

B.Sc. DEGREE EXAMINATION, APRIL 2008
BRANCH V(A) – PLANT BIOLOGY AND PLANT BIOTECHNOLOGY
SIXTH SEMESTER

COURSE : MAJOR – CORE
PAPER : MOLECULAR GENETICS & GENETIC ENGINEERING
TIME : 3 HOURS MAX. MARKS: 100

SECTION –A

ANSWER ALL THE QUESTIONS

I. FILL IN THE BLANKS: (4 marks)

1. The three structural genes in lac operon are lac Z, _____ and _____.
2. MCS stands for _____.
3. The mobile genetic elements called copia are encountered in _____.
4. _____ method is used to detect the hybridization of DNA to radio-labeled probes.

II. MATCH THE FOLLOWING: (5 marks)

- | | | |
|-------------------------|---|--------------------|
| 5. Terminal transferase | - | Antibodies |
| 6. Recon | - | Inducer |
| 7. Western | - | Crown gall |
| 8. Ti plasmid | - | First strand cDNA. |
| 9. IPTG | - | Recombination |

III. STATE WHETHER TRUE OR FALSE: (5 marks)

10. The lac operon and trp operon encode three and five structural genes respectively.
11. Caesium chloride density gradient centrifugation is used for plasmid purification on a large scale.
12. Transposable genetic elements were first discovered in Arabidopsis thaliana.
13. Reverse transcriptase enzyme is used in the construction of cDNA libraries.
14. Sodium chloride is used to prepare the competent cells for transformation.

IV. CHOOSE THE CORRECT ANSWER: (4 marks)

15. The plasmids with very low copy numbers are referred to as
 - a) relaxed plasmids
 - b) stringent plasmids
 - c) F plasmids
 - d) YEP.
16. The most commonly used restriction endonuclease in gene cloning is
 - a) Type I
 - b) Type II
 - c) Type III
 - d) Type IV
17. The size of Ti plasmid in Agrobacterium is
 - a) 235 kb
 - b) 335 kb
 - c) 435 kb
 - d) 535kb.
18. _____ is an example of λ - replacement vector.
 - a) M13
 - b) Ti
 - c) pUC18
 - d) EMBL3

V. ANSWER ANY SIX OF THE FOLLOWING, EACH ANSWER NOT EXCEEDING 50 WORDS: (6 x 3 =18)

19. Muton.
20. X – gal.
21. Gene battery model.
22. Blue – white screening.
23. Chromosome walking.
24. MOPS buffer.
25. Biolistic gun.
26. 2μ (2 micron) plasmids.
27. Nopaline.

SECTION –B

VI. ANSWER ANY FOUR OF THE FOLLOWING, EACH ANSWER NOT EXCEEDING 200 WORDS: (4 x 6 =24)

28. Enumerate the steps involved in Southern blotting, with a diagram.
29. What do you know about the maize elements discovered by Barbara Mc Clintock?
30. List down the applications of genetic engineering in various fields. Add a note on biosafety in gene cloning.
31. Differentiate between micro and macro injection methods of gene delivery.
32. Briefly describe the construction of Yeast Artificial chromosomes.
33. Explain the transcriptional regulation in the prokaryotes by trp operon model.

SECTION –C

VII. ANSWER ANY TWO OF THE FOLLOWING, EACH ANSWER NOT EXCEEDING 1000 WORDS: (2 x 20 =40)

34. Define vectors. What are their desirable features? Explain the types of plasmids and their use as cloning vehicles.
35. Sequentially explain the molecular events occurring when a plant (dicot) is infected by Agrobacterium tumifaciens.
36. Write an essay on the Jacob and Monod's lac operon model, with appropriate sketches.
37. What is the role of restriction enzymes in bacteria? Mention about their types, nomenclature, recognition sites, and explain their use in gene cloning.
