B.Sc. BIOTECHNOLOGY
Fifth Semester
GENETIC ENGINEERING
(BBT - 21)

Duration: 3Hrs. **Full Marks: 70**

Part-A (Objective) =20
Part-B (Descriptive) =50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins. **Marks: 50**

Answer any *five* of the following questions:

1. Writes short notes on- (2×5=10)
   (a) YAC.
   (b) Cosmids.
   (c) Reverse Transcriptase PCR.
   (d) Salient features of human genome.
   (d) Ti-plasmid.
2. What is bacteriophage? How does it act as a cloning vector? Describe the lytic cycle of virus replication. (2+3+5=10)
3. What is transfection? Mention the methods commonly used for transfection to produce transgenic animals. Describe a physical method of gene transfer to create a transgenic animal. (2+3+5=10)
4. Describe the process of PCR. Why is annealing temperature regarded as the most important factor for PCR? What are the applications of PCR? (6+2+2=10)
5. What do you mean by probe? What do you mean by hybridization technique? Describe the process of Southern hybridization. (2+3+5=10)

6. Describe the enzymatic method of DNA sequencing. How will you sequence the following sequence based on the above method. (5+5=10)

   5′- GAATTCCGTCCTATTCTCTACGCC -3′

7. What are the properties of molecular marker? Describe the process of AFLP. Give advantage and disadvantage of AFLP. (4+6=10)

8. What is cDNA? How will you construct a cDNA library? (2+8=10)

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REV-00
BBT/27/32

2015/12

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Duration: 20 minutes **Marks – 20**

(PART A- Objective Type)

I. Choose the correct answer: **1×10=10**

1. Match the following:

1. Northern Hybridization	p. Kary Mullis
2. DNA Finger printing	q. Gordon and Ruddle
3. Polymerase chain reaction	r. Alec Jeffreys
4. Transgenics	s. J. Alwine, Kemp and Stork

(a) 1-s, 2-r, 3-p, 4-q (b) 1-s, 2-r, 3-q, 4-p
(c) 1-q, 2-r, 3-p, 4-s (d) 1-s, 2-p, 3-q, 4-r

2. Some of the steps involved in Gene Cloning are given below:
i) Insertion of isolated gene to the vector.
ii) Introduction of recombinant vector to the host.
iii) Isolation of desired gene.
iv) Expression of recombinant gene in host.
v) Extraction of recombinant gene product.

The correct sequences of steps involved are:
(a) iii, i, iv, ii, v (b) iii, i, ii, iv, v
(c) i, ii, iii, iv, v (d) ii, i, iii, iv, v

3. Endonuclease are a group of enzyme which cleaves
(a) Externally (b) Internally
(c) Hydrogen bond (d) Both a and b

4. Real time PCR is also known as
(a) Quantitative PCR (b) Qualitative PCR
(c) Both a and b (d) None of the above

5. During gene therapy, the possible ways through which the genes can be introduced into the cell are
(a) micro injection (b) some viruses
(c) both a and b (d) erythrocytes

6. The plasmid used to transfer genes in plants is
   (a) Ti plasmid (b) pBR_{322}
   (c) EcoR1 (d) Ri plasmid

7. The use of alkaline phosphatase is to
   (a) remove terminal phosphate from 3' end.
   (b) remove terminal phosphate from 5' end.
   (c) remove terminal phosphate from both end.
   (d) all of these.

8. Hybridization means
   (a) pairing between the nucleotides of DNA sample with probe.
   (b) pairing between the nucleotides of DNA and mRNA.
   (c) pairing between the nucleosides with mRNA.
   (d) both a and b.

9. RAPD are .....markers.
   (a) Dominant (b) Co-dominant
   (c) Recessive (d) Incomplete dominance

10. In chain termination sequencing nucleotide used is
   (a) Deoxynucleotide (b) Ribonucleotide
   (c) Dideoxynucleotide (d) None of these

II. Write true or false: **1×10=10**

1. The cleavage site of BamHI is G^GATCC.
2. Is pUC 18 a cloning vector?
3. Polymerase chain reaction is a method for replicating genes.
4. If the sequence of bases in DNA is GAT TTA CGC, the corresponding codon in mRNA is CTA AAT GCG.
5. The "sticky ends" of a DNA fragment can combine with any other DNA fragment cut by the same restriction enzyme.
6. The F plasmid is also called fertility factor.
7. Lytic cycle replicates only by virulent phage.
8. Klenow fragment can synthesize complementary strand after nick is filled.
9. Polynucleotide kinase adds phosphate groups to 5' and 3' terminus of DNA.
10. Shuttle vector has origin of replication of *E. coli* and *S. cereviase.*

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