



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

This paper contains five questions

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:
- Find the names of all employees who work for First Bank Corporation.
 - Find the names and cities of residence of all employees who work for First Bank Corporation.
 - 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)