

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2024
(Second Semester)

Branch - BIOTECHNOLOGY

GENETIC ENGINEERING

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	Which endonuclease cleaves both single and double stranded DNA molecules, in a non-specific manner? a) S1 b) Bal31 c) DNase I d) BamHI	K1	CO1
	2	Host controlled restriction is a phenomenon related to _____. a) Bacteria b) Virus c) Plasmid d) Gene of interest	K2	CO1
2	3	The size of M13 phage vector is _____. a) 3 kb b) 6.4 kb c) 15.4 kb d) 20.4 kb	K1	CO2
	4	What is the maximum approximate length of the genes that can be cloned using YACs? a) 100kb b) 300kb c) 600kb d) 1000kb	K2	CO2
3	5	What is the main enzyme component of Sanger sequencing? a) Helicase b) Polymerase c) Nuclease d) Gyrase	K1	CO3
	6	_____ is a chemically synthesized oligonucleotide. a) Klenow fragment b) DNA c) Primer d) RNA	K2	CO3
4	7	For analyzing DNA sequences, two techniques have been developed, one is _____ method frequently termed _____, involving the enzymatic synthesis of DNA and stopping the synthesis at specific nucleotides. While another technique, the _____ method of DNA sequencing developed by _____ is often used for sequencing small fragments of DNA. a)chemical cleavage, Sanger sequencing, enzymatic, Maxam and Gilbert b)chemical cleavage, Maxam and Gilbert, enzymatic, Sanger c)enzymatic, Sanger sequencing, chemical cleavage, Maxam and Gilbert d)enzymatic, Maxam and Gilbert, chemical cleavage, Sanger	K1	CO4
	8	The temperature cycles in a polymerase chain reaction are in the order _____. a) 95°, 60°, 72° b) 60°, 72°, 95° c) 72°, 60°, 95° d) 95°, 72°, 60°	K2	CO4
5	9	RNA interference (RNAi) or Post-Transcriptional Gene Silencing (PTGS) is a conserved biological response to _____ that mediates resistance to both endogenous parasitic and exogenous pathogenic nucleic acids. a)ds RNA b) ss RNA c)ds DNA d) ssDNA	K1	CO5
	10	a 20-nucleotide region that is complementary to the target region and defines the target DNA sequence that Cas9 cuts. a) Cas9 enzyme b) Guiding region c) Scaffold region d) Protospacer adjacent motif	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.	Explain the mechanism of Methyltransferase and emphasize on DNA methylation.	K2	CO1
	(OR)			
	11.b.	Classify the different end modifications in DNA insertion.		
2	12.a.	Summarize the types and properties of Natural plasmids.	K3	CO2
	(OR)			
	12.b.	Identify the various artificial chromosome based vectors and list the advantages.		
3	13.a.	Compare the preparation and advantage of Genomic and cDNA library.	K3	CO3
	(OR)			
	13.b.	Classify the methods of gene transfer and markers used for selection of recombinants.		
4	14.a.	Analyze the various types of PCR and list their principle and application.	K4	CO4
	(OR)			
	14.b.	Examine chemical sequencing method.		
5	15.a.	List the therapeutic proteins produced using genetic engineering and analyze their production and application.	K4	CO5
	(OR)			
	15.b.	Define gene editing. Compare and contrast the gene editing tools available.		

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	Classify the Restriction Enzymes and explain their Nomenclature.	K4	CO1
2	17	Compare the features of pBR322, pUC18, phagemid, phasmid and cosmid.	K5	CO2
3	18	Discuss the Functional cloning and protein-protein interactive cloning.	K5	CO3
4	19	Elaborate on Automated and semi-automated DNA sequence.	K6	CO4
5	20	Where do you apply Gene silencing? Discuss the techniques available with required illustration.	K6	CO5