KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

SCT 307: DATABASE SYSTEMS

DATE: THURSDAY, 12TH APRIL 2012 **TIME: 2.00 P.M – 4.00 A.M**

INSTRUCTIONS : ANSWER QUESTION ONE AND ANY OTHER TWO

QUESTION 1: (30 MARKS)

a) Explain how file processing limitations are addressed by database approach. (4 Marks)

b) Explain the difference between external, internal, and conceptual schemas. How are these different schemas layers related to the concepts of logical and physical data independence? (5 Marks)

c) Explain **three phases** which you should follow when designing a database. (6 Marks)

d) By using a relevant example distinguish between unary and binary relationships. (4 Marks)

e) Why should data be normalized? (2 Marks)

f) State two DDL commands and describe their use. (2 Marks)

g) Assume you have a table called **Employee** which stores employee details and the hiring dates in a field called **Hire_date**. Write an SQL statement which will select all those employees who were hired on **hired on May 7th, 1999.** Show all the employee details in your query. (3 Marks)

h) Discuss four important commands which are used to control the execution of a transaction. (4 Marks)

QUESTION TWO (15 MARKS)

a) Explain the term referential integrity. (3 Marks)

b) Consider the following sample user view data.

Sample Userview:

SENECA STUDENT SUPPLIES ORDER FORM

ORDER: 40311
ORDER DATE: March 3, 1999

CUSTOMER No: 12 **CUST NAME:** School of CS

PRODUCT No.	PRODUCT DESCRIPTION	QTY ORDERED
304	All-purpose gadget	7
633	Jick	1
684	Omo	4

Normalize the data into the following norms and for each normal form describe what should be done and state the tables formed and their attributes also Show the Primary Keys and Foreign Keys.

i. 1st Normal Form (4 Marks)
ii. 2nd Normal Form (4 Marks)
iii. 3rd Normal Form (4 Marks)

QUESTION THREE (15 MARKS)

a) Consider the case below for a company:
A company has several departments each department has a supervisor and at least one employee. Employee must be assigned to at least one, but possibly more departments. At least one employee is assigned to a project, but an employee may be on vacation and not assigned to any projects. The important data fields are the names of the employees, as well as the supervisor and employee number and unique project number. Develop and draw a Logical ERD. Show the primary keys and foreign keys (12Marks)

b) With a relevant example explain the term a Weak Entity. (3 Marks)

QUESTION FOUR (15 MARKS)

a) Consider the following entity types in a relational database.

EMPLOYEES (empID, empName, address, basic salary)
PROJECTS (PID, pName, noOfStaffAllocated)
WORKIN(PID, empID, PJob)

REQUIRED

i. Write the SQL code that was used to define the EMPLOYEES relation. (3 Marks)

ii. Describe the following SQL query regarding this database in natural language (English). (2 Marks)

```
SELECT pname
FROM projects
WHERE pid IN ( SELECT pid
FROM projects
MINUS
(SELECT DISTINCT pid
FROM workin
GROUP BY empid));
```

b) Examine the following relations and answer the questions that follow:

SUPPLIERS			
SupNo	**SupName**	**Status**	**City**
Sup1	Onyango	20	Nairobi
Sup2	Kamau	10	Mombasa
Sup3	Chebet	30	Mombasa
Sup4	Lugongo	30	Nakuru
Sup5	Ali	20	Nairobi

SUPPLIERPARTS		
SupNo	**PartNo**	**Quantity**
Sup1	P1	300
Sup1	P2	200
Sup2	P1	100
Sup2	P2	400
Sup3	P2	200
Sup4	P2	200

i. Write SQL code to get supplier numbers for suppliers with a status higher than 25 and whose city is Mombasa. Show the result you will get. (2 Marks)

ii. Get Supplier Numbers and status for suppliers in Mombasa, in descending order of status. (3 Marks)

iii. Using a join of a table with itself, retrieve all pairs of supplier numbers such that the two suppliers are located in the same city. (2 Marks)

iv. For each part supplied, get the part no. and the total quantity supplied for that part. Give the result. (2 Marks)

QUESTION FIVE (15 MARKS)

You have been hired as a data administrator for Kenya Bakeries. They have several branches which report to you all their data including cakes sold, of each type, money made that day, supplies used, which supplies are unusually low (each store gets a certain amount of each supply (e.g. flour, butter etc. each day, but they may need more the next day if they used a lot of it that day), etc.

Each branch manager can insert and change data about their branch, but shouldn't be able to read data about the other branches.

The person in charge of deliveries should be able to look at all the branches to see which supplies need to be delivered. The accountant could look at anything, but is only interested in the money taken in and spent (to buy supplies, for salaries, etc).

After considering all the pros and cons, you decide to put this in a database system.

a) Provide the main reasons for developing views in a DBMS.
(3 Marks)

b) Giving reasons, explain how many users views you would create at the external level.
(6 Marks)

c) The data dictionary (system catalogue) contains at least all the relations and views that are in your database; and which users can access each view.
   i. State three (3) reasons why a dictionary is useful to the database system.
(3 Marks)

   ii. Give three (3) reasons why the information stored in the data dictionary is useful to you as the data administrator.
(3 Marks)