MOMBASA POLYTECHNIC **UNIVERSITY COLLEGE**

University Examinations 2011

DIPLOMA IN INFORMATION TECHNOLOGY- DIT10M

ECS 2215 DATABASE MANAGEMENT SYSTEM I

INSTRUCTIONS

This paper contains five questions

Answer **Question ONE** and any other **TWO** questions

TIME: 2 HOURS

INSTRUCTIONS

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Answer **Question ONE** and any other **TWO** questions

QUESTION ONE

a) Define DBMS. Name any three advantages and two disadvantages of database systems as compared to file processing systems. (6 Marks)

b) List six major database development stages. (3 Marks)

c) With the help of a diagram, explain the various levels of abstraction in a DBMS. Why do we need mappings between different schema levels? (8 Marks)

d) List four significant differences between a file-based system and a DBMS. (4 Marks)

e) Name 5 critical success factors in database design (3 Marks)

f) Consider the relational database given below, where the primary keys are underlined. Give an expression in the relational algebra to express each of the following queries:

a. Find the names of all employees who work for First Bank Corporation.
b. Find the names and cities of residence of all employees who work for First Bank Corporation.
c. Find the names, street address, and cities of residence of all employees who work for First Bank Corporation and earn more than $10,000 per annum. (6 Marks)

***Employee* (*person-name*, *street*, *city*)**
***Works* (*person-name*, *company-name*, *salary*)**
***Company* (*company-name*, *city*)**
***Manages* (*person-name*, *manager-name*)**

QUESTION TWO

a) What are the differences between the terms: CANDIDATE KEY, PRIMARY KEY, FOREIGN KEY and ALTERNATE KEY? (4 marks)

b) How does the concept of an object in the object-oriented model differ from the concept of a table in the relational model? (4 marks)

c) Define the following terms:
(i) Domain (ii) Key Integrity (iii) Entity Integrity (iv) Referential Integrity (4 Marks)

d) With examples define the terms Relation and Relation Schema. (3 Marks)

QUESTION THREE

a) Distinguish between OLTP and OLAP. (4 Marks)

b) Explain how the following differ: failure transparency, replication transparency and location transparency. (6 Marks)

c) List and explain three relational algebra operators. (3 marks)

d) Explain what null values are and why they might be introduced into a database. (2 marks)

QUESTION FOUR

a) What is a distributed database system? (2 marks)

b) Explain four advantages of distributed databases (8 Marks)

c) i. Define a Client Server database (1 Mark)

ii. Explain two approaches of client server databases. (4 Marks)

QUESTION FIVE

a) Define a data model. (1 Mark)
b) Explain two main characteristics of database technology. (4 Marks)
c) Explain the historical evolution of database models. (10 Marks)