A–1209

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MSCBOT-507

M.Sc. Botany (MSCBOT)

Cytogenetic and Plant Breeding

Examination February, 2026

Time : 2:00 Hrs. Max. Marks : 70

Note* :–** This paper is of Seventy (70) marks divided into Two (02) Sections 'A' and 'B'. Attempt the questions contained in these Sections according to the detailed instructions given therein. ***Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

Section–A

Long Answer Type Questions (2×19=38)

***Note* :–** Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any *two* (02) questions only.

1. Write the genetic and physiological basis of heterosis. Discuss various factors affecting the magnitude of heterosis in crop plants.

2. Write a detailed note on resistance breeding for temperature. Describe the applications of in resistance breeding in Crop Improvement.

3. Differentiate any *three* of the following :

   (a) Natural selection and Artificial selection

   (b) Phenotypic and genotypic variability

   (c) Self-incompatibility and male sterility

   (d) Somatic crossing over and Germinal crossing over

   (e) Transversion and transition

4. Write explanatory notes on any *two* of the following :

   (a) Describe problems in breeding for freezing tolerance in plants.

   (b) Discuss types and significance of linkage.

   (c) What are the different hybridization methods for self and cross-pollinated crops ?

5. Describe the molecular mechanism of Crossing over. Discuss the kinds and significance of crossing over, in detail.

Section–B

Short Answer Type Questions (4×8=32)

***Note* :–** Section 'B' contains Eight (08) Short-answer type questions of Eight (08) marks each. Learners are required to answer any *four* (04) questions only.

1. Write about different steps applied in hybridization technique ?

2. Give brief notes any *two* of the following :

   (a) Bateson and Punnett's Hypothesis

   (b) Sex-influenced trains

   (c) Cytoplasmic male sterility.

3. Give a brief account of Mendelian and non-Mendelian inheritance.

4. Describe the applications of apomixis in plant breeding.

5. Discuss the selection methods are used for the improvement in vegetatively propagated crop.

6. Explain the role of genetic variance in plant breeding.

7. Write short notes on any *two* of the following :

   (a) Pedigree method

   (b) Synaptical complex

   (c) Incomplete Linkage

8. Discuss the role of chloroplasts and mitochondria in the cytoplasmic inheritance.

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