



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## UNIVERSITY EXAMINATIONS 2022/2023

FIRST YEAR SECOND SEMESTER EXAMINATIONS FOR THE DEGREE OF  
BACHELOR OF SCIENCE IN STATISTICS

**SMS 3171: INTRODUCTION TO BUSINESS AND SOCIAL STATISTICS**

**DATE: APRIL 2023**

**TIME: 2 HOURS**

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**INSTRUCTIONS: Answer Question ONE and any other TWO questions.**

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### QUESTION ONE (30 MARKS)

- a) Define the following terms;
- i. Business statistics (1mark)
  - ii. Social statistics (1mark)
- b) State and describe comprehensively the term “economically active population” defining all terms used. (3marks)
- c) Consider the example of a person who, during the course of a year (52weeks) was employed for 13 weeks, unemployed for 18 weeks and not economically active during the remaining 21weeks. Classify the employment and activity status of this person, stating the reasons why. (3marks)
- d) Explain the difference between Gross National Product (GNP) and Gross Domestic Product (GDP) (2marks)
- e) Define the term consumer price index state three methods that are commonly used to estimate the CPI (4marks)
- f) In county Y, nominal wage rate was 11 shillings per hour in the year 2000 and 15 shillings in the year 2010. The price index rose from 100 in 2000 to 150 in 2010. What is the real wage index in 2010 in terms of 2000 prices? (3marks)
- g) Define the following terms;
- i. Crude birth rate (1mark)
  - ii. Crude death rate (1mark)

iii. Direct standardization (1mark)

- h) Given the following table of mortality data and age-specific rates for population B and C, calculate the expected deaths for both populations by applying direct standardization method. Use population A as the reference population. (6marks)

	Population A	Population B		Population C	
Age group		Age-specific death rate per 1000	Expected deaths	Age-specific death rate per 1000	Expected deaths
	10,060	2.94	21.34	2.31	25.41
2	27,500	5.45	82.65	7.14	121.38
3	34,100	41.11	825.20	36.36	727.20
4	1,903	83.33	250.00	95.00	285.00

- i) Suppose the following data represent prices of goods involved in household transportation for years 2001 through to 2005. Using 2003 as the base year, compute aggregate transportation indexes for 2001,2002,2004 and 2005. (4marks)

Item	2001	2002	2003	2004	2005
Gasoline	1.10	1.16	1.23	1.23	1.08
Oil	1.58	1.61	1.78	1.77	1.61
Transmission fluid	1.80	1.82	1.98	1.96	1.94
Radiator coolant	7.95	7.96	8.24	8.21	8.19

## QUESTION TWO (20 MARKS)

- a) Discuss the following terms;
- i. Labour underutilization (1mark)
  - ii. Time related underemployment (1mark)
- b) What are the three criteria that must be met for an individual to be regarded as unemployed? (3marks)
- c) State and describe briefly the three types of unemployment (3marks)
- d) You are given the following information on employment statistics of Country x.

Labour force;	3437992
Employed;	3252706 out of which 1217806 are under employed
Unemployed;	185286
Economically inactive population;	2160980
Civilian noninstitutional population;	5598972

Calculate;

- i. Employment rate (2mark)
- ii. Unemployment rate (1mark)
- iii. Under employment rate (2marks)
- iv. Labour force participation rate (2marks)
- e) State five uses of index numbers as a statistical tool (5marks)

**QUESTION THREE (20 MARKS)**

- a) What is an economic cycle? (1mark)
- b) With the help of a well-labelled diagram, briefly explain the four stages of the business cycles in any economy, stating the defining characteristics of each stage (10marks)
- c) The data below shows prices and quantities of commodities in the year 2010 and 2011

Commodity	Price		Quantity	
	2010	2011	2010	2011
Sugar	14	20	13	0
Rice	12	14	20	5
Margarine	10	15	12	20
Cooking Oil	6	4	8	10
Maize flour	8	6	5	5

Calculate the consumer price index for 2011 using 2010 as the base year using;

- i. Laspeyres method (3marks)
- ii. Fishers method (3marks)
- iii. Paasche's Method (3marks)

#### QUESTION FOUR (20 MARKS)

- a) Social statistics are often collected through the population censuses and sample surveys. Give four reasons why a researcher may prefer to conduct a sample survey as opposed to census. (4marks)
- b) Define the following terms;
- i. Mortality rate (1mark)
  - ii. Net migration rate (1mark)
  - iii. Total fertility rate (1mark)
- c) Write down the basic demographic/book-keeping equation, explaining how a population changes over time. (3mark)
- d) Discuss how birth, death, and migration affect the demographic structure of a population (5marks)

The following information was given as the income component of country X in 2022 (figures in millions of shillings)

Transfer payments	Kshs. 54
Interest income	Kshs. 150
Depreciation	Kshs. 36
Wages	Kshs. 67
Gross private Investment	Kshs. 124
Business profits	Kshs. 200
Indirect Business Taxes	Kshs. 74
Rental income	Kshs. 75
Net exports	Kshs. 18
Net foreign factor income	Kshs. 12
Government factor income	Kshs. 156
Household consumption	Kshs. 304

Using the income approach, calculate the Gross Domestic Product (GDP) at market price for the year 2022. (5marks)

#### QUESTION FIVE (20MARKS)

- a) State three sources of social and economic data (3marks)
- b) State three uses of tourism statistics (3marks)
- c) State three factors to consider when constructing index numbers. (3marks)
- d) Use the data below to calculate;

- i. Production index of  $A_2$  to average monthly value of the base year  $A_0$  (4marks)
- ii. Production index of  $A_1$  to the average monthly value of the base year  $A_0$  (4marks)
- iii. Production index for  $A_2$  as a percentage of  $A_1$  (3marks)

Representative goods	Production of goods in physical terms			The average price in base year
	$A_2$	$A_1$	$A_0$	
				Pb
1	200	170	100	120
2	150	100	120	415
3	180	160	80	4002
4	220	250	230	2560
5	130	150	140	2300
6	250	200	160	2450