



**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**

**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) (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)**

**SECTION B (Answer Any Two Questions)**

**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:

	<b>Machine Hours</b>	<b>Labour Hours</b>	<b>Material</b>
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 they arrived for the occasion. The table below shows the arrival pattern of the people.

Time Between Arrivals	0	1	2	3	4	5
Probability	0.2	0.3	0.1	0.10	0.08	0.04
	5	5	8			

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)**