THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

Faculty of Engineering & Technology

DEPARTMENT COMPUTER SCIENCE & INFORMATION TECHNOLOGY

DIPLOMA IN INFORMATION & COMMUNICATION TECHNOLOGY
(DICT 2K 9J & DICT 09 M)

EIT 2313: QUATITATIVE TECHNIQUE II

END OF SEMESTER EXAMINATIONS

SERIES: DECEMBER 2011

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 **FOUT** 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 **FOUR** printed pages

SECTION A (COMPULSORY)

Question 1(20 Marks)

a) Outline **THREE** circumstances in which network analysis would be necessary**.** **(3 marks)**

b) Differentiate between maximin and maximax as used in statistical decision theory. **(4 marks)**

c) A college is proposing to introduce three categories of courses, Engineering, Business and Hospitality, based on assessment of the training needs. Each course category has three levels, Craft certificate, Ordinary Diploma and Higher diploma. However, the college has the capacity to introduce only one course category. The table below shows the details of the course, categories with their corresponding profits. Use it to answer the questions that follows.

		Revenue in millions Ksh		
		Course Category		
Course level	**Probability**	**Engineering**	**Business**	**Hospitality**
Craft certificate	0.2	60	100	120
Ordinary Diploma	0.5	40	60	80
Higher Diploma	0.3	20	0	-40

Using EMV, determine the best course category for the college. (4 marks)

d) Explain the following types of simulation:

i. Analogue simulation
ii. Monte-Carlo simulation (4 marks)

e) Describe the following terms as used in network planning:

i. Critical path
ii. Event (4 marks)

f) Explain the term looping as used in network planning. (1 mark)

SECTION B (ANSWER ANY TWO QUESTIONS)

Question two 20 marks

a) State any **FOUR** importance of network analysis. (4 marks)

b) Outline **FOUR** rules of drawing a network diagram. (4 marks)

c) The table below shows details of activities in a construction project. Use to answer the following questions that follow.

Activity	Preceding Activity	Duration (Weeks)
A	-	6
B	-	8
C	-	15
D	A	14
E	B	8
F	A	12
G	B	10
H	F	8
J	C,D,E	10
K	C,D,E	12
L	C,D,E,G	8
M	H,J	6
N	H,J,K,L	10

i. Draw a network diagram to represent the execution of the project clearly showing the EST and LST for each event. (8 marks)
ii. Determine the expected project duration. (2 mark)
iii. Determine the critical path of the network, stating the critical activities. (2 marks)

Question three 20 marks

a) Explain the main limitation of the graphical method used in linear programming. (2 marks)

b) Explain the **TWO** main objectives of linear programming. (2 marks)

c) A firm produces two brands of batteries, brand X and brand Y which have a sale price of Ksh 50 and Ksh 80 respectively. The production of each brand involves assembling, testing and packaging. The time taken to complete each task per brand and the maximum time available for each task per month is as shown in the table below.

	Hours required for each task		
	Assembly	**Testing**	**Packaging**
Brand X	2	1	0
Brand Y	3	1	1
Hours available per month	600	250	150

i) Formulate a linear programming (LP) model for the above problem. (4 marks)

ii) Using the simplex method, determine the optimum monthly production plan which maximizes sales. (12 marks)

Question four 20 marks

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

b) Pwani industries have developed a new product X. They can either test the market or even abandon due to competition from imported products. The details are set out below. Test market cost ksh. 50,000, likely outcomes are favorable (P = 0.7) or failure (P = 0.3).

If favorable they could either abandon or produce it when demand is anticipated to be

Low P = 0.25 loss Ksh. 100,000
Medium P = 0.6 profit Ksh. 150,000
High P = 0.15 Profit Ksh. 450,000.

If the test market indicates failure the project would be abandoned. Abandonment at any stage results in a gain of Ksh. 30,000 from the special machinery used.

i. Draw the decision tree showing the nodes and probabilities.
ii. Evaluate the decision tree. (14 marks)