



MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND ACTUARIAL SCIENCE

UNIVERSITY ORDINARY EXAMINATION

2018/2019 ACADEMIC YEAR

**SECOND YEAR SECOND SEMESTER EXAMINATION FOR, BACHELOR
OF SCIENCE IN APPLIED STATISTICS WITH PROGRAMMING**

AMS 210 – ECONOMIC STATISTICS

DURATION: 2 HOURS

DATE: 26/04/2019

TIME: 2:00-4:00PM

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: ANSWER ALL QUESTIONS IN THIS SECTION

QUESTION ONE (30 MARKS)

a) The table below shows the details of the products A, B, C, and D produced by a company for a period of Two years.

Product	2016		2017	
	Price (Kshs)	Quantity	Price (Kshs)	Quantity
A	410	4	427	13
B	312	7	147	5
C	115	2	315	4
D	37	6	92	8

Calculate the Marshall – Edge worth Index. (4marks)

b) In an economy of two industries, the production model is given by $X = cx + d$,

where $c = \begin{bmatrix} 0.1 & 0.6 \\ 0.5 & 0.2 \end{bmatrix}$ and $d = \begin{bmatrix} 18 \\ 11 \end{bmatrix}$. Determine the production levels necessary to satisfy the final demand. (4marks)

c) A transport company purchased a motor bike for Kshs.80,000. The resale value of the motor bike keeps decreasing from Kshs. Kshs. 70,000 in the first year to Kshs. 5,000 in the eight year, while the running cost in maintaining the bike keeps on increasing with Kshs.3,000 in the first year till it goes to Kshs. 20,000 in the eight year as shown in the table below:

Year	1	2	3	4	5	6	7	8
Scrap value	70,000	61,000	55,000	49,000	30,000	20,000	10,000	5000
Running cost	3,000	3,600	4,800	5,000	8,000	11,200	15,000	20,000

Determine the optimal replacement policy. (6marks)

d) Suppose that a County X produced 1750 bags of maize in 2015 and 1050 bags of maize in 2017. If the price of a bag of maize in 2015 was Kshs. 2500 and the price of a bag of maize in 2017 was Kshs. 3000, calculate the actual growth in production. (3marks)

e) In January 2010, the Kenyan consumer price index was 240.176 and in January 2011, it was 252.764. Calculate the annual percentage rate of inflation in the CPI over 2010. (2marks)

f) The table below shows the prices per unit (of given commodities) in 2007 and respectively:

Commodity	2007	2008
Milk	149	177
Sugar	168	177
Flour	147	192
Cabbage	162	174

Using 2007 as the base year, calculate the average price relative of the four commodities using geometric mean method. Explain you're your answer. (4marks)

g) Name three uses of price indices (3marks)

h) The table below shows details of components A, B, C, and D produced by a manufacturing firm:

Company	2010		2011	
	Price (Kshs)	Quantity	Price (Kshs)	Quantity
A	452	3	510	4
B	627	9	712	8
C	347	4	432	5
D	127	5	198	7

Compute the price index using the current weighted average method. (4marks)

SECTION B: ANSWER ANY TWO QUESTIONS IN THIS SECTION

QUESTION TWO (20 MARKS)

a) A factory has 1000 bulbs installed. The cost of individual replacement is Kshs. 3 while that of group replacement is Kshs. 1 per bulb respectively. It is decided to replace all bulbs simultaneously at a fixed time interval and also to replace the individual bulbs that fail in between. The failure probabilities are as given below.

Week	1	2	3	4	5
Failure Prob (p)	0.1	0.25	0.5	0.7	1

Determine the optimal replacement policy. Interpret your results. (12marks)

b) The table below shows quantities and prices of commodities sold by a shopkeeper

Commodity	2004		2012	
	Price per unit	Quantity (units)	Price per unit	Quantity (units)
Sugar	25	60	34	62
Milk	42	105	67	115
Butter	15	60	45	33
Bread	37	33	58	76

Construct

i) The Fisher's quantity Index Numbers taking 2004 as the base year. (5marks)

ii) The Paasche's Index Numbers. (3marks)

QUESTION THREE (20 MARKS)

a) A company produces web design, software, and networking services. Consider the company as an open economy described by the accompanying table, where the input is in Kenya shillings needed for Kshs. 1 of output needed.

Services		Input required per Ksh. 1		
		Web design	Software	Networking
	Web design	Kshs. 0.4	Kshs. 0.2	Kshs.0.45
	Software	Kshs. 0.3	Kshs. 0.35	Kshs. 0.3
	Networking	Kshs. 0.15	Kshs. 0.1	Kshs. 0.2

Suppose the (open sector) consumers have a demand for Kshs. 4,500 worth of web design, Kshs 2,700 worth of software and Kshs. 900 worth of networking services. Determine the production of each sector to meet the demand. (10marks)

b) The data below relate to the cost and number of computers sold in the years 2014 and 2015 respectively, by a given dealer.

Type of Computers	2014		2015	
	Price (Kshs)	Quantity	Price (Kshs)	Quantity
A	30,000	4	40,000	3
B	40,000	8	50,000	5
C	60,000	3	65,000	5
D	20,000	10	35,000	6

Calculate the Weighted Index Numbers using the Laspeyres method. (4marks)

c) State three short comings of consumer price Index Numbers. (3marks)

d) Define the following terms:

i) Balance of payments (BoP) (2marks)

ii) Transaction (1mark)

QUESTION FOUR (20 MARKS)

a) State and discuss briefly, the three approaches mainly used in the measurement of GDP.

(10marks)

b) Discuss three drawbacks of GDP as a measure of economic output.

(6marks)

c) From the data below, find the values of the unknowns (A, B, C, and D) by constructing a continuous spliced Index. (4marks)

Year	Index 1	Index 2
2010	100	A
2011	110	B
2012	121	C
2013	133	83
2014	D	91