2022

BOTANY — HONOURS

Paper : DSE-A-1

(Biostatistics)

Full Marks : 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer ***any five*** questions : 2×5

(a) Distinguish between sample and population.

(b) Define quantitative and qualitative data.

(c) What is meant by Standard Error of mean?

(d) What is range?

(e) Distinguish between null hypothesis and alternative hypothesis.

(f) What do you mean by 'degree of freedom'?

(g) State the Hardy-Weinberg Principle.

(h) Define cumulative frequency.

2. Answer ***any two*** questions :

(a) State the Rules of Probability with explanation. 5

(b) What are the different measures of dispersion of a data set? 5

(c) Define the terms :

(i) mutually exclusive event,

(ii) dependant and independant events. 2½×2

(d) Selfing a hybrid we get a population with 47 smooth and 15 wrinkled seeds. Find out the Segregation ratio. Determine the Chi-square value. Test the goodness of fit by Chi-square analysis (Table value 3.84 at 0.05 probability level for 1 df). 2½+2½

3. Answer ***any three*** questions :

(a) Define variable. Differentiate between discrete and continuous variable. Write the significance of random sampling in statistical analysis. What is Normal distribution? What are the limitations of statistical methods? 1+2+3+2+2

(b) Distinguish between Variance and Coefficient of variance. The panicle length (cm) of ten randomly selected plants of two different wheat varieties were recorded as follows :

Plant number	1	2	3	4	5	6	7	8	9	10
Panicle length (cm) Variety (A)	25	23	26	25	22	26	23	21	26	25
Panicle length (cm) Variety (B)	24	22	29	24	23	18	19	23	24	19

Find out the coefficient of variance in both the varieties and comment on observation. 2+6+2

(c) What do you mean by Test of Significance? Define the term 'Goodness of fit'.

By crossing white colour and red colour flowering plants the F_1 plants had pink flower. In F_2 the frequency for Red, Pink and White flowering were 292, 582 and 310 respectively.

Analyse the data statistically and comment on the genetic control of flower colour. [probability 0.05, degree of freedom 2, the χ^2 value 5.99]. 2+2+6

(d) Define central tendency. What is frequency distribution? In a biological experiment, the following data was obtained regarding the length of plants in cm and was represented in following frequency distribution continuous series. Calculate the mean, standard deviation and standard error from the following distribution. 2+2+6

Class interval	0–10	11–20	21–30	31–40	41–50	51–60	61–70	71–80	81–90	91–100
Frequency	6	4	6	9	12	15	10	8	4	1

(e) Discuss how the basic conditions of Hardy-Weinberg Law can alter equilibrium condition in a population. The human MN blood type is determined by two codominant alleles, L^M and L^N. The frequency of L^M in Eskimos on a small Arctic island is 0.80. If random mating takes place in this population, what are the expected frequencies of the M, MN and N blood types on the island? 5+5
