

AGRICULTURAL AND FOOD ENGINEERING DEPARTMENT
INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

Date of Examination: / 9/2011

Time: 2hr

Autumn Semester

Full Marks: 30

M. Tech. in Applied Botany

Subject No. and Name: AG 60033

Principles of Plant Breeding

No. of Students: 15

Instructions: Answer all the questions and be precise in your answer

1. a) What is somaclonal variation?
b) How would you explain the occurrence of variation in the transgenic plants that is not related to the gene of interest? Which method can avoid somaclonal variation in the transgenic plants?
c) Explain the mechanisms of somaclonal variation highlighting the role of
 i) DNA methylation induced changes in chromatin structure
 ii) DNA methylation mediated RIP (repeat induced mutation)
- (1+3+6=10)
2. a) Illustrate the method of haploid production other than anther/microscope culture successfully used in barley. Explain the mechanism(s) involved in such haploid production.
b) Discuss the potential applications (at least three) of haploids in breeding.
c) Depict the different action points of anti-mitotic agents (with names) used for chromosome doubling on the plant's cell cycle and distinguish the mode of action between Group 1 and Group 2 agents.
- (2+3+5 = 10)
3. a) Distinguish different types of cybrid with their distribution of nucleus and cytoplasmic organelle and highlight the potential of cybrids in crop improvement.
b) Diagrammatically illustrate the operational features of Fluorescence Activated Cell Sorter (FACS) and in what way it helps in selecting the heterokaryon?
c) List the methods used for characterization of somatic hybrids and select one method which you feel is the best with justification.

(3+5+2 = 10)
