



MERU UNIVERSITY COLLEGE OF SCIENCE & TECHNOLOGY

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University Examinations 2011/2012

SECOND YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF
BACHELOR OF SCIENCE IN COMPUTER SCIENCE AND BACHELOR OF SCIENCE
IN MATHEMATICS AND COMPUTER SCIENCE

ICS 2206: DATABASE SYSTEMS

D ECEMBER 2011

TIME: 2 HOURS

INSTRUCTIONS: Answer question *one* and any other *two* questions

QUESTION ONE (30 MARKS)

- a. i. Define the term Database Management System (DBMS) (3 Marks)
- ii. List two types of data that would normally be regarded as persistent data. (2 Marks)
- b. i. Define the term distributed database system. (2 Marks)
- ii. Give three reasons for the need for data administration. (2 Marks)
- c. In terms of the relational model, describe the following:-
 - i. Data Definition (2 Marks)
 - ii. Data Manipulation (2 Marks)
 - iii. Candidate key (2 Marks)
- d. i. Briefly describe two types of database currently used by most companies/organizations (2 Marks)
- ii. Describe the difference between a Database and a Database Management System (DBMS). (4 Marks)
- iii. Discuss the network database/data model. (2 Marks)
- e. i. Identify and explain the difference between data and information. (4 Marks)
- ii. Define the term Recursive Relationship. Use a diagram to aid your definition. (3 Marks)

QUESTION TWO (20 MARKS)

- a. Describe the following properties of a database.
 - i. Data integration (3 Marks)
 - ii. Data abstraction (2 Marks)
 - iii. Data independence (3 Marks)
 - iv. Data security (2 Marks)
- b. List four phases carried out during the development of a database system (4 Marks)
- c. Identify and explain the difference between data and information. (4 Marks)
- d. Describe the client/server architecture (2 Marks)

QUESTION THREE (20 MARKS)

- a. Identify and describe the THREE (3) different user types of database systems. (9 Marks)
- b. Briefly describe SIX computer-based measures a data administrator may use to counter threats to the security of a database. (6 Marks)
- c. Discuss the difference between Active and Passive database systems. Use a diagram to illustrate your answer. (3 Marks)
- d. Define entity integrity in terms of a relational database. (2 Marks)

QUESTION FOUR (20 MARKS)

Lecturer Table

Lecturer ID	Name	Department	Gender	Date of birth	Salary band
T005	John Mathenge	ICT	Male	07/07/1960	A
T101	Andrew Livondo	SC	Male	12/08/1968	A
T411	Isaac Lugonz9o	SC	Male	12/12.1975	B
T001	Miriam Wanjohi	ICT	Female	15/02 /1970	A

Unit Table

Unit No	Title	Lecturer ID
UN002	Java Programming	T005
UN005	Multimedia	T001
UN011	Building a Website	T001
UN007	Introduction to Chemistry	T411

Departmental Table

Department Code	Name
ICT	Information Communication & Technology
ML	Modern Language
SC	Sciences

- a. Draw an Entity-Relationship Diagram (ERD) for the three logical tables above. (5 Marks)
- b. Using the above logical tables, write the following SQL statement:
 - i. CREATE TABLE statement for the Lecturer table. (5 Marks)
 - ii. List the names of Lecturers in alphabetical order and their department names. (4 Marks)
 - iii. List the Unit titles and Lecturer names by department name. (4 Marks)
- c. Explain why the word ' DISTINCT ' may be included in an SQL statement, such as SELECT DISTINCT Name. (2 Marks)

QUESTION FIVE (20 MARKS)

- a. Describe the process of normalization, up to and including the third normal form. (11 Marks)
- b. Identify and describe FOUR key functions that a Database Management System (DBMS) must support. (12 Marks)
 - i. Discuss three maintenance problem associated with un-normalized data- sets. (9 Marks)

