

LAIKIPIA



UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST SEMESTER 2025/2026 ACADEMIC YEAR

FIRST YEAR EXAMINATION FOR THE DEGREE OF
BACHELOR OF SCIENCE IN BIOMEDICAL

ECON 100: INTRODUCTION TO ECONOMICS

STREAM: *BMED*

TIME: 2 HRS

DAY: THURSDAY [8.30 A.M-10.30 A.M]

DATE: 29/01/2026

THIS QUESTION PAPER CONSISTS OF THREE (3) PAGES

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Instructions

Vision: Nurture and Transform for the World

Mission: To Contribute to the World through Education, Research, Training, Consultancy, Innovation, Outreach and Collaboration

1. Answer question **ONE** and any other **TWO** questions.
2. Question **ONE** is compulsory and carries **30** marks
3. All other questions carry **20** marks each.
4. Ensure your hand writing is neat and legible. Also ensure that your grammar is correct.

Question 1

- (a) Distinguish between the following pairs of terms:
 - i) Collectively exhaustive events and mutually exclusive events. **(2 Marks)**
 - ii) Uniform distribution and normal distribution. **(2 Marks)**
- (b) State **THREE** properties of the sampling distribution of means. **(3 Marks)**
- (c) Trucks randomly arrive at a loading dock at the rate of one per hour. What is the probability that no truck will arrive in the next hour? **(5 Marks)**
- (d) The travel time between Nairobi and Mombasa is between 5 hours by train and 12 hours by bus. The government wants to construct the Expressway from Nairobi to Mombasa which is expected to reduce the time taken by the bus between the two towns.
 - i) What is the probability that a bus will take between 7 to 9 hours? **(3 Marks)**
 - ii) Compute the mean of the uniform distribution? **(3 Marks)**
 - iii) Compute the standard deviation of the uniform distribution. **(3 Marks)**
- (e) Suppose the manufacturer of coca cola is in the process of producing 350 milliliters cans. The automated pouring machine needs frequent checking to verify that it is actually pouring 350 milliliters in each can. The weights of the cans are known to be normally distributed with a standard deviation of 6 milliliters.
 - i) State the null and alternative hypothesis. **(2 Marks)**
 - ii) State the decision rule if the hypothesis is to be tested at the 5% significance level for a sample of 36 cans. **(7 Marks)**

Question 2

- (a) Distinguish between Type I and Type II error in hypothesis testing. **(2 Marks)**
- (b) Fifty percent of students at LU are registered as voters. If 20 students are selected at random,
 - i) Determine the average of the probability distribution. **(4 Marks)**
 - ii) Determine the variability of this probability distribution. **(4 Marks)**
- (c) A company wants to determine if production will be increased by institution of a bonus plan. The company decides to use the bonus plan on 13 randomly selected workers and compare the results with 15 workers who operate on the usual salary basis. The number of units produced per day is:

$$\begin{array}{lll} \bar{X}_1 = 45 \text{ units} & s_1 = 7 \text{ units} & n_1 = 13 \text{ (Bonus)} \\ \bar{X}_2 = 43 \text{ units} & s_2 = 6 \text{ units} & n_2 = 15 \text{ (Salary)} \end{array}$$

- State the decision rule. **(2 Marks)**
- Compute the standard error of the difference. **(4 Marks)**
- Using the 5% significance level, test to determine whether there is difference between the mean output produced by the workers. **(2 Marks)**

Question 3

- (a) A voter opinion survey was conducted to elicit inputs from voters regarding a proposed Constitutional change. People were asked how they would vote on the ballot and this variable was tested against educational level. The results are:

Voter preference

Educational Level	Yes	No	Undecided
High School	303	65	30
College	282	70	40
University	332	86	30

- State the null and alternative hypothesis. **(2 Marks)**
 - Compute the degrees of freedom. **(4 Marks)**
 - State the decision rule. **(2 Marks)**
 - Use the 0.01 significance level to test if the children prefer one brand over the other. **(8 Marks)**
- (a) A sample of 36 employees has a mean education level of 14 years with a standard deviation of 2 years. What is the standard deviation of the sampling distribution? **(4 Marks)**

Question 4

Given the following data on annual maintenance costs of a car (Y) and its age (X)

Car	1	2	3	4	5	6	7	8	9
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Y (\$)	859	682	471	708	1094	224	320	651	1049
X (Years)	8	5	3	9	11	2	1	8	12

- (a) Compute the correlation coefficient. **(6 Marks)**
 (b) Interpret the results in part (a). **(2 Marks)**
 (c) Compute the coefficients of the regression equation. **(8 Marks)**
 (d) Suppose the value of X is 15, compute the value of Y. **(4 Marks)**

Question 5

Four persons who drink a particular brand of coffee were asked to record the number of cups consumed during a day. The results are shown in the table below:

Cappuccino	Espresso	Nescafe	Domans
3	5	2	3
2	1	10	6
5	4	5	4
6	6	7	5

- (a) State the null and alternative hypothesis **(4 Marks)**
 (b) Construct the ANOVA Table. **(8 Marks)**
 (c) Test the hypothesis at 0.01 significance level **(4 Marks)**
 (d) What should you conclude? **(4 Marks)**