



# CBCS SCHEME

18BT31

## Third Semester B.E. Degree Examination, June/July 2024 Biostatistics

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Construct an Histogram and frequency polygon for the following table of values.

Protein intake (gms) (x)	15-25	25-35	35-45	45-55	55-65	65-75	75-85
Number of families (f)	30	40	100	110	80	30	10

(07 Marks)

- b. Find the mean and standard deviation from the following data :

Marks (x)	10-20	20-30	30-40	40-50	50-60	60-70
No. of students (f)	8	12	20	10	7	3

(07 Marks)

- c. Define : i) Coefficient of variation of x ii) Factorial design iii) Cluster design.

(06 Marks)

OR

- 2 a. Draw a cumulative less than and cumulative greater than curve for the following data :

(07 Marks)

No. of pots (x)	10	20	30	40	50	60
No. of plants (f)	3	9	15	30	18	5

- b. Find the mean deviation about the mean for the data given below :

(07 Marks)

Class interval	0-4	4-8	8-12	12-16	16-20
Frequency	4	6	8	5	2

- c. Define : i) Replication ii) Randomisation iii) Historical controlled study.

(06 Marks)

### Module-2

- 3 a. Discuss various measure of spreads. (06 Marks)  
b. Define skewness of a data. Explain a method used to reduce skewness of a data. (07 Marks)  
c. In a population of 10,000 of the people, it is known that the heights of a certain population of individuals are approximately normally distributed with a mean of 70 inches and standard deviation of 3 inches. What is the probability that a person picked at random from this group will be between 65 and 74 inches tall? [ $A(1.67) = 0.4525$  and  $A(1.33) = 0.4082$ ] (07 Marks)

OR

- 4 a. Define: i) Null hypothesis ii) Significance level  
iii) Confidence interval iv) Type I error and Type II error. (06 Marks)  
b. It is known that in a certain population 10 percent of the population is color blind. If a random sample of 25 people is drawn from this population, find the probability that,  
i) five or fewer will be color blind  
ii) ii) Six or more will be color blind  
iii) iii) between 2 and 4 inclusive will be color blind. (07 Marks)  
c. Explain briefly about cohort studies. (07 Marks)

**Module-3**

- 5 a. Define Mann – Whitney – Wilcoxon U – Test statistic with suitable equation. State equations for  $\mu$ ,  $\sigma^2$  and Z. (07 Marks)
- b. Find the correlation for the following table of values :

Heights of father (inches) (x)	65	66	67	68	69	70	71
Heights of sons (inches) (y)	67	68	66	69	72	72	69

(07 Marks)

- c. Find the regression equation of y on x and x on y given that ,

Time (x) (min)	0	5	10	15	20
Diastolic blood pressure (y)	72	67	70	65	66

(06 Marks)

**OR**

- 6 a. Find the Rank correlation using Sphearman's method given that

x	8	36	98	25	75	82	92	62	65	35
y	84	51	91	60	68	62	86	58	35	49

(08 Marks)

- b. Set up an analysis of variance table for the following per acre production data for three varieties of wheat each grown on 4 plots and state if the variety differences are significant.

Per Acre Production data			
Plot of Land	Variety of Wheat		
	A	B	C
1	6	5	5
2	7	5	4
3	3	3	3
4	8	7	4

(Table value  $F_{0.05} = 4.26$  at (2, 9) d.f.)

(12 Marks)

**Module-4**

- 7 a. Explain and illustrate the randomized block design. (06 Marks)
- b. Discuss biological study design with an example. (07 Marks)
- c. Explain the random effect regression (07 Marks)

**OR**

- 8 a. Under what circumstances stratified random sampling design is considered appropriate? How would you select such sample? Explain by means of an example. (06 Marks)
- b. Discuss multiple source of variation. (07 Marks)
- c. Explain briefly the different types of informal study design. (07 Marks)

**Module-5**

- 9 a. Write SAS representation of histogram for considering the minimum and maximum values of horse power and take a range of 50, so the values from a group is steps of 50. The mid points are from 70 to 550. Fit the distribution curve with mean and SD values mentioned as EST. (10 Marks)
- b. Write the SAS representation of simple bar chart for representing the length and cars as bars. (10 Marks)

**OR**

- 10 a. Write the SAS representation for the one sample t – test comparing the mean of the variable weight – loss in the clinic group for a pre – selected value of 4 and alpha value of 0.1. (10 Marks)
- b. Explain about the different statements available in PROC TEST. (10 Marks)

\* \* \* \* \*