Master of Computer Applications
MCAE 204: Statistical Methods
Unique Paper Code: 223422204
Semester II
May 2025
Year of Admission: 2024
(Including ER/Imp./Ex-Students)

Max. Marks: 70

Time: Three Hours

Note: Attempt any 7 questions. All questions have equal marks.

1. (a) What do you mean by measure of central tendency? Discuss with example.
(b) Consider the series 17, 34, 77, 29, 16, 41, 46, 25, 54, 38, 20, 32, 43, 22. Find out the first quartile, third quartile, median and Interquartile range. Also draw the box plot. (4+6)

2. (a) A couple has two children, sample space is S = {bb, bg, gb, gg} with probability ¼ for each point. Find probability P that both children are girls if it is known that (i) at least one of them is girl (ii) the younger is girl.
(b) Consider 100 instances with attributes A and B. Given that (A)=60, (B)=50, (AB)=25. Examine whether attributes A and B are independent / positively associated / negatively associated? (6+4)

3. Use the Kruskal-Wallis test at 5% level of significance to test the null hypothesis that a professional bowler performs equally well with the four balls, given the following bowling speeds observed five times:

Ball No. A	271	282	257	248	262
Ball No. B	252	275	302	268	276
Ball No. C	260	255	239	246	266
Ball No. D	279	242	297	270	258

(Chi-square value at 5% level of significance for three d.f. is 7.815). (10)

4. (a) A sample of 11 circuits from a large normal population has a mean resistance of 2.20 ohms. Population standard deviation is not known. Sample standard deviation (s_1) is 0.35 ohms. Determine a 95% confidence interval for the true resistance of the population. (table value at 5% level of significance for 10 degree of freedom is 2.228).
(b) A sample of 400 male students is found to have a mean height 67.47 inches. Can it be reasonably regarded as a sample from a large population with mean height 67.39 inches and standard deviation 1.30 inches? Test at 5% level of significance. (z-value at 5% level of significance is 1.96). (5+5)

5. Data for 5305 individuals was collected and two attributes- educational qualification and marital status were noted. Given the summary of the data, test the effect of qualification on marital status using the data below using chi-square test at 0.05 level of significance-

Qualification/Marital status	Middle school	High school	Bachelor's	Master's	Ph.D.
Never married	21	35	22	10	5
Married	12	35	44	36	20
Divorced	6	9	9	3	3
Windowed	3	9	9	6	3

(Chie-square value at 5% level of significance for twelve d.f. is 21.026) (10)

6. Given below are the yields per acre of wheat for six plots entering a crop competition, three of the plots being shown with wheat of variety A and three with B-

Variety	Yields in fields per acre		
	1	2	3
A	32	33	23
B	19	18	16

Set up a table of analysis of variance and calculate F statistic. State whether the difference between the yields of two varieties is significant, the table value of F statistic at 5% level of significance for v1=1 and v2=4 is 7.71. (10)

7. (a) What is Spearman Rank Correlation Coefficient? Calculate a Spearman rank-order correlation for the data given below:

	Marks									
English	56	75	45	71	62	64	58	80	76	61
Maths	66	70	40	60	65	56	59	77	67	63

(b) Obtain regression equation of Y on X and estimate Y when X=55 from the following

X	40	50	60	65	34	50	56
Y	38	60	70	62	36	53	60

(4+6)

8. Differentiate between the following-
   (i) Joint and Marginal probability
   (ii) Parametric and Non-Parametric tests
   (iii) Null hypothesis and alternative hypothesis
   (iv) Type I error and Type II error

(10)