

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted from the academic year 2008-09 & thereafter)
SUBJECT CODE: BT/MC/GG64
B.Sc. DEGREE EXAMINATION, APRIL 2012
BRANCH V(A) – PLANT BIOLOGY AND PLANT BIOTECHNOLOGY
SIXTH SEMESTER

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

SECTION –A

ANSWER ALL THE QUESTIONS

I. CHOOSE THE CORRECT ANSWER: (5 marks)

1. The partial expression of both alleles in a heterozygote so that the phenotype is intermediate between those of the two homozygotes is termed.
a. Dominance b. incomplete dominance
c. Pleiotrophism d. independent assortment
2. Any chromosome other than a sex chromosome is an
a. Allosome b. autosome c. heterosome d. acrosome
3. The term 'cDNA library' means
a. Collection of cDNA clones by an individual researcher
b. Compilation of cDNA sequences in the database
c. Pool of cDNA generated from a specific tissue inserted into an appropriate vector that can be used as a source of the cDNA of interest
d. A manual for cDNA research
4. Restriction endonucleases are
a. used for *in vitro* DNA synthesis
b. synthesized by bacteria as part of their defense mechanism
c. present in mammalian cells for degradation of DNA when the cell dies.
d. used in genetic engineering for ligating two DNA molecules
5. *Agrobacterium tumefaciens* is an effective vector for use with
a. Corn b. Rice c. Wheat d. Soya bean

II. FILL IN THE BLANKS: (5 marks)

6. If plants heterozygous for tallness is selfed, the F₂ generation has both tall and dwarf plants. This proves the principle of _____.
7. Normal _____ are sex chromatin negative.
8. The inserted DNA with restriction site for several enzymes is called _____.
9. _____ is the heritable change brought about by the uptake and establishment of introduced DNA.
10. Transgenic tomato with delayed ripening is termed as _____.

III. STATE WHETHER TRUE OR FALSE: (4 marks)

11. In the F₂ generation, phenotypic and genotypic ratios are identical in cases of monohybrid cross.
12. The strength of linkage is determined by distance between two genes in question.
13. Treatment of DNA with Type II restriction enzymes results in formation of fragments having sticky ends.
14. Genetic transformation that is effected by *Agrobacterium* is dependent on the use of disarmed Ti-plasmid.

IV. MATCH THE FOLLOWING: (4 marks)

- | | |
|----------------------------|--------------------------|
| 15. Alleleic genes | a. PEG |
| 16. Sex linked inheritance | b. Northern blotting |
| 17. RNA bands | c. homologous chromosome |
| 18. Direct uptake of DNA | d. Hemophilia |

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

19. Test cross
20. Co-dominance
21. Crossing over
22. Dosage compensation
23. Linkers
24. Genomic library
25. BAC
26. Transgene
27. Bt cotton

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

28. Explain the law of independent assortment with suitable examples.
29. What is multiple gene inheritance? Briefly explain with suitable examples.
30. Give an account of Yeast Artificial Chromosome.
31. Write notes on cDNA libraries.
32. *Agrobacterium* is a natural genetic engineer- Discuss.
33. Write briefly on the ethical issues relating to genetically modified (GM) plants.

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

34. Describe any four types of gene interactions with suitable example.
35. Give an account of linkage & crossing over in Eukaryotes & Bacteria.
36. Write a descriptive account on southern and western blotting techniques.
37. Write a brief account on any four physical gene delivery methods.
