U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2024 Supplementary Examinations

Programme: B.E. **Semester: V**
Branch: Biotechnology **Duration: 3 hrs.**
Course Code: 22BT5PCGEN **Max Marks: 100**
Course: Genetic Engineering

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

		UNIT - I	CO	PO	Marks
1	a)	List three applications of gene cloning. Give a pictorial description of blunt and sticky ends.	CO 1	PO 1	6
	b)	How are endonucleases and exonucleases different from each other in terms of cleavage sites, specificity and defensive properties? What is the mechanism of action of polynucleotide kinase?	CO 1	PO 1	7
	c)	Elaborate on the mechanism of action of DNA ligase. What are the special features of T4 DNA ligase that makes it such an excellent choice for recombinant DNA laboratory research?	CO 2	PO 5	7
		UNIT - II			
2	a)	Differentiate between strong and weak promoters with examples. What is SD sequence?	CO 2	PO 5	7
	b)	What are the characteristic features of an ideal vector? Represent the typical structure of a plasmid vector with all the important components.	CO 3	PO 5	7
	c)	Viruses such as Moloney murine leukemia virus are very commonly used as vectors in genetic engineering research. Which class of virus is this? Write about its general structural features.	CO 3	PO 5	6
		OR			
3	a)	"A Gram-negative soil bacterium that can cause crown gall tumours in plants". Which plant vector is this? What are its applications in genetic engineering?	CO 2	PO 5	6
	b)	Give a diagrammatic representation of pBR322. Write the main features of pUC 19.	CO 3	5	7
	c)	What is the purpose of creating a cosmid? How is a yeast artificial chromosome constructed?	CO 3	5	7

			UNIT - III			
	4	a)	What is the significance of phenol:chloroform step in alkaline lysis method of DNA isolation? Write the major steps in RNA isolation.	***CO** 4*	***PO** 3*	**6**
		b)	Annealing temperature is a very crucial factor for PCR. How is this temperature determined to get optimum results? Give an overview of Real Time PCR.	***CO** 4*	***PO** 3*	**7**
		c)	Elaborate Northern blotting with a diagram.	***CO** 3*	***PO** 5*	**7**
			OR			
	5	a)	"A single plaque contains enough DNA for detectable hybridization to a labeled probe". This concept has been used to detect particular clones from among a large number in a library. Elucidate this method.	***CO** 4*	***PO** 3*	**6**
		b)	What are the ingredients required for PCR? Write the steps involved.	***CO** 4*	***PO** 3*	**7**
		c)	Give a diagrammatic representation of Western blotting technique. What is Southwestern blot?	***CO** 3*	***PO** 5*	**7**
			UNIT - IV			
	6	a)	How does DEAE dextran form complexes with DNA? Mention the disadvantages of this technique which has led to its decreased popularity over the years.	***CO** 5*	***PO** 6*	**6**
		b)	Give a detailed description of microinjection as a gene transfer technique, including advantages and disadvantages.	***CO** 5*	***PO** 6*	**7**
		c)	What are the disadvantages of microprojectile bombardment method? Elaborate the process of lipofection which is used in gene transfer.	***CO** 5*	***PO** 7*	**7**
			UNIT - V			
	7	a)	How was "Dolly" the cloned sheep produced? Differentiate between somatic gene therapy and germline gene therapy.	***CO** 5*	***PO** 12*	**7**
		b)	What is CRISPR-Cas9 technology? Elucidate the major components and describe the process.	***CO** 6*	***PO4***	**6**
		c)	What are the two genes inserted into the genome of Golden rice? Present the steps of production of Golden rice.	***CO** 6*	***PO** 4*	**7**

****