



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

Faculty of Engineering & Technology

DEPARTMENT COMPUTER SCIENCE & INFORMATION TECHNOLOGY

DIPLOMA IN INFORMATION & COMMUNICATION TECHNOLOGY
(DICT2K9J & DICT09M)

EIT 2312: QUANTITATIVE TECHNIQUE II

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: FEBRUARY/MARCH 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 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

- a) (i) Describe the term 'state of nature' as applied in decision theory.
(ii) Name **FOUR** types of decision making. (6 marks)
- b) With the aid of diagrams, 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** assumption made in linear programming. (2 marks)
- f) Define the term simulation. (2 marks)

SECTION B ANSWER ANY TWO QUESTIONS (40 MARKS)

QUESTION TWO

- a) Explain the term 'optimal solution' as applied in linear programming. (2 marks)
- b) Outline the steps followed in forming a linear programming model. (4 marks)
- c) Delta Company has 3 types of machines, type A, type B and type C. Machine A has 400 production hours, Machine B has 800 hours and Machine C has 300 hours. The company produces two products, X and Y with selling prices sh. 40 and sh. 32 respectively. Product X requires 40 hours on machine B and 10 hours on machine C. Product Y requires 16 hours on machine A, 20 hours on machine B and 10 hours on machine C. Use simplex method to determine the:
i. Quantities of X and Y
ii. Maximum profit (14 marks)

QUESTION THREE

- a) Define the following with respect to network analysis:
i. Float
ii. Critical activity (4 marks)
- b) State **THREE** differences between the critical path method and project evaluation and review technique. (3 marks)
- c) A project had the activities recorded as Shown below.

Activity	Duration 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
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- 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 FOUR

- a)
 - i. Define a decision tree.
 - ii. Distinguish between types of nodes found in decision trees. (6 marks)
- b) Gilgil industries has 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)