THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Engineering and Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

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

ICS 2404 : ADVANCED DATABASE SYSTEMS

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 **TWO** printed pages

SECTION A (*Compulsory - 30 Marks*)

Question 1

a) Briefly discuss the following:

(i)	Timestamping	(2 Marks)
(ii)	Transaction	(2 Marks)
(iii)	Threat	(2 Marks)
(iv)	Database recovery	(2 Marks)

b) List any **FOUR** functions of a Distributed DBMS (4 Marks)

c) Briefly explain the component Architecture for a Distributed DBMS (8 Marks)

d) Discuss the advantages and disadvantages of the web as a database platform. (4 Marks)

e) Distinguish between shared locks and exclusive locks (4 Marks)

f) What is a deadlock? (2 Marks)

SECTION B (*Attempt any **TWO questions*)**

Question 2 (*20 marks*)

a) The consistency and reliability aspects of transactions are due to the Acidity properties of transactions. Discuss each of these properties and how they relate to the concurrency control and recovery mechanism. Give examples to illustrate your answer (6 Marks)

b) Discuss the types of problem that can occur with locking-based mechanisms for concurrency control and the actions that can be taken by DBMS to prevent them (6 Marks)

c) A DBMS should recovery facilities to assist with Database recovery. Discuss (8 Marks)

Question 3 (*20 marks*)

a) Explain the different ways in which concurrently executing transactions can interfere with each other and so compromise integrity and consistency of the database. Suggest a solution to the problems. (10 Marks)

b) What is two-phase locking? Explain in detail how it works. Explain one problem associated with this locking (6 Marks)

c) Distinguish between commit and rollback. (4 Marks)

Question 4 (*20 marks*)

a) Describe the following terms as used in Database Systems

(i) Threat (2 Marks)
(ii) Database security (2 Marks)
(iii) Digital certificate (2 Marks)

b) List the main types of threat that could affect a database system (7 Marks)

c) For each threat listed above, describe the controls that you would use to counteract each of them. (7 Marks)

Question 5 (*20 marks*)

a) The senior management of a company wishes to develop policies and procedures for protecting their database against accidental or intentional loss, destruction or misuse. Prepare a discussion document which outlines the most important security features provided by DBMS. (12 Marks)

b) Explain how a deadlock can occur in a distributed environment. (4 Marks)

c) Distinguish between shared locks and exclusive locks. (4 Marks)