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BBT402

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

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.	Find Mean, Median, Mode for the given data :	10	L2	CO1

C-I (Blood Glucose)	69–76	76–83	83–90	90–97	97–104	104–111	111–115
No. of days	6	9	8	3	2	1	2

			M	L	C
	b.	Define Bio-Statistics and explain the importance.	5	L2	CO1
	c.	Represent the following data using Histogram,	5	L2	CO1

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
F	4	6	7	14	16	14	8	6	5

		OR	M	L	C
Q.2	a.	Calculate mean deviation from the mean and its coefficient :	10	L2	CO1

X	11-15	16-20	21-25	26-30	31-35	36-40	41-45
F	3	4	11	12	9	7	4

			M	L	C
	b.	Calculate the mean, variance, the standard deviation and coefficient of variance for 17.0, 19.1, 20.0, 20.7, 21.2, 22.7, 22.7, 23.1, 25.2, 26.2	10	L2	CO1

		Module – 2	M	L	C
Q.3	a.	From the following data the ages of husbands and wife :	7	L2	CO1

x	36	23	27	28	28	29	30	31	33	35
y	29	18	20	22	27	21	29	27	29	28

Find the two regression lines and calculate the husband age when the wife age is 16 year old.

			M	L	C
	b.	Ten students got the following percentage of marks in two subjects x and y. Compute their Rank correlation coefficient.	7	L3	CO1

x	78	36	98	25	75	82	90	62	65	39
y	84	51	91	60	68	62	86	58	53	47

			M	L	C
	c.	Fit a straight line for the following data :	6	L3	CO1

x	1	3	4	6	8	9	11	14
y	1	2	4	4	5	7	8	9

		OR	M	L	C
Q.4	a.	A random variable X has the following probability function for various values of x:	7	L2	CO1

x	0	1	2	3	4	5	6	7
P(x)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

Find K and Evaluate $P(x < 6)$, $P(x \geq 6)$, $P(3 < x \leq 6)$

	b.	In a quiz contest of answering 'Yes' or 'No', what is the probability of guessing atleast 6 answers correctly out of 10 questions asked? Also find the probability of the same if there are 4 options for a correct answer.	7	L3	CO1
	c.	In an examination 7% of students score less than 35% marks and 89% of students score less than 60% marks. Find the mean and standard deviation if the marks are normally distributed. Given P(1.2263) = 0.39, P(1.4757) = 0.43	6	L2	CO1

Module – 3

Q.5	a.	Define (i) Short study (ii) Case control study	6	L1	CO2
	b.	Explain the experimental epidemiology and mention the types of experimental studies.	10	L2	CO2
	c.	Explain Experimental studies.	4	L2	CO2

OR

Q.6	a.	What is Ecological study? Mention its advantages and disadvantages.	10	L2	CO2
	b.	Explain the concept of descriptive study and mention its advantages and disadvantages.	10	L2	CO2

Module – 4

Q.7	a.	The data recorded for yield in a randomized block design experiment involving six treatments in four randomized blocks, are given. Analyze the data and test whether the treatments differ significantly.	10	L4	CO3

Treatments and Yield

	(1)	(3)	(2)	(4)	(5)	(6)
	24.7	27.7	20.6	16.2	16.2	24.9
	(3)	(2)	(1)	(4)	(6)	(5)
	22.7	28.8	27.3	15.0	22.5	17.0
Blocks	(6)	(4)	(1)	(3)	(2)	(5)
	26.3	19.6	38.5	36.8	39.5	15.4
	(5)	(2)	(1)	(4)	(3)	(6)
	17.7	31.0	28.5	14.1	34.9	22.6

	b.	Analyze and interpret the following statistics concerning output of wheat per field obtained as a result of experiment conducted to test four varieties of wheat viz, A, B, C, D. Under latin-square design.	10	L4	CO3

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

OR

Q.8	a.	Three varieties A, B, C of mungbean are tested in a randomized block design with four replications. The plot yield in pounds are as follows :	10	L4	CO3

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

Analyze the experimental yield and state the conclusion.

	b.	An experiment was conducted on the yield of potatoes in a randomized block design with four replications. Analyze the data and conclude the results.	10	L4	CO3

Block	Treatment combinations			
(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

Module – 5

Q.9	a.	Explain the following terms : (i) Null hypothesis (ii) Alternate Hypothesis	2	L1	CO3
	b.	The data on the weekly expenditure (in Rs.) on entertainment by 14 MBA students of college A and 16 students of college B is reported below. Test using a 1 percent level of significance that there is no difference in the average expenditure of the students of the two colleges.	8	L4	CO3

CollegeA	250	300	350	180	280	260	400	190	320	340	370	160	500	550		
CollegeB	380	130	400	450	360	270	500	480	450	470	500	550	575	470	480	220

	c.	Three different kinds of food are tested on three groups of rats for 5 weeks. The objective is to check the difference in mean weight (in grams) of the rats per week. Apply one way ANOVA using a 0.05 significance level to the following data :	10	L3	CO3

Food 1	8	12	19	8	6	11
Food 2	4	5	4	6	9	7
Food 3	11	8	7	13	7	9

OR

Q.10	a.	Explain the following terms : (i) Sampling distribution (ii) Testing of Hypothesis (iii) Type-I and Type-II error	6	L1	CO3
	b.	Five dice were thrown 96 times and the numbers 1, 2 or 3 appearing on the face of the dice follows the frequency distribution as below :	7	L3	CO3

No. of dice showing 1, 2, or 3	5	4	3	2	1	0
Frequency	7	19	35	24	8	3

Test the hypothesis that the data follows a Binomial distribution ($x^2_{0.05} = 11.07$ for 5 d.f)

	c.	One type of aircraft is found to develop engine trouble in 5 flights out of a total of 100 and another types in 7 flights out of a total 200 flights. Is there a significance difference in the two types of aircrafts so far as engine defects are cancelled? Test at 5% significance level.	7	L3	CO3

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