



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Engineering and Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

**UNIVERSITY EXAMINATION FOR DEGREE IN
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY (BSc. I.T 9S)
(YR III, SEM I)**

EIT 2212: BUSINESS SYSTEM MODELLING

END OF SEMESTER EXAMINATIONS

SERIES: AUGUST/SEPTEMBER 2011

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 is as shown

This paper consists of **THREE** printed pages

SECTION A (Compulsory - 30 marks)

Question 1

- a Explain the following terms
- i) Operations Research
 - ii) Business System
 - iii) Model
 - iv) Regression analysis (8 marks)
- b) Explain the **SIX** stages followed in an Operations Research study (12 marks)
- c) Explain any **TWO** assumptions usually made in Economic Order Quantity calculations (4 marks)
- d) Explain any **THREE** investment appraisal techniques (6 marks)

SECTION B (Attempt any TWO questions)

Question 2 (20 marks)

- a) Explain any **THREE** application areas of simulation (6 marks)
- b) Over a period of 60 days demand for training in a specific computer package was recorded by Mwambao Computer College as follows:

<u>No. of inquiries</u>	<u>Frequency (days)</u>
0	5
1	6
2	16
3	14
4	10
5	7
6	2

Simulate the daily inquiries for a 15 day period using the random numbers provided below:

84649 48968 75215 75215 75498 49539 74240 03466 49292 36401 (14 marks)

Question 3 (20 marks)

- a) Using well illustrated diagrams, explain the following queuing models
- i) Single channel single-phase model
 - ii) Single channel multi-phase model
 - iii) Multi-channel single-phase model
 - iv) Multi-channel multi-phase model (8 marks)
- b) In a simple queue situation, an average arrival rate of 15 per hour had been observed and the service facility can on average deal with 20 items per hour.

Determine:

- i) The traffic intensity
- ii) The average number of items in the queue including the times when there is no queue
- iii) The average time in the queue
- iv) The average time in the system (12 marks)

Question 4 (20 marks)

- a) Two projects with the following estimates are being considered:

Project A

Optimistic Outcome of Ksh. 600,000 with a probability of 0.2
Most likely Outcome of Ksh 350,000 with a probability of 0.5
Pessimistic Outcome of Ksh. 250,000 with a probability of 0.3

Project B

Optimistic Outcome of Ksh. 650,000 with a probability of 0.1
Most likely Outcome of Ksh 400,000 with a probability of 0.6
Pessimistic Outcome of Ksh. 100,000 with a probability of 0.3

Using the data given, explain which project would be preferred. (10 marks)

b) The sugar requirement for a certain institution is as follows:

- Average usage = 300 Kgs per week
- Minimum usage = 220 Kgs per week
- Maximum usage = 420 Kgs per week
- Lead time = 10 to 14 weeks
- EOQ = 3500 Kgs

Use this information to calculate:

- Reorder level
- Minimum stock level
- Maximum stock level at the institution (10 marks)

Question 5 (20 marks)

a) Explain any **THREE** assumptions used in Linear Programming technique (6 marks)

b) A company owns two flour mills A and B. The mills have different production capacities for high, medium and low grades of flour. The company has entered a contract to supply 24, 16 and 48 bags of high, medium and low grades of flour respectively. It costs the company shs 1000 and shs 800 per week to run mills A and B respectively. In a week, mill A produces 12, 4 and 8 bags of high, medium and low grades of flour respectively while mill B produces 4, 4 and 24 bags of high, medium and low grades of flour respectively.

- Develop a linear programming model to represent this information (4 marks)
- Use graphical method to solve the model developed in (a) above (10 marks)