# MURANG'A UNIVERSITY OF TECHNOLOGY

## SCHOOL OF AGRICUTURE AND ENVIRONMENTAL STUDIES

### DEPARTMENT OF AGRICULTURE

UNIVERSITY ORDINARY EXAMINATION

2023/2024 ACADEMIC YEAR

**SECOND** YEAR **FIRST** SEMESTER EXAMINATION
FOR BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND
EXTENSION

GAC 210: STATISTICS.

DURATION: 2 HOURS

**INSTRUCTIONS TO CANDIDATES:**

1. Answer question **ONE** and any other **TWO** questions.

2. Mobile phones are not allowed in the examination room.

3. You are not allowed to write on this examination question paper.

**SECTION A (30 MARKS)**

**QUESTION ONE (30 MARKS)**

a. Carton of orange juice are advertised as containing 1 litre A random sample of 100 cartons gave the following results $\sum_X = 101.4 \sum_{X^2} = 102.83$. Calculate the following.

    a. The mean         (3 marks)

    **b.** Stand         (3 marks)

b. Two tetrahedral dice with faces labelled 1,2,3,4, are tossed and the score is the face figure is recorded. Find the probability density function pdf of X when the dice is cast.

    (8 marks)

c. The pdf of a discrete random variable Y is given by

    a. $P(Y = y) = cy^2$

    b. Determine the value of c.     (5 marks)

d. How many ways are there to choose a committee of 4 persons from a group of 10 people if the order is not important.     (5 marks)

e. Suppose 1 1000 persons has a certain disease .A test detects 99%of the diseased person .The test also shows that 5%of healthy people have the disease. What is the probability that a positive test diagnoses the disease?     (6 marks)

**SECTION B (40 MARKS) ANSWER ANY TWO QUESTIONS**

**QUESTION TWO (20 MARKS)**

a. The average household income in country A is $900 with a standard deviation of 200. Assuming a normal distribution.

    i. Compute the proportion of middle class what income has between $800and $1000

        (6 marks)

    ii. If the government decides to issue a food stamp subsidy to the poorest 3%. Determine the income level of the families who will receive the stamp. (8 marks)

b. A sample of 11 circuit from a large normal population has a mean of 2.20ohms and a standard deviation of 0.35 ohms. Determine the 95% confidence interval for the mean resistance of the population.     (5 marks)

**QUESTION THREE (20 MARKS)**

a. Highlight the five steps to hypothesis testing. (7.5 marks)

b. The average market price for milk is 168per bag to determine if this is true, a random sample of 25 bags is taken and resulted in a mean price of 172.5 and the standard deviation of 15.4/=. Test the hypothesis at $\alpha=0.05$. (6 marks)

c. The average number of seeds set per pod in lucerne were determine for top and bottom flower in ten plants. The values observed we as follows

| top | 4.2 | 5.0 | 5.4 | 4.3 | 4.8 | 3.9 | 4.2 | 3.1 | 4.4 | 5.8 |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| bottom | 4.6 | 3.5 | 4.8 | 3.0 | 4.1 | 4.4 | 3.6 | 3.8 | 3.2 | 2.2 |

Test whether there is any significant difference between the top and bottom flowers with respect to the number of seeds per pod. (6 marks)

**QUESTION FOUR (20 MARKS)**

a. Explain the meaning of the following terms

   i. Statistics (2 marks)

   ii. Population (2 marks)

   iii. Random sampling (2 marks)

   iv. Sample. (2 marks)

   v. Sampling distribution. (2 marks)

b. A breeder claims that the number of filled grams per panicle is more and a new variety of paddy ACM.5 compared to that of an old variety ADT.36. To verify his claim a random sample of 50 plants of ACM5 AND 60 plants of ADT 36 were selected from experimental fields. The following results were obtained

FOR ACM5                                         FORADT36

$\bar{X}_1=139.4$grams /provide                   $\bar{X}_2=112.9$grams provided

$S_1=26.864$                                          $S_2=20.1096$

$n_1=50$                                             $n_2=60$

Test whether the claim of the breeder is correct. (10 marks)