2025

M.Sc. in Agriculture
1st Semester Examination

GENETICS AND PLANT BREEDING

Paper : GPB-503

(Fundamentals of Quantitative Genetics)

Full Marks : 70 Time : Two Hours

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

Group - A

Answer any ***five*** questions : 2×5=10

1. Differentiate between quantitative and qualitative characters.
2. What is transgressive segregation?
3. Define heterozygous and homozygous population with one example of each.
4. What is heterozygotic potential variability?
5. What is a glyph in metroglyph analysis?
6. Differentiate between PCA and D^2 analysis.

P.T.O.

7. Explain the residual effect in path coefficient analysis.

8. Define degrees of freedom with example.

Group - B

Answer any ***four*** questions : 5×4=20

9. Who proposed the concept of D^2 statistics? Explain the merits and demerits of D^2 analysis. 1+4

10. What is selection index? Illustrate different categories of selection index. 1+4

11. Who developed the procedure of diallel cross analysis? Explain the inferences of Vr-vs-Wr graph. 1+4

12. List the mating designs of biparental crosses. Explain the main features of NCD-I. 1+4

13. What is joint scaling test? Explain the six-parameter model of generation mean analysis. 2+3

14. What is breeding value? Explain the main features of breeding value. 2+3

Group - C

Answer any ***two*** questions : 10×2=20

15. Write down the different methods of stability analysis. Briefly explain the Eberhart and Russell model (1966) for stability analysis. 3+7

16. Enlist the classes of genetic variances as suggested by Fisher (1918), Wright (1935) and Mather (1949). Briefly explain the additive, dominance and epistatic variance. 4+6

17. What is gene action? Explain the main features of gene action and discuss the factors affecting gene action. 2+4+4

18. What is combining ability? Explain different methods of testing combining ability. Discuss the utility of combining ability studies in plant breeding. 1+5+4

Internal Assessment : 20 marks
