Total No. of printed pages = 9

63/2 (SEM-3) BOT 304

2021

(held in 2022)

BOTANY

(Theory Paper)

Paper Code : BOT-304 (Part I)

(Biostatistics)

Full Marks – 40

Time – 1½ hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct answer : 1×5=5

I. If Mean > Median > Mode, then the distribution is called as :

A. Negatively Skewed

B. Positively Skewed

C. Symmetrical

D. None of the above

[Turn over

II. For normal curve, the coefficient of kurtosis is :

A. 0 B. 1

C. 2 D. 3

III. Correlation coefficient tends to lie between:

A. 0 to +1 B. – 1 to 0

C. – 1 to +1 D. – 2 to +2

IV. What will be the standard error (SE), when n = 100 and σ= 0.5 ?

A. 0.05 B. 0.01

C. 0.5 D. 0.02

V. The statistical analysis of two unrelated large samples (n = 200) is tested by :

A. Paired 't'-test

B. Chi-square test

C. Z-test

D. Unpaired 't'-test.

2. Answer any *five* of the following questions : 5×5=25

(a) Write short note on presentation of statistical data.

(b) Calculate the average marks by the step deviation method :

Marks :	0–10	10–20	20–30	30–40	40–50	50–60
Number of : Students	40	25	50	35	30	20

(c) Calculate standard deviation SD (σ) and standard error (SE) of the following data :

Height : in inches	95-105	105-115	115-125	125-135	135-145
No. of : Children	19	23	36	70	52

(d) Write short notes on skewness and kurtosis.

(e) Explain Z-test.

(f) Write different methods of studying correlation.

(g) Define chi square test and mention some applications.

(h) Differentiate between co-rrelation and regression.

(i) Write short notes on statistical software packages.

3. Answer any *one* of the following questions : 10×1=10

(a) The following data give the yields on 12 plots of land in three samples under three varieties of fertilizers.

A	B	C
25	20	24
22	17	26
24	16	30
21	19	20

Is there any significant difference in the average yields of land under the three varieties of fertilizers ?

Given that F as df (2, 9) at 5% level is 4.26.

(b) In a nutritional study, 13 children were given a usual diet plus vitamins A & D tables. While the second comparable group of 12 children was taking the usual diet. After 12 months, the gain in weight in pounds was noted as given in the table. Can you say that vitamins A & D were responsible for the difference ?

A =	5	3	4	3	2	6	3	2	3	6	7	5	3
B =	1	3	2	4	2	1	3	4	3	2	2	3	–

Given tabulated value for 't'-test at 0.05 for df 23 is 2.07

C. Write short notes on ANOVA analysis and t-test.

(Theory Paper)

Paper Code : BOT-304 (Part – II)

(Bioinformatics)

Full Marks – 40

Time – 1½ hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct answer of the following questions (any *five*) : 2×5=10

(A) Which of the following BLAST search can be used to search for protein homology ?

(i) T BLAST x (ii) BLAST n

(iii) BLAST x (iv) BLAST p

(B) Open Reading Frame is indicative of

(i) DNA replication

(ii) Coding potential

(iii) Non-coding stretch

(iv) Promoter site

(C) NCBI stands for

(i) National Center for Bioinformatics Information

(ii) National Center for Biotechnology Information

(iii) National Center for Biochemical Information

(iv) National Center for Broadband Information

(D) The two main features of any phylogenetic tree are

(i) The clades and the nodes

(ii) The topology and the branch lengths

(iii) The clades and the root

(iv) The alignment and the bootstrap

(E) Which of the following is true about PAM matrices ?

(i) Created by Chou-Fasman

(ii) Created using conserved DNA families

(iii) PAM-1 means 1 accepted point mutations per 100 residues

(iv) Lower numbered PAM matrices are appropriate for comparing distantly related sequences

(F) Which output from a BLAST search provides an estimate of the number of false positives from a BLAST search ?

(i) E value

(ii) Bit Score

(iii) Percent identity

(iv) Percent positives

2. Define any *five* of the following : 2×5=10

(A) Systems Biology

(B) Protein Domain

(C) Phermacogenomics

(D) Paralog

(E) RMSD Score

(F) SwissProt

(G) TrEMBL

(H) FASTA.

3. Differentiate between any *two* : 5×2=10

(A) Pairwise sequence alignment and Multiple sequence alignment

(B) PAM matrix and BLOSUM matrix

(C) PSI-BLAST and PHI-BLAST.

4. Answer any *one* of the following questions : 10×1= 10

(A) Describe the primary and secondary nucleotide sequence databases commonly encountered in Bioinformatics. 5+5=10

(B) Describe the Drug Discovery Pipeline with illustrations. 10