TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

DIPLOMA IN INFORMATION COMMUNICATIONTECHNOLOGY
DIPLOMA IN INFORMATION TECHNOLOGY
(DIT 10M/DICT 10M)

ECS 2310: QUANTITATIVE TECHNIQUE III

SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: JULY 2014
TIME ALLOWED: 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
Answer question **ONE** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** 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 (6 marks)

(ii) Using the multiplicative model, determine the seasonal variation for each term (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 quarte. Use additive time series model (4 marks)

Question Four (20 marks)

a) Define the following terms as used in correlation theory.

i) Correlation

ii) Un-correlated

iii) Perfect Correlation **(6 marks)**

b) The table below shows the height and weight of a random sample of 10 patients. Use it to answer the questions that follow:

Patient	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**
Height in Inch	62	64	66	68	70	72	74	76	78	80
Weight in Kg	66	67	72	72	57	76	72	76	87	82

i) Calculate Pearson's correlation coefficient for the data. **(8 marks)**

ii) Calcualte the coefficient of determination for the data. **(2 marks)**

iii) Interpret both the values for the coefficient of correlation and determination. **(4 marks)**

Question Five (20 marks)

a) Explain the importance of regression analysis. **(2 marks)**

b) State any **TWO** assumptions of regression analysis. **(2 marks)**

c) Describe the term bivariate as used in regression. **(2 marks)**

d) The table below shows the relationship between age (in years) and price (in thousands of shillings) of a BMW motor bike sold by a company dealing with secondhand motor bikes.

Age	8	3	6	9	2	5	6	4
Price	16	74	38	19	102	36	33	69

i) Draw a scatter diagram to represent the data. **(4 marks)**

ii) Determine the regression line for the data. **(8 marks)**

iii) Comment on the gradient for the data. **(2 marks)**