

M.Sc. (Ag.) Examination, 2017

Semester-II

Genetics and Plant Breeding

Course: GPB-504

(Principles of Quantitative Genetics)

Time : 3 Hours

Full Marks : 50

Questions are of value as indicated in the margin.

Answer **any five** questions among the following.

A. Tick mark the appropriate answer (any ten)

(1×10=10)

1. The value of correlation coefficient ranges from
A) 0 to +1 B) -1 to +1 C) -1 to 0 D) None
2. The number of all possible three-way crosses among n lines is given by the formula
A) $\frac{n(n-1)(n-2)}{2}$ B) $\frac{n(n-1)(n-2)}{3}$ C) $\frac{n(n-1)(n-2)}{4}$
D) $\frac{n(n-1)(n-2)(n-3)}{3}$
3. The metroglyph analysis is based on estimates of
A) correlation B) mean C) coefficient of variation D) variance
4. Line $\times$ tester analysis is a good approach for screening germplasm on the basis of
A) GCA and SCA variances B) GCA and SCA effects C) GCA and SCA variances and effects D) per se performance of hybrids
5. Triple test cross is an extension of
A) top cross scheme B) NCD II C) line $\times$ tester scheme D) North Carolina design III
6. Path analysis is based on the estimate of
A) variance B) regression coefficients C) coefficients of variation
D) correlation coefficients
7. The concept of biparental mating was originally developed by
A) Mather Jinks B) Hayman and Jinks C) Comstock and Robinson
D) Kearsey and Jinks
8. Markers can be
A) Molecular B) Bio-chemical C) Morphological D) All of the above
9. Male and female group are generated in
A) NCD I B) NCD II C) NCD III D) line $\times$ tester scheme
10. The five parameter model of generation mean analysis is used, when this population is absent
A) F_1 and F_2 B) BC_1 and BC_2 C) F_2 D) F_3

11. Genetic variability can be measured by
A) range and variance B) standard deviation, and standard error C) coefficient of variation and D^2 statistic D) all of the above
12. The first systematic approach to the analysis of phenotypic stability was made in 1963 by
A) Eberhart and Russel B) Perkins and Jinks C) Finley and Wilkinson
D) Allard and Bradshaw
13. On Vr-Wr graph, when the regression line passes through the origin, it indicates
A) Over dominance B) Partial dominance C) Complete dominance
D) Non-dominance
14. The concept of D^2 statistic was given by
A) P.C. Mahalanobis B) Anderson C) R.A. Fisher D) Wright

B. Answer **any four** questions: (4×10=40)

1. Define path diagram. Discuss briefly the merits and limitations of path co-efficient analysis. How would you interpret the results of path co-efficient analysis? 2+4+4
 2. List various biometrical techniques used for evaluation of several single crosses. Describe briefly one of them. Write down the inferences which can be drawn from the Vr-Wr graph. 2+4+4
 3. Discuss the role of scaling test in generation mean analysis. What are the various models used for the estimation of gene effects in generation mean analysis? How would you interpret the results of correlation co-efficient analysis? 5+1+4
 4. Define stability. List various stability analysis models and describe any one of them in detail. 2+2+6
 5. Write down the differences (**any four**) 2.5×4=10
 - i) Qualitative traits and quantitative traits
 - ii) Variability and diversity
 - iii) Specific Combining Ability (SCA) and General Combining Ability (GCA)
 - iv) Half diallel and full diallel
 - v) Correlation and path analysis
 - vi) Additive genetic variance and Dominance genetic variance
 - vii) Adaptability and stability
 6. Write down short note on the followings (**any four**) 2.5×4=10
 - i) Genetic advance
 - ii) Heritability
 - iii) Principal component analysis
 - iv) Metroglyph
 - v) Marker Assisted Selection (MAS)
 - vi) Triple Test Cross
 - vii) Multiple factor hypothesis
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