Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
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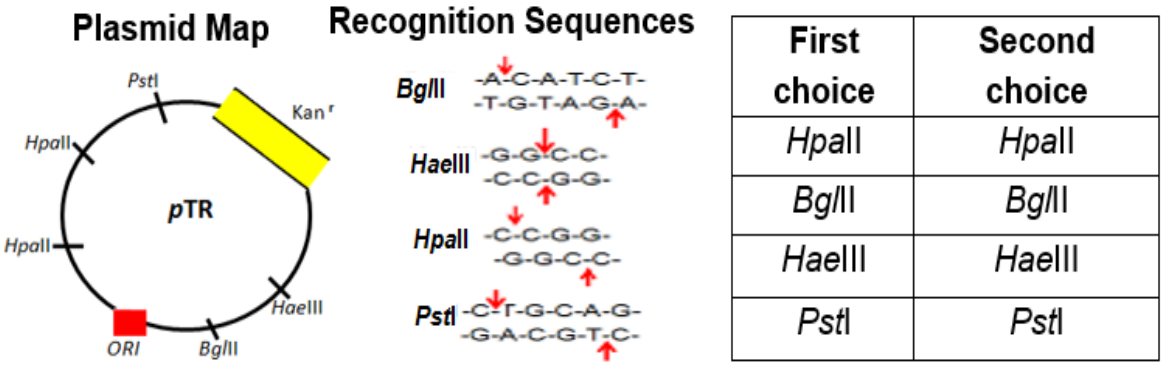
I SEMESTER M.TECH. (INDISTRIAL BIOTECHNOLOGY)

END SEMESTER EXAMINATIONS, NOVEMBER 2017

SUBJECT: MOLECULAR BIOLOGY & rDNA TECHNOLOGY [BIO 5122]

Time: 3 Hours **(18/11/2017)** MAX. MARKS: 50

Instructions to Candidates:
- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A.	Explain, why DNA more stable than RNA?	**2**
1B.	Replication of a linear chromosome presents a complication that is not an issue when a circular chromosome is replicated. Briefly describe this complication.	**2**
1C.	What are telomeres? How are RNA primers at the ends of linear eukaryotic chromosome replaced by DNA?	**3**
1D.	Brief on any 3 promoters for Prokaryotes and Eukaryotes (specifically, RNAP--II)	**3**
2A.	Briefly describe how a single eukaryotic gene can specify more than one mature mRNA and encode more than one protein.	**2**
2B.	How do the roles of ATP and GTP differ in translation?	**5**
2C.	Briefly describe how the levels of glucose, lactose in the cell influence transcription of the lac operon genes?	**3**
3A.	Classify the following mutations:**(1)**A→T **(2)**AGA→UGA **(3)**AGA→CGA and **(4)** AGA→AAA.	**2**
3B.	How does the base excision repair work?	**3**
3C.	Explain why the promoter in general is rich in adenine (A) and thymine (T) bases?	**2**
3D.	Discuss on plasmid vector transformation procedure in bacteria.	**3**
4A.	The plasmid pTR map shows the locations of the restriction sites of four different restriction endonucleases, as well as the ORI and a kanamycin-resistance gene (kanr) is given. The restriction cleaving site for the enzymes are shown. Choose the correct set of restriction enzymes from the table? 	**3**

First choice	Second choice
*Hpa*II	*Hpa*II
*Bgl*II	*Bgl*II
*Hae*III	*Hae*III
*Pst*I	*Pst*I

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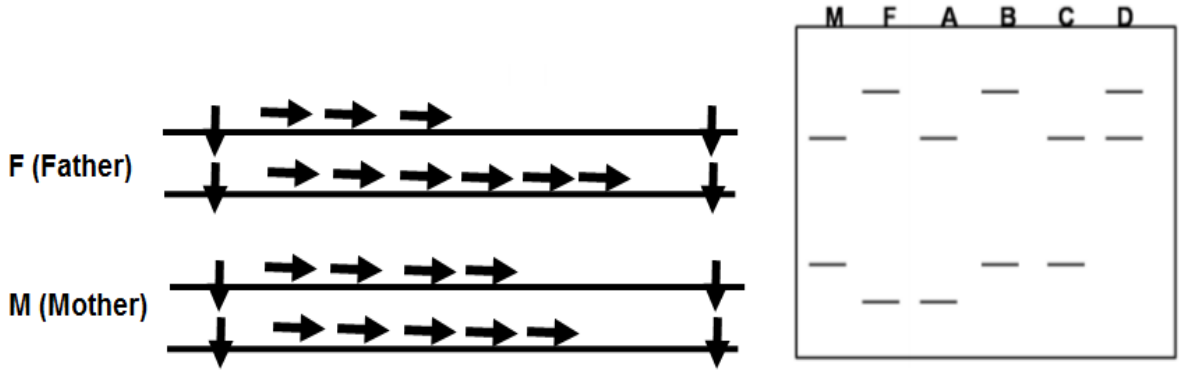
4B.	Identify and sketch a vector from the given information: **I.** Hybrid vectors used in lambda phage and bacteria.	**2**
4C.	How does DNA *Ligase* work in joining two heterogeneous DNA fragments?	**3**
4D.	Explain the importance of linker in GE with illustration.	**2**
5A.	How does dideoxy nucleotide triphosphates method work for DNA sequencing?	**6**
5B.	What factors affects polymerase chain reaction?	**2**
5C.	Minisatellites are used as marker for identifying individuals via DNA fingerprinting as the alleles may differ in the number of repeats. From the Southern blot shown below identify the progeny (A, B, C and D) for the given parents (M= mother, F= father). Explain. 	**2**

FIRST BASE	SECOND BASE U	SECOND BASE C	SECOND BASE A	SECOND BASE G	THIRD BASE
U	UUU Phe	UCU Ser	UAU Tyr	UGU Cys	U
	UUC Phe	UCC Ser	UAC Tyr	UGC Cys	C
	UUA Leu	UCA Ser	**UAA Stop**	**UGA Stop**	A
	UUG Leu	UCG Ser	**UAG Stop**	UGG Trp	G
C	CUU Leu	CCU Pro	CAU His	CGU Arg	U
	CUC Leu	CCC Pro	CAC His	CGC Arg	C
	CUA Leu	CCA Pro	CAA Gln	CGA Arg	A
	CUG Leu	CCG Pro	CAG Gln	CGG Arg	G
A	AUU Ile	ACU Thr	AAU Asn	AGU Ser	U
	AUC Ile	ACC Thr	AAC Asn	AGC Ser	C
	AUA Ile	ACA Thr	AAA Lys	AGA Arg	A
	AUG Met or start	ACG Thr	AAG Lys	AGG Arg	G
G	GUU Val	GCU Ala	GAU Asp	GGU Gly	U
	GUC Val	GCC Ala	GAC Asp	GGC Gly	C
	GUA Val	GCA Ala	GAA Glu	GGA Gly	A
	GUG Val	GCG Ala	GAG Glu	GGG Gly	G