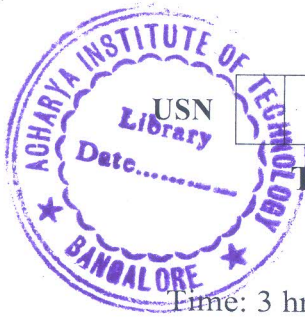


# CBCS SCHEME



18BT31

## Third Semester B.E. Degree Examination, July/August 2021 Biostatistics

Time: 3 hrs.

Max. Marks: 100

**Note: Answer any FIVE full questions.**

- 1 a. Write a short note on :
- i) Randomised controlled studies                      ii) Factorial design. (10 Marks)
- b. Draw "less" than and "more" than cumulative frequency curves to represent the following data :

Number of pods	0-10	10-20	20-30	30-40	40-50	50-60
Number of plants	3	9	15	30	18	5

(10 Marks)

- 2 a. Write a short note on :
- i) Controlled randomized block design                      ii) Cluster design. (10 Marks)
- b. Draw a pie chart for the location of sparrow nests and a frequency table of the given nominal data :

Nest site	Number of nest observed
i) Vines	56
ii) Building eaves	60
iii) Low tree branches	46
iv) Tree and building cavities	49

(10 Marks)

- 3 a. Evaluate the median age for the following data, which relates to the age of distribution of 1000 workers in an industry.

Age (years)	< 25	25-30	30-35	35-40	40-45	45-50	50-55	>55
No. of workers	120	125	180	160	150	140	100	25

(10 Marks)

- b. Calculate the quartiles of the following data :

Difference in years	0-5	5-10	10-15	15-20	20-25	25-30	30-35	40-45
Frequency	499	705	507	281	109	52	16	4

(10 Marks)

- 4 a. The chances that a doctor will diagnose a disease correctly are 60%. The chances that a patient will die by his treatment after correct diagnosis are 40% and the chances of death by wrong diagnosis are 70%. A patient of doctor, who had disease, was died. What is the chance that his disease was diagnosed correctly? (06 Marks)
- b. A certain drug treatment cures 90% of cases of hookworm in children. Suppose that 20 children's suffering from hookworm are to be treated and that the children can be regarded as a sample from the population, find the probability that
- i) all 20 will be cured                      ii) all but one will be cured. (06 Marks)
- c. In a college, the average score on the biology portion was 511, with 21.77 % of the students secured more than 600. Then find  $\sigma$ .

$\therefore$  Note :  $Z = 0.78$  at  $P[X \geq 600]$ .

(08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 5 a. A certain medicine administered to each of 10 patients resulted in the following increase in the blood pressure [BP]. 8, 8, 7, 5, 4, 1, 0, 0, -1, -1. Can it be concluded that the medicine was responsible for increase in BP.  $t_{\alpha} 0.059 = 2.262$ . (10 Marks)
- b. A survey of 320 families with 5 children each revealed the following distributions :

No. of boys :	5	4	3	2	1	0
No. of girls :	0	1	2	3	4	5
No. of families :	14	56	110	88	40	12

Is the result consistent with the hypothesis that male and female births are equally probable? Test the hypothesis  $\chi^2 [0.01, 5] = 15.09$ . (10 Marks)

- 6 a. Explain about i) One way classification ii) Two way classification. (10 Marks)
- b. Blood pressure readings by two different methods were made in 10 patients with essential hypertension. The systolic readings by the two methods are shown in the following table. The Clinician wished to investigate the relationship between the two measurements. You are required to find out whether there is any co-relation between the two methods of measurements. Is it positive (or) negative? Is it high (or) low. Also construct the regression lines.

Patient	Systolic blood pressure readings [mm Hg] by two methods in 10 patients with essential hypertension.	
	Method 1	Method 2
1	132	130
2	138	134
3	144	132
4	146	140
5	148	150
6	152	144
7	158	150
8	130	125
9	162	160
10	168	150

(10 Marks)

- 7 a. The following data give the yields on 12 plots of land in 3 samples, each of 4 plots under 3 varieties of fertilizers A, B and C.

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

Is there any significance difference in the average yields of land under the three varieties of fertilizers? Assume the significance level as 0.05.

$$F_t[\alpha, v_1, v_2] = F_t[0.05, 2, 9] = 4.26 \quad ; \quad F_t[\alpha, v_2, v_1] = F_t[0.05, 9, 2] = 19.4. \quad (10 \text{ Marks})$$

- b. Three varieties A, B and C of mungbean are tested in a randomized block design with four replications. The plot yield 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

$$\therefore F(0.05, 2, 6) = 5.14.$$

(10 Marks)

- 8 a. In a varietal trial on paddy to test the yielding ability of five varieties (A, B, C D and E), an experiment was laid out in a  $5 \times 5$  Latin square design. The plot size was  $10 \times 5$  square meters. The results are presented in the following table. Analyse the data and conclude the results.

Grain yield of Paddy in Kg/plot

D	A	E	B	C	Total
39.0	24.1	26.1	37.0	42.2	168.4
E	B	A	C	D	155.7
21.2	38.1	24.0	39.3	33.1	
C	E	B	D	A	172.2
35.6	33.5	38.1	40.8	24.2	
A	C	D	E	B	182.2
30.8	31.1	46.7	28.7	44.9	
B	D	C	A	E	165.7
44.3	29.6	41.1	26.3	24.4	
Total	170.9	156.4	176.0	172.1	168.8
					844.2

$$\therefore F(0.01, 4, 12) = 5.41, \quad F(0.05, 4, 12) = 3.26.$$

- b. Explain about the advantages of Latin square design. (15 Marks)  
(05 Marks)
- 9 a. Write about the conditions for executing SAS syntax statements. (08 Marks)  
b. Explain about string and its function in SAS. (12 Marks)
- 10 a. Write about the different "If statement" in decision making. (10 Marks)  
b. Explain about the procedure for calculating SAS/STAT ANOVA. (10 Marks)

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