



(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

[MMUST]

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

MAIN EXAM

2023/2024 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE IN ENVIRONMENTAL HEALTH

COURSE CODE: HEH 216

COURSE TITLE: BIostatISTICS

DATE: 7/12/2023

TIME: 11.00-1.00 PM

INSTRUCTIONS TO CANDIDATES:

- This paper consists of Two (2) sections A, and B
- Each section has relevant instructions. Read the instructions specific for each section carefully, and answer the questions accordingly

MMUST observes ZERO tolerance to examination cheating

Paper Consists of 4 Printed Pages. Please Turn Over



SECTION A: SHORT ANSWER QUESTIONS (40 Marks)

Instructions

The section has a total of Eight (8) short answer questions (SAQs), carrying a maximum of forty (40) marks total.

Answer all the questions

Write your answers on the provided university examination booklet

1. Define the following terms as used in biostatistics (4 marks)

- a) Variable
- b) Biostatistics
- c) A sample
- d) Level of significance

2. Differentiate between descriptive and inferential statistics (4marks)

3. State four scales of measurements used in medical statistics (4marks)

4. The following stem-and-leaf plot shows the ages of a group of people in a room.

```
1 | 7 8 9
2 | 0 2 2 4 5 6
3 |
4 | 1 2 4
```

2 | 4 means 24 years

- a) How many people were there in the room?
- b) Two people have the same age. What is that age?
- c) What is the mode, median and mean of the ages? (6 Marks)

5. Explain the two systems of collecting data giving example in each case (4 marks)

6 The times taken by rats to pass through maize are recorded in the table below.

Time in seconds	20-14	15-19	20-24	25-29	30-34	35-39
Frequency	3	11	19	22	6	2

- Calculate: (a) mean
 (b) Median
 (c) Sample variance [8marks]

7. The number of women giving birth per day in Eldoret Hospital is random variable with the following probability distribution function.

X	1	2	3	4	5	6	7	8
P(x)	0.05	0.05	0.15	0.15	0.2	0.1	0.2	0.1

- a) Find the probability that there will be at least four expectant women in a day.
 b) Evaluate the probability of almost two women in a day
 c) Obtain the expected number of expectant women in a day [6 marks]

8. Explain four ways of collecting quantitative data [4 marks]

SECTION B: LONG ANSWER QUESTIONS (30 Marks)

Instructions

The section has THREE (3) long answer questions (LAQs), totaling to a maximum of fifteen (15) marks each
 Answer ANY TWO questions
 Write your answers on the provided university examination booklet

9. What is the relationship between hours studying (X) and scores on a quiz (Y)? 15 marks

STUDENT	HOURS	SCORE
A	1	1
B	1	3
C	3	2
D	4	5
E	6	4
F	7	5
G	8	7
H	8	8

10. (a) Explain the two commonly used types of discrete probability distributions [4marks]

- b. Explain the probability sampling methods [4 marks]

(c) State two sample size determination techniques [2marks]

c. The Duracell Battery Company claims that its new Bunnywabbit batteries have a life, on the average, of 1,000 hours.

Suppose, you take a sample of 100 batteries and test them. You find:

$$\bar{X} = 985 \text{ hours}$$

$$s = 30 \text{ hours}$$

Construct a 95% CIE and decide whether the company's claim should be rejected or not. [5marks]

II. (a) Complete by writing in your answer booklet the letter code and the corresponding test (Z-test or t-test) that would be used to test a hypothesis under these conditions

	Condition	Test
A	one-tailed test $\alpha=0.05$, δ is known, $n=20$	
B	two-tailed test $\alpha=0.05$, δ is unknown, $n=10$	
C	two-tailed tests $\alpha=0.01$, δ is unknown, $n=35$	
D	two-tailed tests $\alpha=0.01$, δ is known, $n=25$	

[4marks]

(b) Suppose the National Transportation Safety Board (NTSB) wants to examine the safety of compact cars, midsize cars, and full-size cars. It collects a sample of three for each of the treatments (cars types). Using the hypothetical data provided below, test whether the mean pressure applied to the driver's head during a crash test is equal for each types of car. Use $\alpha = 5\%$.

Table ANOVA.9.1

	Compact cars	Midsize cars	Full-size cars
	643	469	484
	655	427	456
	702	525	402
\bar{X}	666.67	473.67	447.33
S	31.18	49.17	41.68

[11marks]