KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2020/2021 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
YEAR THREE SEMESTER ONE EXAMINATIONS

FOR THE DEGREE IN
COMPUTER SCIENCE

COURSE CODE : CSC 316

COURSE TITLE : DATABASE SYSTEMS II

DATE: 19/07/2021 **TIME: 09.00 A.M – 11.00 A.M**

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO

QUESTION ONE [COMPULSORY] [30 MARKS]

a) Differentiate conceptual database model and physical Model. **[4 Marks]**

b) Differentiate entity integrity and referential integrity explaining how each is enforced in a relational database management system. **[4 Marks]**

c) Silas would like to create a database system. Explain three stages in the database design development where the ER diagram will be the most appropriate **[6 Marks]**

d) Explain the importance of normalization. **[3 Marks]**

e) Differentiate between a primary key and a candidate key. **[2 Marks]**

f) Distinguish between active data dictionary and passive data dictionary as used in databases **[2 Marks]**

g) Explain 3 problems of a file system that led to development of relational database management system. **[3 Marks]**

h) Your project supervisor has noted that your database has data redundancy. Outline three problems that this may cause **[6 Marks]**

QUESTION TWO [20 MARKS]

a) 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.

i) Use the above business rules to design an entity relation model indicating probable attributes for each entity and relationship between entities. **[4 Marks]**

ii) Use SQL statement to implement the ERD in question 4 ii) above. **[4 Marks]**

b) 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.

(i) Create the above table and include a primary key. **[2 Marks]**

(ii) 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]**

(iii) Change the change area of residence from "Kaithe" to "Nchiru" **[2 Marks]**

(iv) Insert a column called address. **[1 Mark]**

(v) Write an expression that would extract only those employees whose name start with letter "J". **[1 Mark]**

c) Outline characteristics of a well-designed database **[4 Marks]**

QUESTION THREE [20 MARKS]

a) 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]**

b) Write SQL statements to perform the following.

(i) Delete table "Student"? **[2 Marks]**

(ii) Insert "GJU" as the "FName" in the "University" table? **[2 Marks]**

(iii) How can you delete a record from table "student" where "RollNo"=GJU501? **[2 Marks]**

c) Explain the use of Grant and Revoke SQL Commands? **[2 Marks]**

d) 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)

a) Give an expression in SQL for each of the following queries:

b) 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]**

c) 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]**

d) 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]

a) Using MySQL, demonstrate how you will implement the following tables. Give appropriate names to the tables: **[8 Marks]**

EMP_CODE	EMP_LNAME	JOB_CODE
14	Rudell	2
15	McDade	1
16	Ruellardo	1
17	Smith	3
20	Smith	2

PLAN_CODE	PLAN_DESCRIPTION
1	Term life
2	Stock purchase
3	Long-term disability
4	Dental

EMP_CODE	PLAN_CODE
15	2
15	3
16	1
17	1
17	3
17	4
20	3

JOB_CODE	JOB_DESCRIPTION
1	Clerical
2	Technical
3	Managerial

i. Study the tables below and answer the questions that follow:

Lecturer Table

LecturerID	Name	Department	Gender	Date of Birth	Salary Band
T005	John Williams	ICT	Male	07/07/1960	A
T101	Andrew Mathews	SC	Male	02/08/1968	A
T411	Nancy Johson	SC	Female	12/12/1975	B
T001	Rozey Robinson	IT	Female	19/09/1970	B

Unit table

UnitNo	Title	LecturerID
UN002	Java Programming	T005
UN005	Multimedia	T001
UN011	Website design	T001
UN007	Introduction to Chemistry	T411

Departmental table

Departmental Code	Name
ICT	Information, communication & Technology
ML	Modern Language
SC	Sciences

i. Draw an Entity-Relationship Diagram (ERD) for the three logical tables above. **[3 Marks]**

ii. Using the above logical tables, write the following SQL statement:

a. CREATE TABLE statement for the Lecturer table. **[2 Marks]**

b. List the names of Lecturers in alphabetical order and their department names. **[2 Marks]**

c. List the Unit titles and Lecturer names by department name. **[3 Marks]**

iii. Explain why the word' DISTINCT' may be included in an SQL statement, such as SELECT DISTINCT Name. **[2 Marks]**