Q. Code:772866

Reg. No. | | | | | | | | | | | | | | |

B.E / B.TECH. DEGREE EXAMINATIONS, MAY 2024

Sixth Semester

BT18602 – GENETIC ENGINEERING AND GENOMICS

(Biotechnology)

(Regulation 2018 / 2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

CO 1 Explain the methodology to be followed for cloning commercially important genes and for the production of recombinant proteins

CO 2 Categorize the different methodology to be followed for constructing genomic and cDNA library and to screen them.

CO 3 Make use of gene sequencing techniques, site directed mutagenesis and different PCR techniques to amplify and quantify gene expression.

CO 4 Utilize whole genome sequencing and mapping.

CO 5 Apply Microarray, SAGE, TOGA techniques etc

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	List Four enzymes that are used in manipulation of DNA.	**1**	**2**
2.	Describe the role of S1 nuclease and RNAse H.	**1**	**2**
3.	What is full length cDNA cloning? Why it is essential?	**2**	**4**
4.	How do you predict a deafness causing genes in humans? Do you use human as a first test subject?	**2**	**4**
5.	Compute the annealing temperature of this primer GATTGGGCCGAGGGCGGC.	**3**	**3**
6.	Differentiate Taqman Probes and Molecular Beacons.	**3**	**3**
7.	How linkage analysis is related to mapping of genes?	**4**	**3**
8.	Define RFLP.	**4**	**3**
9.	What technique can be used to simultaneously compare the protein expression from two different samples in a same gel?	**5**	**3**

			Marks	CO	RBT LEVEL
10.		List four applications of comparative genomics.	**5**	**3**	

PART- B (5 x 14 = 70 Marks)

			Marks	CO	RBT LEVEL
11. (a)	**(i)**	Describe the application of M13 vector in genetic engineering with a neat sketch of the vector and its salient features.	**(7)**	**1**	**2**
	(ii)	The Cre-loxP based technology can be used to create knockout mice. Justify this statement with suitable example.	**(7)**	**1**	**2**
		(OR)			
(b)		How expression vectors are different from cloning vectors? Describe about cloning vectors and expression vectors with suitable vector map.	**(14)**	**1**	**2**
12. (a)	**(i)**	what are three types of primers that can be used to make first strand cDNA? Describe which among them is better with suitable explanation? (6)	**(4)**	**2**	**4**
	(ii)	How radioactive and non-radio active nucleic acid probes are created? Discuss their applications in Benton-Davis and Grunstein-Hogness screening of DNA libraries.	**(10)**	**2**	**4**
		(OR)			
(b)	**(i)**	Justify that Carbon-Clarke formula helps in identifying the number of colonies required to make a genomic DNA library. Explain this using insert DNA of different size.	**(4)**	**2**	**4**
	(ii)	Genomic DNA library construction makes use of bacteriophage vectors, however there are alternatives to it. What alternative vectors can be used for this purpose? Explain this with at least vectors.	**(10)**	**2**	**4**
13. (a)	**(i)**	Discuss the necessity of fluorescent labelled nucleotides in the automated DNA sequencing and explain the principle behind the technique.	**(7)**	**3**	**3**
	(ii)	Describe a situation in which the inverse PCR and the colony PCR is preferred. Explain the steps involved.	**(7)**	**3**	**3**
		(OR)			
(b)		How a normal mutation differs from site directed mutagenesis? Illustrate at least strategies for the site directed mutagenesis.	**(14)**	**3**	**3**

			Marks	CO	RBT LEVEL
14. (a)	**(i)**	A technology uses the light emitted from a nucleotide addition in a growing strand of DNA and predicts the DNA sequence. Describe about that technology in detail.	**(7)**	**4**	**3**
	(ii)	Illumina sequencing contains different chemistries for the prediction of DNA sequence. Describe the difference in chemistry behind illumina sequencing and highlight its advantages.	**(7)**	**4**	**3**
		(OR)			
(b)		Illustrate the importance of genome mapping techniques used to order the fragments of DNA for the human genome project.	**(14)**	**4**	**3**
15. (a)	**(i)**	What will be the output from an ORF Finder when a hypothetical DNA sequence is fed in it? Write a DNA sequence Describe the principle behind the algorithm of ORF Finder.	**(4)**	**5**	**3**
	(ii)	Protein-Protein interaction can be identified using the Yeast two hybrid system. Illustrate their variants to also identify other types of interactions	**(10)**	**5**	**3**
		(OR)			
(b)		Illustrate the pipeline used in the microarray analysis and emphasize on their types and advantages compared to the conventional techniques.	**(14)**	**5**	**3**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

			Marks	CO	RBT LEVEL
16.		Passing a DNA through a pore can helps in elucidating the DNA sequence. Describe the pipeline involved in this technique to elucidate the genome of an organism.	**(10)**	**4**	**3**

****