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Total No. of Pages : 03

Total No. of Questions : 18

B.Sc. (Agriculture) (Sem.-5)

PLANT TISSUES CULTURE AND GENETIC TRANSFORMATION

Subject Code : BSAG-502

M.Code : 74166

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

Answer briefly :

- 1) a) Adventive embryony.
b) Define Micropropagation and ant two uses.
- 2) a) Batch Culture.
b) Cleistogamy.
- 3) a) Clone.
b) Totipotency.
- 4) a) Protoplast culture.
b) Tripping in clover/Lucerne.
- 5) a) Transgressive breeding.
b) Androgenesis.
- 6) a) Haploid production.
b) Neutrons as Physical mutagen.

- 7) a) Linkage drag.
b) Somaclone.
- 8) a) Protoplast fusion.
b) Intergeneruc hybridization.
- 9) a) Test cross *vs.* Back cross.
b) Cybrid.
- 10) a) Selectable markers.
b) GCA *vs.* SCA.

SECTION-B

- 11) a) Define mutations. Differentiate between natural and induced mutations. What are the characteristics of mutations and their role in plant breeding?
b) Differentiate between Somatic embryogenesis and zygotic embryogenesis.
- 12) a) Differentiate between Anther culture and Pollen culture.
b) Describe Johanssen's pure line theory and its genetic basis.
- 13) a) What are the different methods of handling segregating generations in wheat. Differentiate between single seed decent method and bulk method.
b) Differentiate between Electrophoresis *vs.* Microinjection
- 14) a) What is the role of biotransformation in production of secondary metabolites?
b) What is domestication and what changes occurred due to domestication. List various centres of origin proposed by N.I. Vavilov.
- 15) a) What is apomixis? Apomixis can be beneficial as well as nuisance to a plant breeder, justify with suitable example.
b) What is genetic engineering? Explain direct gene transfer method of gene transformation in plants.

SECTION-C

- 16) a) What is somaclonal variation? Explain the factors governing the origin of somaclonal variation. What are the various mechanisms underlying somaclonal variation?
- b) What is recurrent selection? Discuss the methodology employed for Reciprocal Recurrent Selection (RRS) and also mention their merits and demerits. Give comparative description of RRS and Simple RS methods.
- 17) a) Describe back cross method with its merits and demerits? How as a plant breeder, you can employ this method in transferring a recessive gene of BLB resistance into a well-established Rice variety PR 114 (now became susceptible) from a resistant wild species "A". Also list various achievements of this method across different five crops.
- b) What do you mean by cryo-preservation of germplasm. What are the various factors affecting it? Differentiate between long term and short term methods of storage.
- 18) a) What are haploids? How these can be produced through distant hybridization? Discuss in detail by citing the commercially successful examples from different crops?
- b) What is heterosis and its various types? Explain the dominance and over dominance hypotheses of heterosis giving their main features, objections. Which of the above two hypotheses is more widely accepted and why?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.