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 II)

ICS 2400: TRANSACTION PROCESSING SYSTEMS

END OF SEMESTER II EXAMINATION

SERIES: DECEMBER 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 are as shown
This paper consists of **THREE** printed pages

SECTION A (*Compulsory*)

Question One (30 Marks)

a) Explain the following terms:
   i) Transaction
   ii) Concurrency
   iii) Structured Query Language [6 Marks]

b) Explain the difference between the following terms:
   i) "Online Transaction" and "Transaction Processing Systems"
   ii) "Commit Transaction" and "Rollback"
   iii) "Single User System " and "Multiuser System" [12 Marks]

c) Explain the **FOUR** properties of a transaction. [4 Marks]

d) Explain any **FOUR** types of failures that may occur in transaction processing systems [4 Marks]

e) Explain the following models of a transaction processing system [4Marks]
   i) Nested Transaction
   ii) Flat Transaction [4Marks]

SECTION B (*Attempt any TWO questions*)

Question Two (20 Marks)

a) Explain why concurrency control is need in transaction processing systems [2Marks]

b) Describe the following types of problems encountered when two transaction are executed concurrently:
   i) Lost update problem
   ii) Dirty read Problem
   iii) Incorrect summary problem [6 Marks]

c) Using ATM transactions, explain the following transaction states:
   i) BEGIN_TRANSACTION
   ii) READ(X)
   iii) END_TRANSACTION
   iv) WRITE(X) [12 Marks]

Question Three (20 Marks)

a) Explain the **TWO** conditions that may occur when a transaction is submitted to Database Management for execution. [4 Marks]

b) Explain why recovery is needed in a transaction processing systems [2 Marks]

c) Explain the term "System Log". [2 Mark]

d) Explain the **FIVE** types of entries written in system log and the actions each performs. [10 Marks]

e) Explain the "NO_UNDO/REDO" recovery algorithm [2 Marks]

Question Four (20 Marks)

a) Explain the following types of schedules based serialisability
   i) Serial
   ii) Nonserial
   iii) Conflict [6 Marks]

b) Explain the following terms:
   i) Schedule
   ii) Serialisable transaction [4 Marks]

c) Explain the following characteristics as specified by a SET TRANSACTION statement in SQL:
   i) Locking protocols
   ii) Binary lock
   iii) Shared lock [6 Marks]

d) Outline the typical recovery procedures. [4 Marks]

Question Five (20 Marks)

a) Explain the term "query processing" [2Marks]

b) With an aid of a diagram explain the major components of the query processing. [8 Marks]

c) Explain the following concurrency control protocols:
   i) Locking protocols
   ii) Timestamp protocols [6 Marks]

d) Explain the following terms as used in Transaction Processing System

   i) UNDO
   ii) ABORT [4 Marks]