GRETSA UNIVERSITY - THIKA

UNIVERSITY EXAMINATIONS

MAY – AUGUST 2023 SEMESTER

BACHELOR OF COMMERCE

COURSE CODE: BCBA 301

COURSE TITLE: MANAGERIAL STATISTICS

DATE: JULY 2023 **TIME: 8.00 AM – 11.00 AM**

INSTRUCTIONS TO CANDIDATES

1. SECTION A IS **COMPULSORY.**
2. SECTION B: ANSWER ANY OTHER **THREE** 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 researcher is interested in determining whether the education level of an individual is dependent on their gender. Data was collected from a sample of 420 people and they were required to indicate their highest level of education.

	Certificate	**Diploma**	**Bachelor's**	**Master's**	**PhD**
Female	100	120	75	65	60
Male	145	75	85	80	35

At 5% level of significance, determine if the level of education is independent of a person's gender **[12 marks]**

b) Three computer models are used for test different CPU intense programs. The computers are given a score out of 100, based on their performance. The following data was recorded for the different brands.

HP	Lenovo	Dell
70	90	65
80	85	75
94	86	97
73	68	82
91	84	88
98	67	72
58	72	84
45	59	73
90	85	93

At 10% level of significance, can it be concluded that the performance of the three brands of computers is the same? **[12 marks]**

c) Discuss the key features of a binomial distribution and areas of application **[10 marks]**

d) The following information has been provided, use the information to answer the question that follows.

$\mu = 107.5$

$\alpha = 5\%$

$\bar{X} = 109.3$

$n = 50$

$\sigma^2 = 10.3$

Test the hypothesis that the mean is greater than 107.5 **[6 marks]**

SECTION B: ANSWER ANY THREE QUESTIONS

Question Two

a) Three groups of students were taught using different methods. At the end of the day the researcher is interested in determining whether the three methods differ in their effectiveness. Summarised below are scores obtained in a CAT issued to students sampled from the three groups:

Group 1	Group 2	Group 3
7	14	6
5	17	8
14	13	8
13	15	9
12	15	5
9	13	11
6	9	13
14	12	8
12	10	10
4	5	3

Conduct Kruskal-Wallis H test to determine whether CAT scores obtained differ by method of teaching. **[10 marks]**

b) Through the use of well-illustrated diagrams, differentiate one tail and two tail tests at 5% level of significance. **[5 marks]**

c) Discuss the properties of a normal probability distribution **[5 marks]**

Question three

a) Following the outbreak of an unknown disease, medical experts embarked on a journey to find a cure for the disease. Two treatments methods were introduced with the aim of helping deal with the disease. The efficacy of treatment is measured out of 100 for every patient under investigation. The results are as outlined below:

PATIENT	TREATMENT A	TREATMENT B
1	76	55
2	63	57
3	95	99
4	67	85
5	54	73
6	72	48
7	79	58
8	65	81
9	60	73
10	92	83
11	59	71
12	81	95

At 5% level of significance, test the hypothesis that there is no difference in the two treatment methods presuming normal distribution. **[12 marks]**

b) Discuss the following terms:

i. Inferential statistics **[2 marks]**

ii. Normal distribution **[2 marks]**

iii. Null hypothesis **[2 marks]**

iv. Non-parametric tests **[2 marks]**

Question Four

a) A manufacturer has established that the probability of having defects is 1 unit for every 1000 units produced. He recently sampled 5000 units from his production line.

i. What is the probability that exactly units will be defective? **[3 marks]**

ii. What is the probability that not more than five units will be defective? **[7 marks]**

b) Production of deformed metal bars requires the appropriate size to be 39.5 inches. Metal bars with a range of 38.5 and 40.5 inches are acceptable and are issued for distribution. Determine the number of bars that meet the required specifications from 2000 bars produced over the last one year. **[10 marks]**

Question five

a) A group of students sat for two statistics exam. The scores for the two groups of students are as follows:

Statistics 1:	70	85	75	69	75	55	84	95	55	63
Statistics 2:	43	84	95	67	83	92	58	67	91	94

Test for variation in the two tests. **[10 marks]**

b) The claims department of an insurance company has estimated that the mean cost of processing an insurance claim is sh. 6000. This cost is higher compared to the cost in other insurance firms. Cost cutting measures were introduced to lower the cost. A random sample of 18 claims were selected. The mean was found to be sh. 5600 with a standard deviation of sh.100 at 10% level of significance, can we conclude that the cost cutting measures were effective?

[10 marks]