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 BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY (BSC. IT M11)

ECS 2206: DATABASE 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 consists 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) Briefly explain the following terms:
- **i)** Attribute **(2 marks)**
- **ii)** Domain **(2 marks)**
- **iii)** Entity **(2 marks)**
- **iv)** Relationship **(2 marks)**

b) Define and briefly explain the importance logical data independence in a database. **(4 marks)**

c) What are the responsibilities of a database administrator? **(4 marks)**

d) Describe the main characteristics of the following:

i) File-based systems **(3 marks)**
ii) Database approach **(3 marks)**

How does the database approach address the limitations of the file-based systems? **(4 marks)**

e) Briefly discuss the functions of database management system. **(4 marks)**

SECTION B (Answer Any Two Questions)

Question Two (20 marks)

a) Explain the difference between external, internal and conceptual schemas. How are these different schema layers related to the concepts of logical and physical independency **(10 marks)**

b) Describe the components of the DBMS environment and discuss how they relate to each other. **(10 marks)**

Question Three (20 marks)

a) A University database contains information about professors (identified by employee number) and courses (identified by course id). Professors teach courses; each of the following situations concerns the Teaches relationship set. For each situation, draw an ER diagram that describes it (assuming no further constraints hold).

i) Professors can teach the same course in several semesters, and each offering must be recorded. **(3 marks)**
ii) Professors can teach the same course in several semesters, and only the most recent such offering needs to be recorded. (Assume this condition applies in all subsequent questions) **(3 marks)**
iii) Every Professor must teach some course. **(3 marks)**
iv) Every Professor teaches exactly one course (no more, no less) **(3 marks)**
v) Every Professor teaches exactly one course (no more, no less) and every course must be taught by some Professor. **(3 marks)**

b) Briefly explain the different ways of creating a database using oracle software. **(5 marks)**

Question Four (20 marks)

a) Briefly explain the process of mapping the ER model into relations. **(6 marks)**

b) Answer each of the following questions briefly. The questions are based on the following relational schema:

Emp(eid:integer, ename: string, age: integer, salary: real
works (eid: integer, did: integer, pettime: integer)
Dept(did:integer,dmane: string, budget: real, managerid: integer)

i) Give an example of a foreign key constraint that involves the dept relation. What are the options for enforcing this constraint when a user attempts to delete a dept tuple? **(4 marks)**
ii) Write the SQL statements required to create these relations, including appropriate versions of all primary and foreign key integrity constraints. **(6 marks)**
iii) Write an SQL statement to give every employee a 10 percent (10%) rise. **(4 marks)**

Question Five (20 marks)

a) Mr. Ngao wants to store information (tenant names, addresses, house rent, etc) about his real estates business. Not surprisingly, the volume of data compels him to buy a database system. To

save money, he wants to buy one with the fairest possible features and he plans to run it as stand-alone application on his PC clone. Off course, Mr. Ngao does not plan to share his data with anyone. Indicate the DBMS features Mr. Ngao should consider while selecting the database management system to buy. **(10 marks)**

b) Explain the term stored procedure and give examples why stored procedures are useful**. (4 marks)**

c) Discuss the limitations of relational database model. **(6 marks)**