



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

(A Centre of Excellence)

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

**UNIVERSITY EXAMINATION FOR DEGREE IN BSCI. /BTECH. IN
INFORMATION TECHNOLOGY (BSC IT 9S/BT IT M11)**

ICS 2403/EIT 4312: DISTRIBUTED SYSTEMS

END OF SEMESTER EXAMINATION

SERIES: AUGUST 2012

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 **ALL** questions in section **A** and any other **TWO** from section **B**

Maximum marks for each part of a question are as shown

This paper consists of **TWO** printed pages

SECTION A (COMPULSORY)

Question One (30 Marks)

- | | |
|--|------------------|
| a) Define the term distributed systems | (2 marks) |
| b) Explain FOUR characteristics of a distributed system. | (4 marks) |
| c) Give THREE common examples of distributed systems. | (3 marks) |
| d) List FIVE applications of distributed systems | (5 marks) |
| e) Identify FIVE design goals of a distributed system. | (5 marks) |
| f) Describe FIVE design challenges of a distributed system | (5 marks) |
| g) List FOUR characteristics of a heterogeneous system. | (4 marks) |
| h) Identify FOUR elements of a distributed system architecture. | (4 marks) |
| i) List FOUR characteristics of a distributed operating system. | (4 marks) |

SECTION B (Answer Any Two Questions)

Question Two (20 marks)

- a) Define the term process synchronization. **(2 marks)**
- b) Describe **FIVE** general approaches to process synchronization. **(5 marks)**
- c) Differentiate between centralized mutual exclusion and distributed mutual exclusion. **(8 marks)**
- d) Explain how a bully logarithm works. **(5 marks)**

Question Three (20 marks)

- a) Describe the function of an election algorithm **(2 marks)**
- b) When is an election algorithm created? **(2 marks)**
- c) Describe with diagrams how the ring algorithm works. **(16 marks)**

Question Four (20 marks)

- a) List **FOUR** properties of a transaction. **(4 marks)**
- b) Describe **FIVE** activities of a distributed transaction. **(5 marks)**
- c) List **THREE** types of group communications. **(3 marks)**
- d) Identify **FOUR** group management functions. **(4 marks)**
- e) Describe **FOUR** message ordering techniques. **(4 marks)**

Question Five (20 marks)

- a) Differentiate between normal procedure call and remote procedure call. **(3 marks)**
- b) Identify the components of a call message. **(4 marks)**
- c) List any **FIVE** elements of an RPC system. **(5 marks)**
- d) Describe the steps in conducting a remote procedure call. **(8 marks)**