Registration no: | | | | | | | | | | |

Total Number of Pages: 02 **B.Tech.**
PBT5I101

5th Semester Regular Examination 2017-18
Genetic Engineering
BRANCH: BIOTECH
Time: 3 Hours
Max Marks: 100
Q.CODE: B188

Answer Question No.1 and 2 which are compulsory and any four from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions: *multiple type or dash fill up type*** **(2 x 10)**

a) The term 'endonuclease' refers to cutting the DNA sequence from:
a) only within the polynucleotide chain, not at the ends
b) the ends of the chain
c) anywhere in the chain
d) exactly in the middle of the chain

b) Cuts in DNA are sealed with_____ enzyme.

c) TA cloning is a method used for cloning of PCR products. Which of the statement is correct with respect to it?
a) It is based on the fact that a T residue is incorporated at the end of the PCR product
b) 'A' residue is incorporated into the end of the vector
c) It gives low yield
d) It is preferred over blunt end ligation

d) Polyacrylamide gel is usually used for analysis of _____.
Proteins b) DNA c) both A and B d) Vitamins

e) Microarray analysis can be used to:
a) Determine the intron-exon organization of a gene
b) Determine the concentration of a protein in a cell
c) Determine the stage-specific expression of a gene
d) Determine the presence of a DNA sequence in a cell

f) Guanine specific cleavage in Maxam-Gilbert method is done by using
formic acid b) hydrazine c) Dimethyl sulphate d) piperidine

g) A molecular marker which is amplified by PCR and is polymorphic by length is a(n):
RFLP b) VNTR C) AFLP d) SNP

h) RFLPs are inherited in a simple Mendelian fashion and display codominance.
True/ False

i) Germ-line gene therapy could potentially correct a genetic defect in a(n)...
Affected individual only
Affected individual and his or her offspring only
Affected individual and all of his or her descendants
Parent of an affected child

j) The process of _____ involves the introduction of a gene into a cell where it exchanges places with its counterpart in the host cell.
transgenic technology c) gene targeting
knockout technology d) recombinant DNA technology

Q2 **Answer the following questions: *Short answer type*** **(2 x 10)**

a) What do mean by Isoschizomers?

b) What is pUC19 ?

c) What is ESTs? and state its role.

d) What are the achievements of HGP ?

e) What are the advantages and disadvantages of DNA microarray?

f) What is purpose of gene *knockout* strategies?

g) Briefly explain DNA fingerprinting.

h) What is VNTRs? How it affects the DNA polymorphism?

i) What are the objectives of gene therapy?

j) What are cosmid vectors?

Q3 **a)** Illustrate with diagram the processes of *in-vitro* gene cloning. **(10)**

b) You have inserted a single DNA fragment into a cloning vector. Describe two methods you could use to determine which host bacterial cells will eventually contain the clonal insert. **(5)**

Q4 **a)** What is RAPD? Describe the process of RAPD analysis and its application. **(10)**

b) Explain different features of *YAC* vector. **(5)**

Q5 **a)** Illustrate with diagram the isolation of m-RNA and construction of c-DNA library. **(10)**

b) In the PCR reaction, you need a three-step reaction cycle, which results in a chain reaction that produces an exponentially growing population of identical DNA molecules. Each step of a reaction cycle is performed at a specific temperature i.e. 95 ^{0}C for Step 1, 55 ^{0}C for step 2 and 70 ^{0}C for Step 3. Briefly explain why the three steps are performed under different temperatures. **(5)**

Q6 **a)** Describe in detail the chain-termination method of sequencing. **(10)**

b) Explain RNA silencing by miRNA. **(5)**

Q7 **a)** What is 16s rRNA typing? Describe methods involved in 16s rRNA typing for genome analysis. **(10)**

b) Define gene tagging with suitable example. **(5)**

Q8 **a)** How you can achieve the single and double stand mutagenesis at specific site using PCR technology? Explain with diagram. **(10)**

b) Explain the technique to study protein-protein interaction. **(5)**

Q9 **Write short note on (any THREE) :** **(5 x 3)**

a) Footprinting assays

b) *In-vitro* translation

c) DNA Vaccine

d) Gene Therapy