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 2K 10J)

EIT 2313: QUANTITATIVE TECHNIQUE II

SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: OCTOBER 2012
TIME: 2 HOURS

<u>**Instructions to Candidates:**</u>
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
<u>**SECTION A (COMPULSORY)**</u>

Question One (30 marks)

a) (i) Describe the term "Decision tree" as applied in decision theory.
(ii) Explain **TWO** types of simulation. **(6 marks)**
b) With the aid of a diagram, describe the following terms as used in network analysis.
   i) Dangling
   ii) Looping **(4 marks)**
c) Explain the term dummy activity as applied in network diagrams. **(2 marks)**
d) List the steps involved in formulating a linear programming problem using the simplex method.
   (4 marks)
e) State any **FOUR** assumptions made in linear programming. **(2 marks)**
f) Define the term simulation. **(2 marks)**

<u>**SECTION B (Answer Any Two Questions)**</u>

Question Two (20 marks)

a) Define the term linear programming. **(2 marks)**

b) Explain the components of linear programming model. **(4 marks)**

c) A firm produces three products X, Y and Z with a contribution of ksh. 20, 18 and 16 respectively, production data are as follows:

	Machine Hours	Labour Hours	Material
X	5	2	8
Y	3	5	10
Z	6	3	3
Availability	3000	2500	10,000

   (i) Set up the initial simplex tableau including the slack variables.
   (ii) Use the simplex method to set up content of the second table. **(14 marks)**

Question Three (20 marks)

a) (i) Define a pay-off table as used in decision theory.
(ii) Distinguish between types of nodes found in decision trees. **(6 marks)**

b) Susan, a business lady would like to borrow shs. 300,000 from a bank in order to finance a project. The money to be repaid within one year. The bank charges a 16% p.a. Simple interest. The bank may grant the loan or invest the same amount and be guaranteed a return of 10% p.a. From past experience at the bank 5% of clients granted loans default on repayment.

   (i) Using this information, construct a pay off table for the bank. **(5 marks)**
   (ii) Draw a decision tree to represent this information. **(5 marks)**
   (iii) Determine the best decision for the bank. **(4 marks)**

Question Four (20 marks)

a) Define the following with respect to network analysis.
    i) Event
    ii) Network

b) State THREE characteristics of the critical path method. **(3 marks)**

c) A project had activities shown below:

Activity	Durations in Weeks	Preceding Activity	Std. Deviation of time
A	5	-	1.5
B	6	-	2
C	7	A	2.5
D	4	A	1
E	2	A,B	0.5
F	4	C,D,E	1.5
G	10	D,E	3
H	3	F,G	1.5

(i) Draw the network and mark the critical path. **(6 marks)**

(ii) Calculate the probability that the project will last for more than 26 weeks. **(7 marks)**

Question Five (20 marks)

a) State **TWO** advantages and disadvantages of simulation. **(4 marks)**
b) State **THREE** areas where simulation can be applied. **(3 marks)**
c) During the Jamuhuri Day celebrations, a human rights organization decided to interview 100 people to get their opinion on the dressing mode for ladies. The organization chose a strategic place where they could interview the people as the arrived for the occasion. The table below shows the arrival pattern of the people.

Time Between Arrivals	0	1	2	3	4	5
Probability	0.25	0.35	0.18	0.10	0.08	0.04

The interview time had the following distribution.

Interview time (min)	2	4	6
Probability	0.40	0.45	0.15

    i) Allocate random numbers ranges to the following:
      - Time between arrivals
      - Interview time **(5 marks)**
    ii) Using the following random numbers arrival pattern, simulate the problem and find the average time between arrivals.
        (8 marks)