U.S.N.										

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

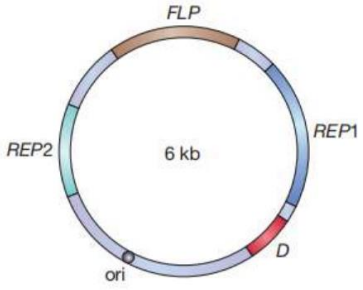
Autonomous Institute Affiliated to VTU

August 2024 Semester End Main Examinations

Programme: B.E. **Semester: IV**
Branch: Biotechnology **Duration: 3 hrs.**
Course Code: 23BT4PCGEN **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.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	CO	PO	Marks
1	a)		What are the different types of nucleases found in DNase I family? How is mechanism of DNase I different from DNase II?	*CO1*	*PO1*	**7**
	b)		How does DNA polymerase work? Elaborate the reaction taking place with a diagram.	*CO*1	*PO1*	**7**
	c)		What makes TdT an important tool in genetic engineering?	*CO* 1	*PO1*	**6**
			UNIT - II			
2	a)		Highlight the main features of a vector. What is a yeast artificial chromosome?	*CO2*	*PO5*	**7**
	b)		Elaborate on the construction of pBR322. Denote all its major components with a diagram.	*CO*2	*PO5*	**8**
	c)		Differentiate between a cosmid and a plasmid. Why do cosmids always form colonies and not plaques?	*CO2*	*PO5*	**5**
			OR			
3	a)		What is relation between start codon and SD sequences? The genetic codes of different organisms are often biased towards using one of the several codons that encode the same amino acid over the others. What is the significance of this?	*CO*2	*PO 5*	**5**
	b)		Give a diagrammatic representation of Ti plasmid of *Agrobacterium tumefaciens*. How are binary vector systems constructed?	*CO* 2	*PO5*	**5**
	c)		What are the functions of the various components in the plasmid depicted below? 			**10**

			"In order to use LEU2 as a selectable marker, the host must be an auxotrophic mutant that has a non-functional LEU2 gene". Explain the method of selection involved in this type of selectable marker.			
			UNIT - III			
	4	a)	Write the procedure of genomic DNA isolation by alkaline lysis method.	***CO4***	***PO3***	**7**
		b)	What is the principle of blotting? Highlight its types.	***CO***4	***PO3***	**8**
		c)	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*** 3	***PO5***	**5**
			OR			
	5	a)	Give a diagrammatic representation of immunoscreening technique.	***CO***3	***PO5***	**5**
		b)	Write the steps of plasmid DNA isolation by alkaline denaturation method.	***CO*** 3	***PO5***	**7**
		c)	What is the difference between genomic and cDNA libraries? How is a cDNA library constructed?	***CO***3	***PO5***	**8**
			UNIT - IV			
	6	a)	Elaborate the PEG mediated transformation method. What are liposomes? Why are they used in gene transfer techniques?	***CO***5	***PO6, 7,12***	**6**
		b)	Give a comprehensive description of microinjection as a gene transfer technique, including advantages and disadvantages.	***CO5***	***PO6, 7,12***	**6**
		c)	What is electroporation? Present a detailed account of this method. Mention the major applications of electroporation.	***CO5***	***PO6, 7,12***	**8**
			UNIT - V			
	7	a)	How was "Dolly" the cloned sheep produced? Differentiate between somatic gene therapy and germline gene therapy.	***CO5***	***PO6, 7,12***	**8**
		b)	Highlight the rare genetic disorder that David Vetter had which went on to give him the name "Bubble Boy".	***CO5***	***PO6, 7,12***	**5**
		c)	What is CRISPR-Cas9 technology? Elucidate the major components and depict the process with a labelled diagram.	***CO5***	***PO6, 7,12***	**7**

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