

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086  
(For candidates admitted from the academic year 2004-05)

SUBJECT CODE: BT/MC/GE64

B.Sc. DEGREE EXAMINATION, APRIL 2007  
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 smallest genetic unit that carries information for the synthesis of a single enzyme or protein is called \_\_\_\_\_.
2. Tryptophan operon is controlled by either repressor or \_\_\_\_\_
3. \_\_\_\_\_ are circular DNA molecules that are capable of autonomous replication.
4. The simplest mobile genetic element found in prokaryotes is \_\_\_\_\_ element.

II. MATCH THE FOLLOWING: (5 marks)

- |                     |   |                       |
|---------------------|---|-----------------------|
| 5. cDNA             | - | Eli Lilly             |
| 6. Micro projectile | - | Mutation              |
| 7. Humulin          | - | Jacob & Monad         |
| 8. Recon            | - | Reverse Transcriptase |
| 9. Lac operon       | - | Particle Gun          |
|                     | - | Recombination         |

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

10. Pili are not involved in transfer of plasmids.
11. Composite transposons are a part of prokaryotic transposons.
12. Western blotting is used to find out the newly encoded protein by a transformed cell.
13. Root induction in *Agrobacterium rhizogenes* is due to Ti plasmid.
14. Superbug is produced by introducing plasmids from different strains into a single cell of *Pseudomonas putida*.

IV. CHOOSE THE CORRECT ANSWER: (4 marks)

15. The smallest unit of a gene involved in mutation is called:  
a. mutagen    b. mutant    c. muton    d. mitogen
16. Pick the odd one out:  
a. ribulose kinase    b. arabinose isomerase  
c. anthranilate synthetase    d. ribulose 5 – phosphate epimerase

17. Which of the following is associated with Barbara McClintock's experiment?  
a. kernel colour in corn                      b. seedcoat texture in pea  
c. embryo colour of maize                    d. eye colour in Drosophila
18. Colony hybridization technique is based on the availability of radioactively labeled \_\_\_\_\_ probe:  
a. tRNA                      b. DNA                      c. rRNA                      d. cDNA

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

19. Electroporation  
20. IFN – B  
21. F Plasmid  
22. Ac transposon  
23. Gene library  
24. Octopine  
25. Somatostatin  
26. Copy number  
27. Marker genes

**SECTION –B**

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

28. Give an account of eukaryotic regulation of gene expression.  
29. Write about purification of plasmids.  
30. Discuss the phenotypic and genotypic effect of transposons.  
31. Explain the characteristics of expression vectors.  
32. Discuss gene transfer in monocots.  
33. Expand the following, with a foot note each:  
a. R plasmid   b. IS element   c. YAC   d. PEG   e. FMDV   f. MAB

**SECTION –C**

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

34. Give a detailed account of the mechanism of tryptophan operon.  
35. What are transposons? Discuss the types present in prokaryotes and eukaryotes. Write about the mechanism of transposition.  
36. What are cloning vectors? Discuss the role of plasmids and phages as cloning vectors.  
37. Write about any five areas of application of genetic engineering.

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