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## University Examinations 2012/2013

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

## ICS 2206: DATABASE SYSTEMS

**DATE: AUGUST 2013** **TIME: 2 HOURS**

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

## QUESTION ONE – 30 MARKS

a.  Explain the following terms:
    i.    Database management system (1 Mark)
    ii.   Entity (1 Mark)
    iii.  Primary Key (1 Mark)
    iv.  Relational database (1 Mark)
    v.   Attribute (1 Mark)

b.  Give and explain:
    i.    Four disadvantages of file based system. (4 Marks)
    ii.   Four advantages of  a DBMS (4 Marks)
    iii.  One disadvantages of DBMS (1 Mark)

c.  What is conceptual database design? (1 Marks)
d.  A table for storing employee's records in a database had the following data:

| Staff_No | F_Name | L_Name | Postion | Gender | D.O.B |
|---|---|---|---|---|---|
| S102 | John | Kingori | Manager | M | 13/3/1985 |
| Sg37 | Steve | Kipkorir | Supervisor | M | 13/3/1985 |
| Sg14 | Susan | Mutua | Driver | F | 13/3/1985 |
| Sc26 | Steve | Kingori | Driver | M | |

i.      Which of the fields on the table is most likely to be the primary key and why? (3 Marks)
ii.     Write a SQL statement that will produce from the table a list of all staffs showing the staff number, last name and first names only. (3 Marks)
iii.    Write an SQL statement that will produce the same list but with the last name and first name combined as staff names. (4 Marks)
iv.    Use an SQL statement to find the details of all supervisors. (2 Marks)
v.     Write a statement that would count the different type of positions for the employees. (3 Marks)

## QUESTION TWO – 20 MARKS

a. Differentiate between a primary key and a candidate key. (2 Marks)
b. The relational structure below captures a snapshot of the database tables of a small database for a university.

**STUDENT**

| REG NO | STUD-NAME | STUD-ADDRESS | TOWN |
|--------|-----------|--------------|------|
| KUC001 | Adams Wama | 456 | Mombasa |
| KUC002 | Catherine Were | 234 | Kiumu |
| KUC003 | Hassna Amina | 687 | Nairobi |
| KUC004 | Wagechi Mwae | 357 | Mombasa |

**EXAMINATION**

| REGNO | DEPT | COURSE | RESULT | GRADE |
|-------|------|--------|--------|-------|
| KUC001 | IT | Bsc IT | PASS | B |
| KUC002 | COMP | Comp Sc | PASS | C |
| KUC003 | ENGINEERING | TIE | FAIL | E |
| KUC004 | ENGINEERNG | Civil | PASS | A |

Write SQL statements to perform the following:

   i. Create the examinations table including the appropriate integrity constrains. (4 Marks)
  ii. List the Regno, studentname, dept and results for students of comp_sc who have passed. (3 Marks)
 iii. Change the results of students whose regno is kuc001 to fail. (2 Marks)
  iv. Include another field called guardian in the student's table. (3 Marks)
   v. Delete records of students from Mombasa and have failed. (2 Marks)
  vi. A new student "James Hassan" is to be registered into the database so that his exam results are captured. Comment on the order in which his details should be added and write SQL statements to show how this is implemented. (4 Marks)
 vii. Remove table examination from the database. (2 Marks)

## QUESTION THREE – 20 MARKS

a. Explain any four DBMS utilities. (4 Marks)
b. Briefly describe the three levels of a database schema. (6 Marks)
c. Differentiate between an entity type and an entity instance. (2 Marks)
d. Carefully outline the database system life cycle. (6 Marks)
e. Differentiate between an entify type and an entity instance. (2 Marks)

## QUESTION FOUR – 20 MARKS

a. What is normalization? (2 Marks)
b. Explain the first three normal forms. (6 Marks)
c. Use the following information draw the relevant ER diagram. (4 Marks)
   INVOICE (Invoice-no, Customer Number, Pro-code, date, invoice total)
   INVOICE PRODUCT (Prod-code, Prod-description, Unit price)
   CUSTOMER (Customer Number, Customer_Name, customer_Address, del.address

d. Explain any two rules that are followed in normalizing a relational database. (4 Marks)
e. The following table is in which normal form? Explain your answer. (4 Marks)
   Example table

| Student Number | Unit Code | Unit Title | C.F | Marks |
|----------------|-----------|------------|-----|-------|
|                |           |            |     |       |

## QUESTION FIVE – 20 MARKS

a. Explain the following terms:
   i.   Data mappings                                                      (2 Marks)
   ii.  Data modeling                                                      (2 Marks)
b. Discuss the different types of data independence.                      (6 Marks)
c. Meru University of Technology offers a numbers of course from various departments. A course cannot be offered by more than one department. A school may have a number of departments. Each course has a number of subjects. Some subjects in a course are offered from different departments, that is a subject may be offered to more than one course. Each lecturer belongs to a department, and can teach a number of subjects. One subject may be taught by many lecturers when taught to many groups. A student can only do one course at a time.

   **Required:**

   Draw an ER diagram for the above database showing all the relationships and the major attributes for each entity. (10 Marks)