CBCS SCHEME - Make-Up Exam

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

BBT402

Fourth Semester B.E/B.Tech. Degree Examination, June/July 2025

Biostatistics and Tools + LAB

Time: 3 hrs. Max. Marks:100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. VTU Formula Handbook is permitted.

		Module – 1	M	L	C
1	a.	Explain the classification of variables and data collection.	6	L2	CO1
	b.	The adjoining table gives the break – up of the expenditure of a family on different items of consumption. Draw percentage bar diagram to represent the data :	7	L2	CO1

Item	Expenditure (Rs)
Food	240
Clothing	66
Rent	125
Fuel and lighting	57
Education	42
Miscellaneous	100

	c.	Convert the following distribution into more than frequency distribution :	7	L2	CO1

Weekly wages less than	20	40	60	80	100
No. of workers	41	92	156	194	201

For the data given above, draw less than and more than ogive. And hence find the value of median.

OR

2	a.	Find the mode of discrete series and analyse the table :	7	L2	CO1

x	2	4	6	8	10	12	14	16	18	20
f	15	20	25	27	30	20	15	12	10	11

	b.	Find the geometric mean for the data related to the internode length (cms) for a rice variety.	7	L2	CO1

Inter node length (cms)	0-10	10-20	20-30	30-40	40-50	50-60
No. of plants	10	16	22	32	26	20

	c.	Calculate the standard deviation from the following data : Variable (x) = 10 , 13 , 17 , 22 , 27 , 30 , 31 , 32	6	L2	CO1

		Module – 2			
3	a.	$8x - 10y + 66 = 0$ and $40x - 18y = 214$ are the two regression lines. Find the mean of x's and y's and the correlation co-efficient. Find σ_y if $\sigma_x = 3$.	**7**	**L2**	**CO1**
	b.	Ten students got the following percentage of marks in 2 subjects x and y. Compute their rank correlation coefficient for the following data : Marks in x: 78, 36, 98, 25, 75, 82, 90, 62, 65, 39 Marks in y: 84, 51, 91, 60, 68, 62, 86, 58, 53, 47	**7**	**L3**	**CO1**
	c.	An experiment on lifetime 't' of cutting tool at different cutting speeds V (units) are given below : Speed (v): 350, 400, 500, 600 Life (t): 61, 26, 7, 2.6 Fit a relation of the form $v = at^b$.	**6**	**L3**	**CO1**
		OR			
4	a.	Five dice were thrown 96 times and the number of times an odd number actually turned out in the experiment is given. Fit a binomial distribution to this data and calculate the expected frequencies. No. of dice showing 1 (or) 3 (or) 5: 0, 1, 2, 3, 4, 5 Observed frequency: 1, 10, 24, 35, 18, 8	**6**	**L2**	**CO1**
	b.	The probability that a news reader commits no mistake in reading the news is $\frac{1}{e^3}$. Find the probability that on a particular news broadcast he commits i) only 2 mistakes ii) more than 3 mistakes iii) Atmost 3 mistakes	**7**	**L3**	**CO1**
	c.	In a test on electric bulbs, it was found that the life time of a particular brand was distributed normally with an average life of 2000 hours and standard deviation of 60 hours. If a firm purchases 2500 bulbs, find the number of bulbs that are likely to last for i) more than 2100 hours ii) less than 1950 hours iii) between 1900 to 2100 hours [Given $\phi(1.67) = 0.4525$, $\phi(0.83) = 0.2967$].	**7**	**L3**	**CO1**
		Module – 3			
5	a.	Define Cross – Sectional studies and mention its advantages and disadvantages.	**10**	**L2**	**CO2**
	b.	Write the differences between case control study and cohort study.	**10**	**L2**	**CO2**
		OR			
6	a.	Define Randomized controlled trail. Explain the experimental design and write the advantages and disadvantages.	**10**	**L2**	**CO2**
	b.	Write the uses of Epidemiology.	**10**	**L2**	**CO2**

		Module – 4			
7	a.	The data recorded for yield in a randomized black design experiment involving six treatments in 4 randomized blocks are given below : Analyse the data and test whether the treatments differ significantly. Blocks / Treatments and yield: (1) 24.7 (3) 27.7 (2) 20.6 (4) 16.2 (5) 16.2 (6) 24.9 (3) 22.7 (2) 28.8 (1) 27.3 (4) 15.0 (6) 22.5 (5) 17.0 (6) 26.3 (4) 19.6 (1) 38.5 (3) 36.8 (2) 39.5 (5) 15.4 (5) 17.7 (2) 31.0 (1) 28.5 (4) 14.1 (3) 34.9 (6) 22.6	**10**	**L4**	**CO3**
	b.	Analyze and interpret the following statistics concerning output of wheat for field obtained as a result of experiment conducted to test for four varieties of wheat vig. A, B, C, D under a 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	**10**	**L4**	**CO3**
		OR			
8	a.	An experiment was conducted on the yield of potatoes in a Randomized block design with four replications. Analyze the data and conclude the results. (1) (1) 23 K 25 P 22 KP 38 (2) P 40 (1) 26 K 36 KP 38 (3) (1) 29 K 20 KP 30 P 20 (4) KP 34 K 31 P 24 (1) 28	**10**	**L4**	**CO3**

	b.	Set up ANOVA Table for the following information relating to three drugs testing to judge the effectiveness in reducing blood pressure for three different groups of people. Do the drugs act differently? Are the different groups of people affected differently? Is the interaction term significant? Answer the above questions taking a significant level of 5%?	**10**	**L4**	**CO3**

Group of people	Drug		
	X	Y	Z
A	14 15	10 9	11 11
B	12 11	7 8	10 11
C	10 11	11 11	8 7

Module – 5

9	a.	Define : i) Null Hypothesis ii) Alternative Hypothesis iii) Type I and Type II error iv) Significance level	**6**	**L1**	**CO3**
	b.	A coin was tossed 1000 times and heat turns up 540 times. Test the hypothesis that the coin is unbiased at 1% level of significance.	**7**	**L3**	**CO3**
	c.	A certain stimulus administered to each of 12 patients resulted in the following change in blood pressure : 5 , 2 , 8 , -1 , 3 , 0 , 6 , -2 , 1, 5 , 0 , 4 (in appropriate unit) can it be concluded that , on the whole , the stimulus will change the blood pressure? [$t_{0.05}$ (11) = 2.201].	**7**	**L3**	**CO3**

OR

10	a.	Define : i) Sample size ii) Critical value	**2**	**L1**	**CO3**
	b.	A drug is given to 11 patients and difference in their BP were recorded to be : Use the Wilcoxon Signed Rank Test to test the hypothesis that the drug has no effect on change of BP?	**8**	**L4**	**CO3**
	c.	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 at 5% significant level.	**10**	**L4**	**CO3**

Before Drug A	112	113	118	120	119	113	110	122	126	115	119
After Drug B	116	120	117	125	126	111	111	117	126	112	129

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

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