



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

P.O. Box 972 – 60200, Meru – Kenya.

Tel. 020-2069349, 061-2309217, 064-30320. Cell phone: +254 712524293, +254 789151411

Fax: 064-30321

Website: [www.mucst.ac.ke](http://www.mucst.ac.ke) Email: [info@mucst.ac.ke](mailto:info@mucst.ac.ke)

---

## University Examinations 2013/2014

FOURTH YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR  
OF BUSINESS IN INFORMATION TECHNOLOGY

AND

SECOND YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR  
OF BUSINESS IN INFORMATION TECHNOLOGY

### ICS 2206: DATABASE SYSTEMS

**DATE: APRIL 2014**

**TIME: 2 HOURS**

---

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

---

#### QUESTION ONE (30 MARKS)

- a) Differentiate between physical and logical view as applied in database. (2 marks)
- b) Briefly explain any four categories of SQL commands giving two examples of SQL statements used in each category. (4 marks)
- c) Discuss the following database models. (4 marks)
  - i. Hierarchical database model
  - ii. Network database model
- d) Describe two functions of a database catalogue. (2 marks)
- e) Define the term constraints as applied in databases and discuss any THREE integrity constraints used in relational databases. (3 marks)
- f) Explain the purpose of indexing and describe three types of index used in SQL. (3marks)
- g) Distinguish a schema and an instance. (2 marks)

- h) Describe the following terms used in managing users in database system. (2 marks)
  - i. Altering user
  - ii. User sessions
  
- i) Differentiate between system privileges and object privileges. (4 marks)
  
- j) Differentiate between client/server database system and centralized database system giving one advantage and disadvantage of each system. (4 marks)

**QUESTION TWO (20 MARKS)**

- a) The diagram below shows student transcript submitted to a database programmer to initiate design of a relational database system that will eventually produce the transcript. Use the transcript details to normalize the database the database indicating the objective of each normal form. (9 marks)

- b) ABC stores is a leading supermarket that has branches in all major towns across the country, ABC has been for years using a point of sale system and all their transaction data is stored in a relational database, they are currently thinking of mining their data; you have been contracted as a database expert to advise on the benefits ABC seeks to reap by doing so, discuss in detail citing examples any FOUR benefits you will present to the top management. (6 marks)
  
- c) Discuss the role of joins in SQL and differentiate between the TWO main SQL joins. (5 marks)

### QUESTION THREE (20 MARKS)

- a) Ujamaa cooperative society intends to computerize its operation to meet members demand and to offer quality service to its members. After collecting information on the current system and normalization it was clear that the system requires 3 main database tables to store members' registration information, deposits and Loans details.
- i. Use SQL statement to design the 3 tables' structure with at least 4 columns in each table indicating the primary key and relationship among the 3 tables. (8 marks)
  - ii. Explain the importance of validity integrity and apply it in at least one column in each of the above table. (3 marks)
  - iii. Insert one record in each table using SQL statement. (3 marks)
- b) (i) Explain the types of problems that can occur in a multi user environment when concurrent access to the database is allowed. (3 marks)
- (ii) Explain mechanisms that can be used to ensure that the above problem does not occur. (3 marks)

### QUESTION FOUR (20 MARKS)

- a) A health facility would like to design a system with the following relationship.
- A patient is treated by a doctor
  - A patient can be attended by more than one nurse
  - A nurse is attached to a ward
  - Doctors can operate in any ward
- Use an Entity Relation Diagram (ERD) to show relationship among the entities indicating any possible attributes for each entity. (6 marks)
- b) Discuss the TWO statements used by SQL to manage users. (4 marks)
- c) Explain the role of data dictionary in database management system. (4 marks)

d) The table below shows details of products in an inventory system

Prodnum	Prodname	Quantity	Unit_price	Supplier_name	Supply_date
3245	Processing unit	40	25000	ABC computers	8/09/10
7643	Monitor	60	12000	ABC computers	7/10/10
2190	Keyboard	200	600	Umoja solution	12/10/10
4372	Mouse	400	300	IT comm..	3/09/10
8733	Hard disk	60	2400	IT comm..	16/10/10
6754	Modem	120	1500	ABC computers	5/09/10

Write an expression that will extract records that satisfy the following conditions using SQL query statements.

- i. List all products details starting with letter M. (2 marks)
- ii. List all products prodnum, prodname columns of all products with unit prices 25000,2400, 600 and 1500. (2 marks)
- iii. Group all records by supplier\_name. (2 marks)

### QUESTION FIVE (20 MARKS)

a) Consider the following table structures:

Table 1: project

P_ID	P_Name	Client	Client_Location
------	--------	--------	-----------------

Table 1: project

Emp_ID	EmpFName	EmpLName	Gender	P_ID	Department
--------	----------	----------	--------	------	------------

Write SQL statements that will:

- i. Create the employee table (4 marks)
- ii. Update the first name of an employee whose employee ID is 0045 to Mark. (2 marks)

- iii. Count the number of female employees in the IT department (2 marks)
  - iv. Output the names of all employees and the names of the projects they are working on. (2 marks)
- b) Explain 2 problems that redundancy creates and how it can be reduced in a relational database management system. (6 marks)
- c) Use SQL statements to implement the following database security concepts. (4 marks)
- i. Create user
  - ii. Revoke privilege