MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
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VI SEMESTER B.TECH. MAKEUP EXAMINATIONS APRIL/JUNE 2019

SUBJECT: GENETIC ENGINEERING [BIO 2203]

Date of Exam: **June 2019** Time of Exam: **2.00 PM – 5.00 PM** Max. Marks: **50**

Instructions to Candidates:

- Answer ALL the questions & missing data may be suitable assumed

1A.	How do insertion vectors differ from replacement vectors?	**5**
1B.	What changes will you bring about in a lamda phage DNA for it to be used as suitable cloning vector?	**5**
2A.	Explain the mode of mechanism of DNA hydrolytic enzymes with 2 applications	**4**
2B.	The following is part of the sequence of an 8 base pair, palindromic restriction enzyme recognition site: : : : : C T A A : : : : ***i.*** Complete the sequence of the restriction enzyme recognition sequence ***(0.5)*** ***ii.*** Label the 5' and 3' ends of each DNA strand on the drawing above. ***(0.5)*** ***iii.*** Draw the products you'd expect to see if this enzyme cuts to leave a 5' overhang of 5 nucleotides. ***(1)*** ***iv.*** You now dephosphorylate the cut DNA name the enzyme used and its mode of mechanism. Draw the resulting products. ***(1)***	**3**
2C.	Is it possible to ligate two heterologous fragments cleaved with *Bam* HI and *Bgl* II? Can the ligated DNA fragments be cleaved again with *Bam* HI or *Bgl* II? Recognition site sequence of *Bgl* II A/GATCT Recognition site sequence of *Bam* HI G/GATCC	**2**
2D.	A new restriction endonuclease from the S strain of the bacterium *Swaminathania salitolerans* is discovered and characterized. No such enzyme was isolated from the same organism. Suggest a possible nomenclature for this new enzyme. Explain.	**1**
3A.	You were standardizing a protocol for fluorescence in situ hybridization. The results you got showed a lot of background noise. What could have gone wrong and what changes will you bring about in your protocol to get better results?	**5**
3B.	Explain how northern blotting is carried out.	**5**
4A.	How does dideoxy nucleotide triphosphates technique work for sequencing DNA molecules?	**4**
4B.	Compare and contrast *invivo* and *invitro* DNA replication	**3**
4C.	The following result was obtained in AGE with single and multiple restriction digestion of clone using *Bgl*II and with *Bam*HI. AGE band information - Uncut insert - 6kb, *Bgl*II-5kb+1kb, *Bam*HI - 3.5kb + 2.5kb, *Bam*HI + *Bgl*II - 3.5kb + 1.5kb	**3**

	+ 1kb. Draw the map of the genomic insert indicating the restriction sites for the enzymes *Bgl*II, *Bam*HI.	
5A.	With an example explain how SNPs may and may not alter the protein sequence?	**3**
5B.	Dicuss the important conclusions of HVP.	**4**
5C.	Results from a single locus VNTR probe DNA fingerprint analysis for a female and her five children are given below. Identify the lane contains the DNA of the mother? Explain. AGE DNA fragment size: Lane 1- 2kb, 3kb Lane 2-2kb, 5kb Lane 3-1kb, 4kb Lane 4-2kb, 4kb Lane 5-4kb Lane 6-2kb, 5kb.	**3**