THE TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

DIPLOMA IN COMMUNICATION & INFORMATION TECHNOLOGY
(DCIT 2K11/DICT10A/DICT 11M)

ECS 2211: QUANTITATIVE TECHNIQUES

SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: FEBRUARY 2013
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer Booklet*

This paper consist of **FIVE** questions
Answer question **ONE (COMPULSORY)** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

Question One (Compulsory)

a) Distinguish between the following terms:
    (i) Regression
    (ii) Correlation   (4 marks)

b) Define each of the following terms as used in time series analysis:-
    (i) Trend
    (ii) Cyclic movement
    (iii) Random variation   (6 marks)

c) It is Define the following statistical measures:
d) Price index
e) Coefficient of determination   **(4 marks)**

f) State **TWO** characteristics of the Poisson distribution.   **(2 marks)**

g) Explain **FOUR** characteristics of the components of a time series.   **(4 marks)**

h) The probability of getting a defective resistor from a supplier is 0.03. The resistors are packed in boxes each containing 100 resistors. Calculate the probability of getting at most 2 defective resistors.   **(4 marks)**

i) State **TWO** uses of the concept of regression analysis.   **(2 marks)**

j) With the aid of a diagram, distinguish between perfect positive correlation and negative correlation. Showing the line of best fit where possible.   **(4 marks)**

Question Two

a) The table below shows the relationship between age (in years) and price (in thousands of shillings) of BMW motorbike sold by a company dealing with second hand motorbikes.

Age	8	3	6	9	2	5	6	4
Price	16	47	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 using the least squares method.   **(6 marks)**
    (iii) Interpret the gradient of the line.   **(2 marks)**
    (iv) Estimate the price of the motorbike which is aged at 10 years.   **(2 marks)**

Question Three

a) Explain the following terms as applied in indices:
    (i) Volume index
    (ii) Base year   **(4 marks)**

b) State **FOUR** uses of index numbers.   **(4 marks)**
c) The table below shows the trend of oil products for the years 2007 and 2008.

PRODUCTS	2007	2008

	QUANTITY	PRICE	QUANTITY	PRICE
Pertrol	210	90	160	140
Diesel	250	80	230	120
Kerosene	340	60	290	100
Lubricant	430	30	620	80

Calculate the following index numbers:

(Use 2007 = 100)

(i)	Laspeyres price index	**(3 marks)**
(ii)	Paasches volume index	**(3 marks)**
(iii)	Fisher price index	**(6 marks)**

Question Four

a) Distinguish the terms correlation and regression.   **(4 marks)**

b) Describe why the Spearmans Rank Correlation is used.   **(2 marks)**

c) The table below shows the scores awarded by two judges P and Q to several competitors during inter-college music festivals.

Competitor	A	B	C	D	E	F	G	H
Judge P	25	19	21	23	28	17	16	28
Judge Q	20	9	21	13	7	14	21	15

(i)	Determine the spearman's Rank correlation coefficient for the scores.	**(8 marks)**
(ii)	Determine the coefficient of determine nation.	**(2 marks)**
(iii)	Give an interpretation of both the values of r and r^2.	**(4 marks)**

Question Five

a) Differentiate between irregular and cyclic components of a time series.   **(4 marks)**

b) Describe the steps involved in determining the trend using the Semi Average Method**. (4 marks)**

c) The table below shows the quarterly production of Keyboards at particular electronic company.

YEAR	1				2				3		
QUARTER	1	2	3	4	1	2	3	4	1	2	3
OUTPUT	24	50	56	63	79	89	79	80	93	100	88
(in '000')											

(i)	Calculate the Four-quarter moving averages for the production.	**(5 marks)**
(ii)	Evaluate the seasonal components for each quarter. User the additive model.	**(5 marks)**
(iii)	Evaluate the deseasonalised data.	**(2 marks)**