Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

IV SEMESTER B.TECH. (BIOTECHNOLOGY)

END-SEMESTER EXAMINATIONS, APRIL 2018

SUBJECT: GENETIC ENGINEERING [BIO 2203]

REVISED CREDIT SYSTEM
(19/04/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A.	During a practical exam, two students were asked to use a restriction enzyme from a vial. The enzymes were put to use in two different experiments and the ensuing band patterns on agarose gel was different. How is this possible?	2
1B.	An antibiotic-sensitive bacterium is turned antibiotic-resistant through a naturally existing plasmid-mediated process. Suggest a possible mechanism for this change in bacterial property.	3
1C.	I have asked you to use an adaptor with a given cDNA of interest in a typical expression vector. Draw labelled diagrammatic sketches (only) of the expression vector (a) before the cDNA is included and (b) after the cDNA is included.	5
2A.	You are attempting to use the enzyme ligase with two DNA fragments composed of dideoxynucleotides. Will you be successful in achieving what you intended to do using the enzyme? Why or why not?	2
2B.	If you want to create the cDNA library corresponding to a specific protein, present the first three steps that you would follow.	3
2C.	You are a genetics expert and based on your diagnosis using RFLP patterns, you determine that your patient has a critical disorder. How did you arrive at this conclusion? Illustrate with a schematic diagram.	5
3A.	You are asked to clone a cDNA fragment into pBR322. You are provided with dATPs and dTTPs. Explain using a diagram ONLY, as to how you would employ the given dNTPs to achieve the cloning process..	3

3B.	What are the chemicals used for the base-specific reactions that are conducted for Maxam-Gilbert sequencing technique?	3
3C.	A person is suffering from persistent thick mucus in his bronchi. He is diagnosed with a genetic disorder. What is the likely disease he is suffering from? With an outline on the different forms of gene therapy, write a brief note on the gene therapy of this condition.	4
4A.	How is an SNP different from a mutation? What are the different types and sub-types of SNPs?	4
4B.	A DNA fragment with the sequence 5'-TAGGATCGTTGC-3' is provided and you are asked to sequence it using Maxam-Gilbert as well as Sanger methods. At the end of the respective processes, what actual sequence do you arrive at, using the two methods? Show ONLY the nested set of fragments in each case.	6
5A.	If you plan to run the thermocycler, what steps would you consider in your program? Add a note on what happens in the cyclic steps of a polymerase chain reaction.	4
5B.	The head of your research lab gave you a nucleic acid sample and asked you to check for the presence of a specific sequence. You forgot to ask whether it was a DNA or RNA sample. How would you proceed to detect the sequence?	6