CBCS SCHEME

18BT31

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
Biostatistics

Time: 3 hrs.

Max. Marks: 100

Note: 1. *Answer any FIVE full questions, choosing ONE full question from each module.*
2. *Use of Statistical Tables is permitted.*

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 form 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. Define i) Basics of study design (any two)   ii) Cohort studies
   iii) Measure of spread   iv) Interval estimation.   (10 Marks)

b. The probability of recovery for some severe infection is 0.4. Five children are with severe infection. Find the probability that i) Five will recover   ii) Four will recover
   iii) Four or more will recover   iv) At the most three will recover. (Use Binomial distribution).   (10 Marks)

OR

4 a. Explain in brief : i) Logarithmic transformation   ii) Hypothesis testing
   iii) Point estimation   iv) Principle of local control in study design.   (10 Marks)

b. Among diabetics, the fasting blood glucose level (x) may be assumed to be approximately normally distributed with mean 106 mg/100 mℓ and standard deviation 8mg/100mℓ. Find the probability that i) Less than or equal to 120mg/100 mℓ
   ii) Between 106mg/ 100mℓ and 110 mg/100 mℓ   iii) More than 121mg/100 mℓ.
   iv) What percentage of diabetics have levels between 90 and 120mg/100 mℓ.
   (Area under normal curve are :
   For i) 0.4599   ii) 0.1915   iii) 0.4686   iv) 0.4772 , 0.4599).   (10 Marks)

Module-3

5 a. Define Mann – Whitney – Wilcoxon U – Test statistic with suitable equation. State equations for μ, σ^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 in brief : i) Random block design (RBD) with suitable ANOVA table
ii) Stratified design   iii) Model fitting. **(08 Marks)**

b. Three varieties A, B, C of a crop are tested in a randomized block design with four replications. The plot yields in pounds are as follows :

A 6	C 5	A 8	B 9
C 8	A 4	B 6	C 9
B 7	B 6	C 10	A 6

Analyse the experimental yield.
(Table value : $F_{0.05}$ = 5.14 at (2, 6) df   , $F_{0.05}$ = 4.76 at (3, 6) df). **(12 Marks)**

OR

8 a. Explain in brief : i) Completely Randomized block design (RCBD)
ii) Biological study design   iii) Multiple sources of variation. **(08 Marks)**

b. Analyse the following observations with A, B, C, d as treatments.

Row Column	1	2	3	4
1	A(12)	D(20)	C(16)	B(10)
2	D(18)	A(14)	B(11)	C(14)
3	B(12)	C(15)	D(19)	A(13)
4	C(16)	B(11)	A(15)	D(20)

(Table value F_1 = 27.91 , F_2 = 27.91 , F_3 = 27.91 at 3 d.f for 1% level of significance) **(12 Marks)**

Module-5

9 a. Define i) Variables ii) Arrays iii) Input methods
       iv) Output delivery system in SAS programming. **(08 Marks)**

   b. What is Bar Chart in SAS? Write the basic syntax to create a SAS Bar Chart. Represent the following data in SAS Bar Chart, given that

Product (x)	A	B	C	D	E	F	G	H
Total sales (f) (Rs in thousands)	10	20	30	40	60	25	18	9

(12 Marks)

OR

10 a. Discuss in brief :
       i)   String variables in SAS
       ii) Merging of Data in SAS
       iii) Arithmetic mean is SAS
       iv) Linear regression in SAS. **(08 Marks)**

   b. i)   What is ANOVA in SAS?
       ii) Write the basic syntax for applying PROC ANOVA in SAS.
       iii) Mention the parameters used for ANOVA in SAS programming. **(12 Marks)**

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