



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

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)**