



# **MAASAI MARA UNIVERSITY**

**REGULAR UNIVERSITY EXAMINATIONS  
2020/2021 ACADEMIC YEAR  
FIRST YEAR SECOND SEMESTER**

**SCHOOL OF BUSINESS AND ECONOMICS  
BACHELOR OF SCIENCE-ECONOMICS**

**COURSE CODE: ECO 1205-1**

**COURSE TITLE: APPLIED STATISTICS**

DATE: 7<sup>TH</sup> OCTOBER, 2021

TIME: 0830 – 1030HRS

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**INSTRUCTIONS TO CANDIDATES**

Answer Question **ONE** and any other **THREE** questions

*This paper consists of **FOUR** printed pages. Please turn over.*

**QUESTION ONE:**

1a). Joyce sells crates of product X in Narok Town. She usually sells the larger number of crates on Monday. She has established the data below of the number of crates she expects to sell on a particular Monday.

<b>Number of crates</b>	<b>Probability</b>
0	0.25
1	0.10
2	0.15
3	0.20
4	0.10
5	0.15
6	0.05

- i) Give the name of the distribution 1 mark
- ii) On a typical Friday, how many crates does she expect to sell? 2 marks
- iii) Determine the standard deviation of the distribution. 2 marks

b) There are six flights daily from Nairobi Kenya to Kigali Rwanda. Suppose the probability that any flight arrives late is 0.15, determine the following;

- i.) Probability that none of the flights are late today. 2 marks
- ii.) Probability that four of the flights are late. 2 marks
- iii.)  $P(x > 5)$  2 marks
- iv.)  $P(x \leq 3)$  2 marks

c) Given a population consisting of measurements 9, 6 and 3 and described by the probability distribution as per the table below

x	3	6	9
P (x)	1/3	1/3	1/3

If a random sample of  $n=3$  measurements is selected from the population, construct the sampling distribution of the sample median 4 marks

d) Differentiate between an Estimate and an Estimator and give two important properties of an Estimator 3 marks

e) Differentiate between Type 1 error and Type 2 error in the test of hypothesis 2 marks

f) Given the following sample information

TREATMENT 1	TREATMENT 2	TREATMENT 3
1	3	4
5	2	2
3	1	1
2	3	3

Assume you want to test the hypothesis that the treatment means are equal, Required state the set of hypothesis and compute the ANOVA table 4 marks

### QUESTION TWO

Erick was curious about the relationship between size of a family and the amount spent on food per week in Nakuru.

He took a sample of ten families from an estate in Nakuru town. The figures of family size and the amount spent on food per week in Kenya Shillings were as below.

Family Size	Amount spent on food
3	900
6	1040
5	1510
6	1290
6	1420
3	1110
4	740
4	910
5	1190
3	910

Taking the amount spent on food as the independent variable (Y)

- Compute the coefficient of correlation and interpret your answer. 5 marks
- Determine the coefficient of Determination and interpret your answer. 2 marks
- Determine the regression equation y on x 5 marks
- Determine the standard error of estimate 3 marks

### QUESTION THREE

- With the help of diagrams , explain the difference between One tailed test and Two tailed test as applied to hypothesis testing 4 marks
- The records of m revealed that the mean life of battery in driving a vehicle is 22,100 kilometers. The distribution of the life of the Battery approximately normal. A Battery

manufacturer claimed that its Batteries have a mean life in excess of 22,100 kilometers. The director of the company purchased a large number of batteries. A sample of 18 batteries revealed that the sample mean life was 23,400 kilometers and the sample standard deviation was 1,500 kilometers.

Is there enough evidence to substantiate the manufacturer's claim at 0.1 level.

( 6 marks)

c) Using a flow chart explain when to use a Z-test and when to use a student's t-tests.

(5 marks)

#### QUESTION FOUR

Organization X has six production employees in total. The hourly earnings of each of the employees in Kenya Shillings is given as per the table below:-

Employee	Hourly earnings
A	50
B	60
C	70
D	80
E	90
F	100

Required:

- Determine the population mean earning. (2 marks)
- Construct the sampling distribution of the mean earning for a sample of size two given the sampling is done without replacement. (5 marks)
- Find the mean of the sample means (3 marks)
- Determine the standard error. (3 marks)
- Assuming sampling was done with Replacement, what would be the sample size. (2 marks)

#### QUESTION FIVE (FIFTEEN MARKS)

- Give four important characteristics of a normal probability distribution. (4 marks)
- Weekly income of supervisors in a given manufacturing industry follow the normal probability distribution with mean being Kshs. 10,000 and standard deviation of Kshs. 1000.

Determine:

- The Z value for the income (3 marks)
- The probability that a supervisor earns between Kshs. 8,000 and Kshs. 1250. (4 marks)
- The mean under the curve lying between Kshs. 5,000 and Kshs. 9,000. (4 marks)

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