THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

(A Centre of Excellence)

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY (DICT 10M)

DIPLOMA IN INFORMATION TECHNOLOGY (DIT 10M)

EIT 2306: QUANTITATIVE TECHNIQUES I

END OF SEMESTER EXAMINATION
SERIES: AUGUST 2012
TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

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 **THREE** printed pages

SECTION A (COMPULSORY)

Question One (20 Marks)

a) Explain the following terms as applied in Estimation:
   (i) Point estimate
   (ii) Internal estimate
(4 marks)

b) Distinguish between regression and correlation. **(4 marks)**

c) The time taken to learn the standing order by members of parliament is normally distributed with a mean of 80 hours with a standard deviation of 3 hours. If a random sample of 16 members is selected, find the probability that the mean time to learn the standing orders will be more than 90 hours. **(4 marks)**

d) The population mean weight of packets of sugar is normally distributed with a standard deviation of 2.5g. the machine used in packaging is adjusted to give anew metric size packet. A random sample of 20 new packets produced after adjustment had a mean weight of 1010g. Determine a 99% confidence interval for the population mean weight of the new packet. **(4 marks)**

e) State **FOUR** stages involved in the sample survey. **(2 marks)**

f) State any **TWO** areas where Poisson distribution is applied. **(2 marks)**

SECTION B (Answer Any Two Questions)

Question Two (20 marks)

a) Explain on the following sampling methods giving relevant examples on where they can be applied:
   i) Random sampling
   ii) Quota sampling
   iii) Cluster sampling **(6 marks)**

b) Explain the following terms as used in the concept of probabilities.
   i) Event
   ii) Discrete probability **(4 marks)**

c) The probability that a bulb produced by a factory will fuse after 100 days of use is 0.05. Find the probability that out of 5 such bulbs.
   i) Two
   ii) Not more than 1
   iii) At most 3

   Will fuse after 100 days of use. (Use binomial distribution). **(10 marks)**

Question Three (20 marks)

a) A radio station, during one of its morning programmes, decided to collect opinions of Nairobi residents about traffic jams. In a random sample of 800 residents, 480 revealed that they would like to see a jam free city. Find the 95% confidence interval for the proportion of residents who would like to see a jam free city. **(6 marks)**

b) The table below shows the mean scores for eight primary schools in two national examinations for years 2010 and 2011.

School	2010 Mean Score	2011 Mean Score
A	300.5	290.7
B	239.6	250.1
C	278.5	218.5
D	312.7	314
E	312.7	218.5
F	340.0	284.8
G	284.9	320.5
H	267.5	218.5

Calculate the Spearman's Rank correlation co-efficient for the scores. **(6 marks)**

c) When appointing computer operators, a firm requires the candidates to pass a written examination. The paper contains one hundred multiple choice questions, each with three answers out of which only one is correct. A pass is obtained by answering 40 or more questions correctly. Estimate the probability that a candidate who chooses to answer each question randomly will pass the examination. **(8 marks)**

Question Four (20 marks)

a) State two examples of sample statistics. **(2 marks)**

b) Define the following terms as used in estimation.

i) Sample statistic

ii) Population parameter

iii) Sample. **(6 marks)**

d) The table below shows data relating to different batch sizes of clothes and their corresponding production costs per week at a particular textile company. Use it to answer the questions that follows:

Batch size	11	13	18	24	28	32	38	42	47	53
Cost ('000')	2.1	2.7	2.9	2.9	3.1	3.0	3.3	3.7	4.0	4.4

i) Calculate the Pearson's product moment correlation coefficient. **(8 marks)**

ii) Calculate the coefficient to determine and interpret the result. **(4 marks)**

Question Five (20 marks)

a) Explain **TWO** assumptions associated with regression analysis. **(2 marks)**

b) Distinguish between negative gradient and positive gradient as used in regression analysis. **(4 marks)**

c) The table below shows the income and savings per year for some civil servants. Use it to answer the questions below:

Income/Year (shs '000')	15	6	9	20	11	14	10	12
Savings/Year (shs '000'	2	0.2	0.5	2.5	1.8	1.5	1.5	1.6

i) State the independent and dependent variable. **(1 mark)**

ii) Determine the equation of the regression line for the data using the least squares method. **(6 marks)**

iii) Represent the data above on a graph including the regression line. **(7 marks)**