

M.Sc. Biotechnology
Third Semester
Genetic Engineering
MBT-5314

Duration: 3Hrs.

Full Marks: 70

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

1. Write short notes on (any five)

2 x 5 = 10

- a. Plasmid.
- b. Klenow enzymes.
- c. M-13 cloning vector.
- d. cDNA.
- e. Cosmid vector.
- f. Significant genes for lytic cycle.
- g. DNA cohesive end.

2. Answer the following (any five)

3 x 5 = 15

- a. Describe in detail the lamda insertion vector with suitable figure.
- b. Name the two organisms which cause crown gall diseases and hairy root induction. Define Binary vector.
- c. Draw P-CAMBIA plant binary vector with labeling.
- d. What is the importance of adaptors in genetic engineering?
- e. What are the three essential features of plasmid vector? Name one plasmid vector which is commonly used for gene cloning.
- f. What is genomic library? Explain the method by which it is prepared.
- g. Significance of DNA Ligase in genetic engineering.

3. Answer the following (any five)

5 x 5 = 25

- i. Write briefly about Isolation of mRNA from total RNA.
- ii. Describe the essential features of yeast cloning vectors with suitable labeled diagram.
- iii. What is PCR? What are the advantages of PCR over normal gene cloning?
(1+4=5)
- iv. Illustrate Alpha- complementation.
- v. What is DNA fingerprinting? Explain the steps involved in RAPD. (1+4=5)
- vi. Write about the method and importance of Southern blotting.
- vii. Write a note on Chain termination method of DNA sequencing.

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PART A: Objective

Duration: 20 minutes

Marks - 20

1. Size of the T-DNA of *A. tumefaciens* is
 - a. 20 kb
 - b. 50 kb
 - c. 10 kb
 - d. none of these
2. Maximum length of foreign DNA that can be inserted in plasmid vector is
 - a. 10–12 kb
 - b. 10–12 mb
 - c. 10–12 gb
 - d. depends upon the host organisms
3. After transformation with foreign DNA the blue and white colonies represents
 - a. blue represents transformed and white represents untransformed colonies
 - b. blue represents untransformed and white represents transformed colonies
 - c. both a and b are correct
 - d. none of these
4. Vector P-CAMBIA is a
 - a. Plant expression vector
 - b. cloning vector
 - c. yeast artificial vector
 - d. lamda vector
5. Single stranded vector regularly used in genetic engineering is
 - a. PUC-19
 - b. M-13
 - c. PBR-322
 - d. None of these
6. Phagemid is a
 - a. hybrid of plasmid and M-13
 - b. hybrid of lamda and plasmid
 - c. helper plasmid
 - d. doner plasmid
7. Most popular lamda replacement vector for genomic library construction is
 - a. EMBL-3
 - b. PMBL-3A
 - c. EMBL- 4A
 - d. PMBL- 4A
8. Co-integrate vectors contains
 - a. Vir genes and T-DNA as separate entities
 - b. Vir genes and T-DNA together
 - c. only Vir genes
 - d. only T-DNA
9. An important segment of lamda genome which helps for packaging inside the host cell is
 - a. Nos-site
 - b. Cos-site
 - c. Ter-site
 - d. Stuffer segment

10. Cosmid is a hybrid of
a. Plasmid and entire lamda genome
b. Plasmid and Cos site
c. Yeast cloning vector and lamda genome
d. None of these
11. PCR is used in
a. RFLP
b. RAPD
c. AFLP
d. both RAPD and AFLP
12. Phosphate group is added by
a. Polynucleotide kinase
b. DNA ligase
c. Phosphatased.
d. DNA polymerase
13. In Sanger's method, the nucleotide used
a. simple nucleotides
b. dideoxy nucleotides
c. triple nucleotides
d. all of the above
14. Nick in a DNA double strand is
a. one strand cut
b. both strand cut
c. entire strand is degraded
d. denaturation of DNA
15. Chargaff rule is
a. $A+G=C+T$
b. $A+C=G+T$
c. both are correct
d. both are incorrect
16. Both strands of DNA are connected by
a. hydrogen bond
b. glycosidic bond
c. phosphodiester bond
d. peptide bond
17. Temperature requirement for denaturation of DNA will be more when
a. GC content is high
b. AT content is high
c. GA content is high
d. TC content is high
18. The enzyme not used in PCR is
a. Taq polymerase
b. DNA ligase
c. both are required
d. none is required
19. Reverse transcriptase is used in
a. nested PCR
b. RT PCR
c. real time PCR
d. nested PCR
20. Palindrome of EcoRI is
a. GAATTC
b. AGGCCT
c. TAACAAT
d. GCCG
