CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD DEGREE OF BACHELOR OF SCIENCE IN APPLIED COMPUTER SCIENCE

ACSC 351: INTRODUCTION TO DATABASE

STREAMS: **TIME: 2 HOURS**

DAY/DATE: TUESDAY 3/12/2019   **2.30 P.M – 4.30 P.M**

INSTRUCTIONS:

- Answer Question **ONE** and any other **TWO** questions.

- Diagrams should be used whenever they are relevant to support an answer.

- This is a closed book exam, no reference materials are allowed in the examination room
- All mobile phones in an examination room must be switched off.

SECTION A: COMPULSORY
QUESTION 1: [30 MARKS] COMPULSORY
   a. Other than INNER JOIN, explain other FIVE joins used in SQL   (5marks)

   b. Explain FIVE functions of a relational database management system   (5 marks)

   c. Databases need to be backed up due to numerous failures that can be experienced in databases. Explain what is database backup; hence outline THREE types of failures that necessitate database backup.   (5marks)

   d. Outline FIVE disadvantages of Networked database models   (5 marks)

   e. Explain FIVE differences between strong and weak database entities   (5 marks)

   f. Outline FIVE logical operators that are likely to be found in SQL databases. (5 marks)

SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION 2: [20 MARKS]

a) Using an example in each case, explain FIVE SQL database development constraints

(5 marks)

b) A student was called upon to develop a database. He quickly developed an un-normalized table, and noted several redundancies as shown in the table below.

staffNo	name	position	salary	branchNo	branchAddress	telNo
S1500	Tom Daniels	Manager	46000	B001	8 Jefferson Way, Portland, OR 97201	503-555-3618
S0003	Sally Adams	Assistant	30000	B001	8 Jefferson Way, Portland, OR 97201	503-555-3618
S0010	Mary Martinez	Manager	50000	B002	City Center Plaza, Seattle, WA 98122	206-555-6756
S3250	Robert Chin	Supervisor	32000	B002	City Center Plaza, Seattle, WA 98122	206-555-6756
S2250	Sally Stern	Manager	48000	B004	16 – 14th Avenue, Seattle, WA 98128	206-555-3131
S0415	Art Peters	Manager	41000	B003	14 – 8th Avenue, New York, NY 10012	212-371-3000

i) Normalize the above table to 3NF and correct the redundancies on the resultant tables (7 marks)

ii) Explain which attributes from the normalized tables are going to link together to form the relationships (3 marks)

iii) Write SQL codes for developing any TWO of the normalized tables (5 marks)

QUESTION 3: [20 MARKS]

a) Using an example, write SQL syntax for the following operators.

    i)   OR

    ii)   AND (4 marks)

b) You have been called upon to develop strategies for database security, identify FIVE factors that you would put in place when developing the security strategies

(5 marks)

c) Using an example, explain the following categories of data types

    i)   simple data type (2 marks)

    ii) complex data type (2 marks)

    iii) specialized data type (2 marks)

d) With the help of a diagram explain RAID-5 data storage system (5 marks)

QUESTION 4: [20 MARKS]

a) below is information provided by a college registrar to aid in developing their database, use it to answer the questions below: -

A university registrar's office maintains data about the following entities:

- *Courses, including number, title, credits, syllabus, and prerequisites;*
- *Course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom;*
- *Students, including student-id, name, and program;*
- *Instructors, including identification number, name, department, and title.*
- *Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled.*

    i) Draw an ER diagram of the above information (include the necessary derived attributes, as necessary)   (8 marks)

    ii) Add cardinality of the relationships to the ER diagram above   (4 marks)

b) Using relational database sketches and SQL extracts in each case, explain how the following operations affect a relational database.

    i. Intersection

    ii. Join

    iii. Insert

    iv. Update   (8 marks)

QUESTION 5: [20 MARKS]

a) Using an SQL example, write TWO ways of getting the system date   (3 marks)

b) Outline FIVE RDBMS utilities   (5 marks)

c) Discuss THREE Benefits of the database approach to organizations   (6Marks)

c) Explain the importance of the following files in oracle databases

    i) Control files

    ii) Archive log files

    iii) Parameter files   (6 Marks)