**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.must.ac.ke**](http://www.must.ac.ke) **Email:** **info@must.ac.ke**

**University Examinations 2015/2016**

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

AND

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

AND

THIRD YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER TECHNOLOGY

**CIT 3225/CIT 3201: DATABASE SYSTEMS**

**DATE: NOVEMBER 2015 TIME: 2 HOURS**

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

**QUESTION ONE (30 MARKS)**

1. Differentiate conceptual database model and physical Model. (4 marks)
2. Differentiate entity integrity and referential integrity explaining how each is enforced in a relational database management system. (4 marks)
3. Describe **FOUR** components of a database system. (4Marks)
4. Explain the importance of normalization. (3 marks)
5. Differentiate primary key and foreign key. (2 marks)
6. Explain the types of problems that can occur in a multi user environment when concurrent access to the database is allowed. (3 marks)
7. Explain mechanisms that can be used to ensure that the above problems do not occur. (3 marks)
8. Differentiate between hierarchical and network database models. (4 marks)
9. Explain 3 problems of a file system that led to development of relational database management system. (3 marks)

**QUESTION TWO (20 MARKS)**

1. A customer can make many payments, but each payment is made by only one customer. A customer can make many orders and can be served by different salespersons. Salespersons are attached to a specific region.
2. Use the above business rules to design an entity relation model indicating probable attributes for each entity and relationship between entities. (4 marks)
3. Use SQL statement to implement the ERD in question 4 ii) above. (4 marks)
4. Easy coach is a bus company that offers transport services to the public. The company has decided to keep a database record of the employees. The database contains a table employee with the following details of employees: name, Date\_of\_birth, IDno and area\_of\_residence. Write SQL expression to.
5. Create the above table and include a primary key. (3 marks)
6. Insert the following details into the table employee.name=john smith, Date\_of\_birth =22/7/1977,IDno=202584,area of residence=kaithe. (2 marks)
7. Change the change area of residence from “Kaithe” to “Nchiru” (2 marks)
8. Insert a column called address. (3 marks)
9. Write an expression that would extract only those employees whose name start with letter “J”. (2 marks)

 **QUESTION THREE (20 MARKS)**

1. An organization wish to computerize its payroll system. During analysis of the current system the following set of data were captured to be used in database design:

EMP\_CODE, EMP\_LNAME, EMP\_EDUCATION, JOB\_CLASS, EMP\_DEPENDENTS, DEPT\_CODE, DEPT\_NAME, DEPT\_MANAGER, EMP\_TITLE, EMP\_DOB, EMP\_HIRE\_DATE, EMP\_TRAINING, EMP\_BASE\_SALARY, and EMP\_COMMISSION\_RATE.

 Normalize the above data to 3rd Normal form indicating the objective of each normal

 form. (9 marks)

1. Write SQL statements to perform the following.
2. Delete table “Student”? (2 marks)
3. Insert "GJU" as the "FName" in the "University" table? (2 marks)
4. How can you delete a record from table “student” where “RollNo”=GJU501?

(2 marks)

1. Explain the use of Grant and Revoke SQL Commands? (2 marks)
2. Explain the purpose of indexes as used in database management system. `(3 marks)

 **QUESTION FOUR (20 MARKS)**

Consider the following relation schema:

employee(employee-name, street, city)

works(employee-name, company-name, salary)

company(company-name, city)

manages(employee-name, manager-name)

1. Give an expression in SQL for each of the following queries:
2. a) Find the names, street address, and cities of residence for all employees who work for 'First Bank Corporation' and earn more than kshs10,000. (3 marks)
3. b) Find the names of all employees in the database who live in the same cities and on the same streets as do their managers. (4 marks)
4. c) Find the names of all employees in the database who live in the same cities as the companies for which they work. (3 marks)

d) Find the names of all employees in the database who do not work for 'First Bank Corporation'. Assume that all people work for exactly one company. (3 marks)

e) Find the names of all employees in the database who earn more than every employee of 'Small Bank Corporation'. Assume that all people work for at most one company. (4 marks)

f) Assume that the companies may be located in several cities. Find all companies located in every city in which 'Small Bank Corporation' is located. (3 marks)

**QUESTION FIVE (20 MARKS)**

1. Use Entity Relation Diagram to represent the tables below and give appropriate names to entities: (6 marks)

 

 

1. Identify FOUR different types of threats that database systems are exposed to. (4Marks)
2. “The current technological advancements have now made it possible for Organizations to have most of their databases in the cloud”. This seems to be the computing trend for most of the organizations. Describe SIX benefits this may have to an organization.

 (6 Marks)

1. Explain **TWO** transaction states that you are familiar with. (4 Marks)