CBCS SCHEME

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BBT402

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2026
Biostatistics and Tools + Lab

ACHARYA INSTITUTE OF TECHNOLOGY LIBRARY BANGALORE

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.

		Module – 1	M	L	C
Q.1	a.	Draw the pie diagram for the following data Food – 12.9 %, Clothing – 12.5%, Oil – 27.2%, Education – 15.4%, Transport – 15.9%, Social Service – 16.1%.	7	L2	CO1
	b.	The following is the distribution of IQ's of 75 children. Draw the ogives to the data and find the median.	10	L2	CO1

I Q	:	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140
No. of children	:	2	8	15	26	17	5	1	1

	c.	Define variable and types of data.	3	L2	CO1
		OR			
Q.2	a.	Calculate Mean, Median, Mode.	10	L2	CO1

Daily earning	:	50-53	53-56	56-59	59-62	62-65	65-68	68-71	71-74	74-77
No. of Persons	:	3	8	14	30	36	28	16	10	5

	b.	Calculate Mean Deviation about median from the following :	5	L2	CO1

X	10	11	12	13	14
f	3	12	18	12	3

	c.	Find the geometric mean for the following distribution :	5	L2	CO1

Marks :	0-10	10-20	20-30	30-40	40-50
No. of Students	5	7	15	25	8

		Module – 2			
Q.3	a.	Calculate Spearman's rank correlation co-efficient between advertisement cost and sales from the following data :	7	L3	CO1

Advertisement Cost (Rs) :	39	65	62	90	82	75	25	98	36	78
Sales (Lakh Rs)	47	53	58	86	62	68	60	91	51	84

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	b.	From the following data of marks in maths and statistics, find the two regression equations,, also find the most likely mark in statistics when marks in maths is 30 and coefficient of correlation between marks	8	L2	CO1

Maths Marks	:	25	28	35	32	31	36	29	38	34	32
Statistics Marks	:	43	46	49	41	36	32	31	30	33	39

	c.	Fit a straight line of the form y = ax + b for the following data :	5	L3	CO1

X	:	1	3	4	6	8	9	11	14
Y	:	1	2	4	4	5	7	8	9

		OR			
Q.4	**a.**	6 dices are thrown 729 times. How many times do you expect atleast 3 dice to show a number 5 or 6.	**6**	**L2**	**CO1**
	b.	A car hire firm has 2 cars. Which it hires out daily. The number of demands for a car on each day is distributed as Poisson variate with mean 1.5 obtain the probability that i) There was no demand ii) Demand is refused	**7**	**L3**	**CO1**
	c.	An electrical company manufactures light bulbs that have life time before burnout is normally distributed with mean 800 hrs and standard deviation of 40 hours. Find the probability that, the bulb burns i) More than 834 hours ii) Between 778 and 834 hours	**7**	**L3**	**CO1**
		Module – 3			
Q.5	**a.**	Explain cohort study and mention its advantages and disadvantages.	**10**	**L2**	**CO2**
	b.	Explain : i) Replication ii) Randomization iii) Local control.	**10**	**L2**	**CO2**
		OR			
Q.6	**a.**	Explain case control study and mention its advantages and disadvantages.	**10**	**L2**	**CO2**
	b.	Explain the different types of blinding experiments and its importance.	**10**	**L2**	**CO2**

Module – 4

Q.7 a. Three different machines are used for a production on the basis of the output, setup a completely randomized design analysis and test whether the machines are equally effective [F at 5% , level of significance for (2, 9) degree of freedom is 4.26] **10 L4 CO3**

Output		
Machine I	Machine II	Machine III
10	9	20
15	7	16
11	5	10
20	6	14

b. Four varieties A, B, C, D of fertilizers are tested in a randomized block design with four replication. The plot yields in a bound are as follows. Analyze the experimental yield. **10 L4 CO3**

A12	D20	C16	B10
D18	A14	B11	C14
B12	C15	D19	A13
C16	B11	A15	D20

i) F at 5% LOS at (9, 3) d.f is 8.81
ii) F at 5% LOS at (3, 9) d.f is 3.86

OR

Q.8 a. Analyze the variance in the following Latin square design of yields where A, B, C, D, E denote the different methods of cultivation. Examine whether the different method of cultivation yields significantly **10 L4 CO3**

D122	A121	C123	B122
B124	C123	A122	D125
A120	B119	D120	C121
C122	D125	B121	A122

F at 5% LOS at (3, 6) d.f is 4.76

b. 5 doctors, each test 5 treatments for a certain disease and observe the number of days each patients requires to recover, the results are as follows **10 L4 CO3**

Treatments					
Doctors	1	2	3	4	5
A	10	14	23	19	20
B	11	15	24	17	21
C	9	12	20	16	19
D	8	13	17	17	20
E	12	15	19	15	22

Discuss the difference between Doctors and treatments
F at 5% L.O.S for (4, 16) = 3.01 and (4, 16) = 3.01.

Module – 5

Q.9	**a.**	Explain the following : i) Null hypothesis ii) Alternative hypothesis iii) Test Statistics	**6**	**L1**	**CO3**
	b.	In a sample of 1000 people in Karnataka 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular in the state at 1% Level of significance [Z at 1% = 2.576 ≃ 2.58]	**7**	**L3**	**CO3**
	c.	The following table gives the number of aircraft accidents that occurred during the various days of the week. Test whether the accidents are uniformly distributed over the week. (χ^2 at 5% with 5 degrees of freedom = 11.07] Days : Mon, Tue, Wed, Thurs, Fri, Sat No of accidents : 14, 18, 12, 11, 15, 14	**7**	**L1**	**CO3**

OR

Q.10	**a.**	Write short notes on : i) Testing of hypothesis ii) Type I and Type II error	**4**	**L1**	**CO3**
	b.	A sample of 26 bulbs gives a mean life of 990 hours with a standard deviation of 20 hrs. The manufacturer claims that the mean life of bulbs is 1000 hrs. Is the sample not upto the standard? [t at 5% level of significance with 25 degrees of freedom is 1.708]	**6**	**L3**	**CO3**
	c.	The following data gives the yields on 14 plots of land in three samples of (5, 5, 4) plot under three variety of seeds A, B and C. A: 35, 40, 33, 36, 31 B: 30, 25, 34, 28, 33 C: 28, 24, 30, 26 [F at 5% level of significance at (2, 11) degrees of freedom is 3.9823].	**10**	**L3**	**CO3**

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