CO1
2	3	Expression vectors differ from a cloning vector in having ---------- a) An origin of replication b) Control elements c) Suitable marker genes d) Unique restriction sites	K1	CO2
	4	Phage M13 vectors are widely used for obtaining --------- of cloned DNA suitable for DNA sequencing a) Single stranded copies b) Double stranded copies c) Fragments d) All the above	K2	CO2
3	5	Probe is labelled to improve ---------- . a) Visibility b) Stability c) Location identification d) Binding capability	K1	CO3
	6	In molecular cloning, blue white screening is used to ----- a) Detect gene mutation b) Screen for recombinant vectors c) Detect host DNA in situ d) Identify desired chromosomal DNA insert in plasmid vectors	K2	CO3
4	7	In RT – PCR the enzyme deoxynucleotydil transferase adds poly-G residues in the --------- a) 5' end of RNA b) 3' end of RNA c) 5' end of cDNA d) 3' end of cDNA	K1	CO4
	8	---------- type of DNA cleavage is done in the Maxam Gilbert method a) Edge b) Interstitial c) Gene specific d) Base specific	K2	CO4
5	9	What is the primary purpose of genetic knockout in biological research? a) To enhance gene expression b) To amplify gene sequences c) To study the function of specific genes d) To delete entire genomes	K1	CO5
	10	Which two genes are absent in the E. coli strain CJ236? a) dut/Ung b) Rec/RecB c) duB/Ung d) dut/Umg	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	What are DNA ligases? How do these enzymes participate in the recombinant DNA technology?	K3	CO1
		(OR)		
	11.b.	Describe the types and properties of plasmid.		
2	12.a.	Explain how pBR322 is used in genetic engineering.	K3	CO2
		(OR)		
	12.b.	Elucidate the salient features and advantages of using YRC and cosmid.		
3	13.a.	List out the applications of any two animal vectors.	K3	CO3
		(OR)		
	13.b.	Summarize the methods involved in transfer of foreign gene in to host cells.		
4	14.a.	Describe the identification of nucleic acid sequencing by Sanger's di-deoxy chain termination method.	K4	CO4
		(OR)		
	14.b.	Illustrate the principle and steps involved in next-generation sequencing.		
5	15.a.	Discuss the miRNA induced silencing.	K3	CO5
		(OR)		
	15.b.	Elucidate the PCR based method for oligo nucleotide mediated mutagenesis.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Elaborate the uses of type II restriction enzyme and S1 nuclease enzymes in genetic engineering.	K6	CO1
2	17	Discuss the types and significance of selectable markers in rDNA technology.	K5	CO2
3	18	Explain the steps involved in the construction of cDNA library and applications of Southern blotting technique.	K5	CO3
4	19	Enumerate the essential steps of the polymerase chain reaction. How is this technique useful in diagnosis of infectious diseases?	K4	CO4
5	20	Explain the CRISPR-Cas9 gene editing technology.	K5	CO5

Z-Z-Z END