Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.TECH(B.T)/SEM-1/MBT-101/2011-12

2011

GENETIC ENGINEERING

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

$10 \times 1 = 10$

i) Which of the following could not be the recognition site of a Restriction Endonuclease ?

a) GAATTC
CTTAAG

b) ATCGAT
TAGCTA

c) CTGCAG
GACGTC

d) GCTTGC
CGAACG

ii) The single stranded ends of DNA molecules can be joined together by

a) Restriction Endonucleases

b) DNA Ligase

c) Primase

d) Helicase.

iii) The first step in cloning a gene is to
   a) isolate the DNA from the organism that contains the desired gene
   b) insert a plasmid into a bacterium
   c) treat plate cells on agar
   d) treat plasmids with restriction enzymes.

iv) A microarray is a/an
   a) ray of a small wavelength
   b) type of ultraviolet ray
   c) RNA probe used to identify viruses
   d) arrangement of oligonucleotide probes, closely arranged on a small solid support surface.

v) PCR requires all of the following except
   a) Primers b) DNA ligase
   c) DNA polymerase d) Deoxyribonucleotides.

vi) If you start with one double stranded DNA molecule and you perform *SIX* cycles of PCR, how many double stranded copies of the DNA will you have ?
   a) 8 b) 16
   c) 32 d) 64.

vii) DNA probes are used to
   a) locate complementary RNA sequences in a test sample
   b) make homologous DNA
   c) make homologous RNA
   d) locate a specific DNA nucleotide sequence in a test sample.

viii) ..... consist of recombinant cells containing different fragments of a foreign genome.
   a) DNA probes
   b) Homologous recombinants
   c) Genomic libraries
   d) Knockout organisms.

ix) Ti plasmids are used to create transgenic
   a) plants b) animals
   c) fungi d) all of these.

x) *c*DNA is made from
   a) *m*RNA b) *r*RNA
   c) DNA d) Plasmids.

xi) The first drug produced using recombinant DNA technology was
   a) streptokinase b) tPA
   c) insulin d) penicillin.

xii) Genetic engineering manipulates gene products at the level of
   a) DNA b) RNA
   c) Amino Acid d) Protein.

GROUP – B
(Short Answer Type Questions)

Answer any *three* of the following 3 × 5 = 15

2. Write down a short note on YAC.
3. Distinguish between *c*DNA library and genomic library.
4. Why is Gateway cloning technology better than other cloning methods ?
5. Write short notes on any *two* of the following : 2 × 2½
   a) ALP
   b) PNK
   c) Klenow Fragment.

GROUP – C
(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

6. Describe different types of hybridization techniques. What is PCR ? Discuss about the method of amplifying a specific DNA fragment by PCR and its uses. 8 + 1 + 6

7. What is restriction endonuclease ? Differentiate between blant ends and sticky ends. Name one blant end generating RE and one sticky end generating RE. What is the characteristic of DNA segment recognized by restriction endonucleases ? What do you mean by restriction mapping ? RFLP provides markers for characterizing genes. Explain.

2 + 2 + 2 + 2 + 3 + 4

8. Describe the structure of *si*RNAs and mention its prospective therapeutic applications and challenges. Compare *si*RNAs with *mi*RNAs. 3 + 7 + 5

9. What is Ribozyme ? Describe with diagram the method of self-excision and splicing in Tetrahymena pre-ribosomal RNA.

10. What are the recent developments in Gene Therapy ? Discuss its problems. 7 + 8

==========