CBCS SCHEME

USN | | | | | | | | | | |

18BT31

Third Semester B.E. Degree Examination, July/August 2022
Biostatistics

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. The following table gives a distribution of monthly income of 600 families in a certain city

Monthly income (100 Rs.)	Below 75	75-150	150-225	225-300	300-375	375-450	450 & over
Number of Families	60	170	200	60	50	40	20

Draw a "less than" and "more than" Ogive curve for the above data. **(07 Marks)**

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

Value	90-99	80-89	70-79	60-69	50-59	40-49	30-39
Frequency	2	12	22	20	14	4	1

(07 Marks)

c. Explain briefly: i) Factorial design ii) Cluster design. **(06 Marks)**

OR

2 a. Represent the adjoining distribution of marks of 100 students in the examination by a histogram. Also draw a frequency polygon.

Marks obtained (Less than)	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60	Less than 70	Less than 80	Less than 90
No. of students	4	6	24	46	67	86	96	99	100

(07 Marks)

b. The height in inches of 49 persons are given below:

Height	58	59	60	61	62	63	64	65	66
No. of persons	2	3	6	15	10	5	4	3	1

Calculate Q_1 and Q_3 for the above data and hence find Quartile Deviation (QD). **(07 Marks)**

c. Discuss briefly (i) Historical controlled study (ii) Completely randomized block design. **(06 Marks)**

Module-2

3 a. Explain the brief : (i) Type I and Type II error (ii) Logarithmic transformation (iii) Estimation (iv) Odd – ratio. **(10 Marks)**

b. What is the probability of collecting (i) atleast 6 of 10 answers (ii) at most 3 answers, is true or false in objective test. **(10 Marks)**

OR

4 a. Explain in brief : (i) Types of variables (ii) Relative risk ratio (iii) Cohort study (iv) Case control study. **(10 Marks)**

b. A mean weight of 500 students of a certain school is 50 kgs and SD is 6Kgs assuming that the weight are normally distributed. Find the expected number of students (i) weighing between 40 to 50 Kgs (ii) More than 60 Kgs **(10 Marks)**
Given $\phi(1.66) = 0.4515$.

Module-3

5 a. To test the claim that the median age of diabetic patent in state community is less than 42 years. A survey from a random sample of 32 diabetic patent yields the following ages in years.
56, 62, 61, 54, 52, 32, 24, 35, 50, 42, 52, 49, 26, 31, 31, 54, 38, 36, 45, 53, 37, 40, 38, 31, 29, 25, 45, 52, 48, 39, 30, 38. Use Wilcoxon signed rank test at 5% level of significance. **(12 Marks)**

b. Calculate coefficient of correlation from the following data by Spearman's rank correlation method.

Series X	20	11	24	18	20	22
Series Y	24	9	20	22	9	11

(08 Marks)

OR

6 a. Find coefficient of correlation between the height of father and sons from the following data

Height of father (X)	65	66	67	68	69	70	71
Height of Sons (Y)	67	68	68	69	72	72	69

(08 Marks)

b. A farmer applies 3 types fertilizers on 4 separate plots. The figure on yield/acre is tabulated below. Find out plots are materially different in fertility as also in the 3 fertilizers make any material difference in fields.

Fertilizer	plots			
	A	B	C	D
Nitrogen	6	4	8	6
Potash	7	6	6	9
Phosphates	8	5	10	9

$F_{0.005}(2, 6) = 5.14$; $F_{0.05}(3, 6) = 4.76$. **(12 Marks)**

Module-4

7 a. Explain in brief (i) Random block design
(ii) Multiple source of variation
(iii) Biological study design. **(08 Marks)**

b. A cutting speed of 4 types of tools are being compared in an experiment. Five cutting materials of varying degree of hardness are to be used as experimental blocks. The data giving the measurement of cutting time in second appear in the table below :

	Blocks				
Treatment	1	2	3	4	5
1	12	2	8	1	7
2	20	14	17	12	17
3	13	7	13	8	14
4	11	5	10	3	6

The table value $F_{0.05}(3, 12) = 349$ and $F_{0.05}(4, 12) = 3.26$. **(12 Marks)**

OR

8 a. Explain : i) Stratified design ii) Random effects regression. **(08 Marks)**

b. Analyse the interpret the following statistics concerning output of wheat per field obtained as a result of experiment conducted to test 4 varieties of wheat viz A, B, C, D under Latin square design.

C(25)	B(23)	A(20)	D(20)
A(19)	D(19)	C(21)	B(18)
B(19)	A(14)	D(17)	C(20)
D(17)	C(20)	B(21)	A(15)

Analyse the experiment (Table value $F_1 = F_2 = F_3 = 4.76$ at (3, 6) d.f for 5% level of significance). **(12 Marks)**

Module-5

9 a. Define : (i) Strings (ii)Arrays (iii) SAS data set operations (iv) decision making. **(08 Marks)**

b. Write the basic syntax to create a SAS BAR CHART. Represent following data in SAS BAR chart, given that

Medicine X	A	B	C	D	E	F	G	H
Total sales (f)	23	16	30	42	18	25	38	10

(12 Marks)

OR

10 a. Discuss in brief :
(i) Merging of data in SAS
(ii) Sorting of data in SAS
(iii) T-test of SAS
(iv) Correlation analysis **(08 Marks)**

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

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