



# THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

*Faculty of Engineering & Technology*

DEPARTMENT COMPUTER SCIENCE & INFORMATION TECHNOLOGY

DIPLOMA IN INFORMATION TECHNOLOGY (DIT 2 K 9J)

**ECS 2310: QUANTITATIVE TECHNIQUES III**

SPECIAL/SUPPLEMENTARY EXAMINATION

**SERIES: FEBRUARY/MARCH 2012**

**TIME: 2 HOURS**

## **Instructions to Candidates:**

You should have the following for this examination

- *Answer Booklet*
- *Calculator and SMP Tables can be used*

This paper consist of **FIVE** questions in **TWO** sections **A & B**

Answer question **ONE (COMPULSORY)** and any other **TWO** questions

Maximum marks for each part of a question are as shown

This paper consists of **FOUR** printed pages

## SECTION A (COMPULSORY)

### QUESTION ONE (30 MARKS)

- a) Explain the following components of time series
- (i) Cyclic movement
  - (ii) Secular trend
- (4 marks)
- b) Describe the following type of index numbers:
- (i) Laspeyres price index
  - (ii) Paasches price index
- (4 marks)
- c) The table below shows the quantities with their corresponding prices in 2009 and 2010

Commodity	Standard Quantity	Prices in Ksh	
		2009	2010
	W	Po	Pn
A	5	215	210
B	12	250	275
C	2	110	130
D	8	950	950

Calculate the following:

- (i) Expenditure index
  - (ii) Simple aggregate price index
- (6 marks)
- d) Explain any **TWO** methods of determining the trend under time series analysis
- (4 marks)
- e) Describe any **TWO** types of correlation
- (2 marks)

## SECTION B (Answer any two questions)

### QUESTION TWO

Explain the **TWO** models of time series

(4 marks)

The table below shows the details of student's enrolment in a college for three successive years. Use it to answer the questions that follow

Year	Student Enrolment		
	Term 1	Term 2	Term 3
2008	1500	1300	1050
2009	1600	1450	1150
2010	1750	1650	1300

- (i) Using the moving average method, determine the trend values
  - (ii) Using the multiplicative model, determine the seasonal variation for each term
- (6 marks)
- (6 marks)

- (iii) Represent the above data including the trend values graphically. (4 marks)

### QUESTION THREE

- a) (i) Differentiate between irregular and cyclic component of a time series.  
 (ii) Describe the following terms as applied in time series  
 (i) Deseasonalization  
 (ii) Decomposing a time series (6 marks)
- b) The table below shows the quarterly production of keyboards at particular electronics company.

Year	1				2				3		
Quarter	1	2	3	4	1	2	3	4	1	2	3
Output in ('000)	24	50	56	63	79	89	79	80	93	100	88

- i) Calculate the Four-quarter moving average for the production (6 marks)  
 ii) Plot the trend and time series curves for the production on the same axis (4 marks)  
 iii) Evaluate the adjusted seasonal component for each quarter. Use additive time series model (4 marks)

### QUESTION FOUR

- a) Define the term index numbers (2 marks)
- b) Describe the following types of index numbers:  
 (i) Expenditure index  
 (ii) Simple aggregate index (2 marks)
- c) The table below shows the trend of oil products for the year 2007 and 2008

Products	2007		2008	
	Quantity (Barrels)	Unit Price (\$)	Quantity (Barrels)	Unit Price (\$)
Petrol	210	90	160	140
Diesel	250	80	230	120
Kerosene	340	60	290	100
Lubricant	430	30	620	80

Find the fishers ideal price index for the products. (Use 2007 = 100) (10 marks)

### QUESTION FIVE

- a) The table below shows the quantities with their corresponding prices in 2009 and 2010.

Commodity	Standard Quantity	Prices in Ksh	
		2009	2010
	W	P <sub>0</sub>	P <sub>n</sub>
A	5	215	210
B	12	250	275
C	2	110	130
D	8	950	950

Calculate the following:

- (i) A weighted average of price relative
- (ii) A weighed aggregate price index (8 marks)

f) The table below shows the details of student's enrolment in a college for three successive years. Use it to answer the questions that follow.

Year	Student Enrolment		
	Term 1	Term 2	Term 3
2008	1500	1300	1050
2009	1600	1450	1150
2010	1750	1650	1300

- (i) Using the moving average method, determine the trend values (6 marks)
- (ii) Using the multiplicative model, determine the seasonal variation for each term (6 marks)
- (iii) Forecast the student enrolment for the year 2011 in the college