



GRETSA UNIVERSITY - THIKA

UNIVERSITY EXAMINATIONS JANUARY – APRIL 2025 SEMESTER

BACHELOR OF COMMERCE

COURSE CODE: BCBA 302

COURSE TITLE: MANAGERIAL STATISTICS

DATE: APRIL 2025

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES

1. SECTION A IS **COMPULSORY**.
2. SECTION B: ANSWER ANY OTHER **TWO** QUESTIONS.
3. **DO NOT** WRITE ANYTHING ON THIS QUESTION PAPER AS IT WILL BE AN EXAM IRREGULARITY.
4. ALL ROUGH WORK SHOULD BE AT THE BACK OF YOUR ANSWER BOOKLET AND CROSSED OUT.

CAUTION: *All exam rooms are under CCTV surveillance during the examination period.*

SECTION A: COMPULSORY

Question One

- a) A study was conducted to determine whether there is association between the type of a rehabilitation program and treatment of mental disorder. The data collected is summarized below.

	Improvement scores		
	Great Improvement	Slight Improvement	No Improvement
Rehabilitation Program A	23	12	31
Rehabilitation Program B	18	19	12
Rehabilitation Program C	13	22	40

Perform a chi-square test to test the association between rehabilitation program and level of improvement at 5% level of significance. **[12 marks]**

- b) Discuss the characteristics of the following distributions:
- i. Chi-square distribution **[2 marks]**
 - ii. T distribution **[2 marks]**
 - iii. Normal distribution **[3 marks]**
- c) A foreign parts manufacturer claims a lifespan of 38 months with a 6-month standard deviation for their parts. After testing 75 parts, a mean lifespan of 29.8 months was found. Conduct a hypothesis test at a 1% significance level to verify this claim. **[9 marks]**
- d) Discuss the terms descriptive and inferential statistics **[2 marks]**

SECTION B: ANSWER ANY TWO QUESTIONS

Question Two

- a) An economics survey magazine states the average spending by households in country x is sh. 105 per day. A survey of 45 households indicated an average of sh. 145.67, while 40

households in a country z averaged sh. 98.64. The assumed standard deviations are sh. 35 for the country x and sh. 20 for country z.

- i. At a 5% significance level, determine if there is a significant spending difference between households of the two countries? **[10 marks]**

- b) An insurance company tracks the ages of insured clients. A survey showed that, based on actuarial tables, the probability of surviving 30 years is the same for individuals of the same age. Calculate the probabilities of different outcomes for 5 insured people in 30 years.
 - i. All are alive **[3 marks]**
 - ii. At least 3 are alive **[3 marks]**
 - iii. At most one is alive **[2 marks]**
 - iv. None is alive **[2 marks]**
- c)

Question three

- a) A nutritionist aims to evaluate the impact of a new dietary supplement on weight loss. She randomly divides 24 participants into two groups of 12: Group 1 receives the supplement, while Group 2 gets a placebo. After 8 weeks, the weight loss (in pounds) is recorded as follows:

Dietary Supplement Group (Group 1): 15, 16, 17, 14, 18, 15, 16, 17, 19, 15, 16, 18

Placebo Group (Group 2): 12, 13, 11, 12, 12, 13, 11, 10, 12, 11, 12, 11

Conduct a hypothesis test to assess whether there is a significant difference in mean weight loss between the two groups. **[12 marks]**

- b) Explain the difference between parametric and non-parametric tests **[4marks]**
- c) Discuss the advantages of using nonparametric test **[4marks]**

Question Four

- a) The following Samples were selected from three by social science researchers. Use the data to answer the questions that follow:

Sample 1	Sample 2	Sample 3
88	84	93
84	87	75
107	77	73
102	95	98
85	79	82
100	85	75

Carry out a one-way ANOVA to determine if the three populations mean are equal at 10% level of significance. **[12 marks]**

- b) Discuss the following terms:

- i. Type 1 error and type error **[4 marks]**
- ii. One tailed and two tailed tests of hypothesis **[4 marks]**

Question five

- a) A researcher aims to evaluate the effectiveness of three distinct teaching methods on student performance. To achieve this, they randomly assign 30 students into three groups, with each group consisting of 10 students. Following a semester of instruction, the students' scores (out of 100) are recorded as follows:

Method A: 78, 85, 91, 74, 88, 77, 80, 84, 82, 79

Method B: 73, 76, 80, 75, 82, 78, 70, 74, 77, 72

Method C: 90, 92, 85, 88, 87, 91, 89, 94, 90, 86

Conduct a Kruskal-Wallis test to determine if there are significant differences in student scores among the three teaching methods at 5% level of significance. **[12 marks]**

- b) Consider the following time series data

Week	1	2	3	4	5	6	7	8	9	10
Value	8	13	15	17	16	9	12	19	21	18

- i. Plot a graph for the time series data **[4 marks]**
- ii. Develop a 3 week moving average for the time series data. **[4 marks]**

