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BBT402

Fourth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.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. Use of Statistical data hand book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain : (i) Line graph (ii) Histogram (iii) Frequency polygon.	6	L1	CO1
	b.	Compute Quartile deviation for the given data :	7	L2	CO1

Class	1 – 10	11 – 20	21 – 30	31 – 40	41 – 50	51 – 60
Frequency	3	16	26	31	16	8

			M	L	C
	c.	Calculate mean and standard deviation for the given data :	7	L2	CO1

Size of item	6	7	8	9	10	11	12
Frequency	3	6	9	13	8	5	4

		OR	M	L	C
Q.2	a.	Explain : (i) Biostatistics (ii) Collection of data.	6	L1	CO1
	b.	Draw the frequency curve and the Ogives 'less than' and 'more than' from the given data of distribution of marks obtained by 49 students.	7	L3	CO1

Class	5–10	10–15	15–20	20–25	25–30	30–35	35–40	40 – 45
F	5	6	15	10	5	4	2	2

			M	L	C
	c.	The following are the scores of two batsmen A and B in a series of innings :	7	L3	CO1

A	12	115	6	73	7	19	119	36	84	29
B	47	12	16	42	4	51	37	48	13	0

Who is better score getter and who is more consistent?

		Module – 2	M	L	C
Q.3	a.	Find Spearman's rank correlation co-efficient for the given data:	6	L2	CO1

x	12	17	22	27	31
y	113	119	117	115	121

			M	L	C
	b.	Fit a second degree parabola $y = a + bx + cx^2$ for the data:	7	L2	CO1

x	0	1	2	3	4
y	1	1.8	1.3	2.5	2.3

			M	L	C
	c.	The number of telephone lines busy at an instant of time is a binomial variate with probability 0.1 that a line is busy. If 10 lines are chosen at random, what is the probability that, (i) No line is busy (ii) All lines are busy, (iii) at least one line is busy (iv) atmost 2 lines are busy.	7	L3	CO1

		OR	M	L	C
Q.4	a.	Define: (i) Correlation and Karl Pearson's co-efficient of correlation. (ii) Regression	6	L1	CO1
	b.	Find the correlation co-efficient and the equation of lines of regression for the following values of x and y.	7	L2	CO1

x	1	2	3	4	5
y	2	5	3	8	7

	c.	In a test on 2000 electric bulbs, it was found that the life of a particular make was normally distributed with an average life of 2040 hrs and S.D. of 60 hrs. Estimate the number of bulbs likely to burn for : (i) More than 2150 hrs (ii) Less than 1950 hrs (iii) Between 1920 hrs and 2160 hrs. $(\phi(1.83) = 0.4664, \phi(1.33) = 0.4082, \phi(2)=0.4772)$	7	L3	CO1

Module – 3					
Q.5	a.	Define (i) Odds Ratio (ii) Risk Ratio.	6	L1	CO2
	b.	Explain : (i) Single blind experiment (ii) Double blind experiment.	7	L2	CO2
	c.	Write the merits and demerits of cross sectional studies.	7	L2	CO2

OR					
Q.6	a.	Write a note on case-studies referring to experimental studies.	6	L2	CO2
	b.	Define Bias and hence explain, (i) Selection bias (ii) Information bias.	7	L1	CO2
	c.	Write the advantages and disadvantages of cohort study.	7	L2	CO2

Module – 4					
Q.7	a.	Explain (i) Blocking (ii) Confounding in 2^K factorial design.	10	L2	CO3
	b.	What is CRD analysis? Write advantages and disadvantages of CRD analysis.	10	L2	CO3

OR					
Q.8	a.	Explain Plackett-Burman Designs.	10	L3	CO3
	b.	Define RCBD analysis. State few advantages and disadvantages of RCBD analysis.	10	L3	CO3

Module – 5					
Q.9	a.	Ten individuals are chosen at random from a population and their heights in inches are found to be 63, 63, 66, 67, 68, 69, 70, 70, 71, 71. Test the hypothesis that the mean height of the universe is 66 inches. $(t_{0.05} = 2.262$ for 9 d.f.$)$	6	L4	CO3
	b.	To test the hypothesis that a coin is fair, the following rule of decision is adopted : Accept the hypothesis if the number of heads in a sample of 100 tosses is between 40 and 60; reject the hypothesis otherwise. Find the probability of occurrence of Type – I error. (Given $\phi(2) = 0.4772$).	7	L3	CO3
	c.	A teacher claims that the median time to do a particular type of statistics problems is atmost 3 minutes, but her students belive that the median time is more than 3 minutes. A random sample of 10 students completed the problem in the following times (in minutes): 2.5, 2, 4, 4.5, 4, 2.5, 4.5, 3, 3.5, 5 Use Wilcoxon signed rank test with 5% level of significance to test the teacher's claim given that the critical value of T for n = 9 at 5% level of significance for a single-tailed is 8.	7	L4	CO3

OR					
Q.10	a.	A die was thrown 9000 times and a throw of 5 or 6 was obtained 3240 times. On the assumption of random throwing, do the data indicate an unbiased die?	6	L2	CO3