



# **KIBABII UNIVERSITY COLLEGE**

**A CONSTITUENT COLLEGE OF**

**MASINDE MULIRO UNIVERSITY OF**

**SCIENCE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS**

**2014/2015 ACADEMIC YEAR**

**THIRD YEAR SECOND SEMESTER**

**MAIN EXAMINATION**

**FOR THE DEGREE OF**

**BACHELOR OF SCIENCE COMPUTER SCIENCE**

**COURSE CODE: CSC 310**

**COURSE TITLE: DATABASE SYSTEMS**

**DATE: 4<sup>TH</sup> MAY, 2015**

**TIME: 11.30 AM- 1.30PM**

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## **INSTRUCTIONS TO CANDIDATES**

Answer Question One in Section A and Any other TWO (2) Questions in Section B

TIME: 2 Hours

## INSTRUCTIONS

Answer **QUESTION ONE** and **ANY** other **TWO QUESTIONS**.

### QUESTION ONE

a. Define the following terms as used in Database Management Systems. [2 Marks]

- i. Database
- ii. Relation

b. Explain the basic properties that all database transactions must possess. [4 Marks]

c. Below are tables in a particular database. Study them carefully and answer questions that follow.

#### Students

RegNo	Name	DateOfBirth	Programme	Department
SC-001	Juma	1990-05-10	CS01	CSC
IT-002	Terry	1992-03-17	IT01	ITD

#### Programmes

Pro_code	Name
CS01	Computer Science
IT01	Information Technology

#### Departments

code	Name
CS01	Computer Science
T01	Information Technology

#### Courses

CourseCode	CourseName
CSC 100	Computer Basics
CSC 101	Programming
BIT 100	Discrete Things
BIT 102	Database Programming

#### Marks

RegNo	Course_code	Score
SC-001	CSC 100	67
IT-002	CSC 100	73
SC-001	CSC 101	56
SC-001	BIT 102	46
IT-002	BIT 100	76

- i. Write the SQL scripts that will create the tables *Students*, *Courses* and *Marks* above. [3 Marks]
- ii. Add constraints on the table *Marks* such that score is between 0 and 100; and table *Students* such that a student registered must be above 18 years. [3 Marks]
- iii. Write the SQL script that will populate the table *Students* with the two records as shown above. [2 Marks]
- iv. Write the SQL script that will query the database represented by tables above and produce the output shown below. [4 Marks]

RegNo	Name	CourseCode	Course Name	Marks
SC-001	Juma	CSC 100	Computer Basics	67

SC-001	Juma	CSC 101	Programming	56
SC-001	Juma	BIT 101	Database Program	46

- v. Write the SQL script that will remove all marks for the student with registration number *SC-001*. [2 Marks]
  - vi. Write the SQL script that will change the department code of Computer Science Department from *CS01* to *CS02*. [2 Marks]
  - vii. Write the SQL script that will remove the entire table *Programes* from the database. [1 Marks]
  - viii. Write the SQL script that will remove all marks for the student with registration number *SC-001*. [2 Marks]
- d. Differentiate between authorization and authentication as means of ensuring database security. [2 Marks]
  - e. Write a trigger that will update the value of the column *today* in table *sales* with the current date after a record has been inserted in that table. [3 Marks]

### QUESTION TWO

- a. What is a Mobile Database? [2 Marks]
- b. Explain **FOUR** referential actions commonly used when defining foreign keys. [8 Marks]
- c. State and explain the **TWO** kinds of data independence in Database Management Systems. [4 Marks]
- d. State any **THREE** properties of relations in a relational database. [3 Marks]
- e. a database designer requires that the values for *PFNo* in the table *SalaryRates* to be four-character values in the column *PFNo* in the table *Employees*. Write a SQL script to create this domain constraint. [3 Marks]

### QUESTION THREE

- a. What is a transaction as used in Database Management Systems? [2 Marks]
- b. Describe the three-level ANSI-SPARC database architecture. [6 Marks]
- c. Explain any **THREE** advantages of views in databases. [3 Marks]
- d. Differentiate Backup and Journaling as used in database security. [3 Marks]
- e. A table *Results* stores *regNo*, *courseCode* and *score* of students in various courses. Write a SQL query that will return the sum of a student with registration number *SBD002*. [3 Marks]
- f. Outline any **THREE** reasons why questionnaires may not be a favourable fact-finding technique in a database project. [3 Marks]

### QUESTION FOUR

- a. What is a view as used in databases? [2 Marks]

- b. Differentiate between shared lock and exclusive lock as used in transaction management in the Database Management System. [4 Marks]
- c. State and explain any **FOUR** benefits gained from database replication. [8 Marks]
- d. What is the basic difference between 1NF and 2NF? [2 Marks]
- e. Table *StudentCourse* stores registration number in the column *regNo* and course code of the courses a student is taking in the column *code*. There is a table called *Marks* that stores registration number as *regNo*, course code as *code* and marks of each course for each student as *score*. You are required to write a query that will populate the columns *regNo* and *code* in the table *Marks* with values from the table *StudentCourse*. [4 Marks]

### **QUESTION FIVE**

- a. What is concurrency control as used in Database Management Systems? [2 Marks]
- b. Differentiate between tuple and degree as used in databases. [2 Marks]
- c. Define the term design methodology as used in database and explain the main phases of the database design process. [6 Marks]
- d. Explain **THREE** main demerits of views in databases. [3 Marks]
- e. A *student* table stores date of birth of each student in a column *birth* as a date. Write a query that will return the age in years of all students. [4 Marks]
- f. Write the code for a stored procedure that receives radius of a circle as a double in a variable *r* and calculates the area of a circle and insert it in a column *area* in the table *Circle*. [3 Marks]