

3 Hours

Total Marks: 100

1. Attempt **all** questions.
2. **All questions** carry **equal** marks.
3. Draw **neat labeled diagrams** wherever necessary.
4. Use of **log tables** and **non-programmable calculator** is **allowed**.

Q.1 a. Do as directed: (Any Six)**06**

1. What is disarmed Ti plasmid?
2. Give significance of protoplast.
3. What is 'Marker gene'?
4. State the voltage- time conditions used for electroporation.
5. What is 'Agroinfection'?
6. State an advantage of Ti plasmid based vectors for plant transgenesis over physical methods available.
7. State an advantage of using viral vector for plant transgenesis.
8. Define Opines.
9. State the role of Gemini virus.

Q.1 b. Answer the following questions: (Any Two)**14**

1. Explain the use of 'cointegrate vector system' using a neat labeled diagram.
2. Describe the mechanism of transfer of T-DNA in plants.
3. What is the need for seed quality protein improvement? How can it be achieved using transgenic technology? Explain giving example.

Q.2 a. Do as instructed: (Any Six)**06**

1. Define Karyogamy.
2. State the use of Xenomouse.
3. Name any one vector used for animal cell.
4. State the role of cre gene.
5. What do you mean by Pharming?
6. Give the significance of Biosensor:
7. *gfp* gene codes for _____.
8. Name the compound used for positive and negative selection of transgenic mice.
9. Explain the term Quiescent state.

Q.2 b. Give an account of: (Any Two)

14

1. Embryonic stem cell method of producing transgenic mice.
2. Microinjection method for producing transgenic mice.
3. Positive and negative selection method for transgenic mice.

Q.3 a. Answer the following objective questions as directed: (Any Six)

06

1. One application of S1 nuclease.
2. Cloning capacity of plasmid vector.
3. The acronym HART stands for _____.
4. The library which provides information on the types of mRNA in a particular cell at a particular time (select the correct answer):
1] Genomic library 2] cDNA library
5. Define Chromosome Walking.
6. Name one Restriction Endonuclease.
7. State the significance of MCS.
8. True or False: Genomic library helps to study the regulatory genes.
9. Define alpha complementation.

Q.3 b. Attempt the following questions: (Any Two)

14

1. Explain Northern Blotting.
2. Describe a method to screen genomic library.
3. How would you use a cosmid as a cloning vector?

Q.4 a. Answer the following objective questions as instructed: (Any Six)

06

1. State true or false: ZFNs are artificial restriction enzymes generated by fusing DNA-binding and DNA cleaving domains.
2. What is the use of piperidine?
3. Give full form of CRISPR.
4. Luciferase is used in _____ method to identify the order of nucleotides.
5. What is SNP?
6. State true or false: CRISPR/Cas 9 system induces single stranded break in DNA.
7. Which method of DNA sequencing uses fluorescence labeling?

8. Name the protein domain that recognizes a single bp in DNA sequence.
9. State true or false: Maxam Gilbert's method uses dideoxynucleotides.

Q.4 b. Discuss the following: (Any Two)

14

1. Components and applications of RNAi technology.
2. Sanger's method of DNA sequencing.
3. Use of ZFNs and TALENs in genome editing.

Q.5 Write Short notes on the following: (Any Four)

20

- a. Biolistic method.
- b. Reporter genes.
- c. Cloning sheep by nuclear transfer method.
- d. Cre-*loxP* recombination system for activating a gene.
- e. Chromosome jumping.
- f. Maxam Gilbert's method of sequencing.