



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

Faculty of Engineering & Technology

DEPARTMENT COMPUTER SCIENCE & INFORMATION TECHNOLOGY

DIPLOMA IN INFORMATION TECHNOLOGY – DIT 10M

ECS 2215: DATABASE MANAGEMENT SYSTEM I

END OF SEMESTER EXAMINATIONS

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) 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)

SECTION B (ANSWER ANY TWO QUESTIONS)

Question 2 15 marks

- 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 3 15 marks

- 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 4 15 marks

- 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 5 15 marks

- 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)