UNIVERSITY EXAMINATIONS

EXAMINATION FOR SEPTEMBER-DECEMBER 2019/2020 FOR BACHELOR OF SCIENCE IN COMPUTER SCIENCE

RCS 207: Database Systems

DATE: 16th December, 2019. TIME: 2 HOURS

GENERAL INSTRUCTIONS:

Students are NOT permitted to write on the examination paper during examination time.

This is a closed book examination. Text book/Reference books/notes are not permitted.

SPECIAL INSTRUCTIONS:

This examination paper consists Questions in Section A followed by section B.

Answer **Question 1 and any Other Two** questions.

QUESTIONS in ALL Sections should be answered in answer booklet(s).

1. **PLEASE start the answer to EACH question on a NEW PAGE.**
2. **Keep your phone(s) switched off at the front of the examination room.**
3. **Keep ALL bags and caps at the front of the examination room and DO NOT refer to ANY unauthorized material before or during the course of the examination.**
4. **ALWAYS show your working.**
5. **Marks indicated in parenthesis i.e. ( ) will be awarded for clear and logical answers.**
6. **Write your REGISTRATION No. clearly on the answer booklet(s).**
7. **For the Questions, write the number of the question on the answer booklet(s) in the order you answered them.**
8. **DO NOT use your PHONE as a CALCULATOR.**
9. **YOU are ONLY ALLOWED to leave the exam room 30minutes to the end of the Exam.**
10. **DO NOT write on the QUESTION PAPER. Use the back of your BOOKLET for any calculations or rough work.**

SECTION A - Compulsory

QUESTION ONE (30 Marks)

a) Define: **(3 Marks)**
   i. Database Model
   ii. Database System
   iii. Database Architecture

b) Explain three techniques that can be used to recover data after a database failure **(6 Marks)**

c) ACID should be enforced by the concurrency control and recovery methods of the DBMS. Explain the four ACID properties. **(4 Marks)**

d) What is a referential integrity constraint when creating relationships between tables in a database? **(2 Marks)**

e) Differentiate between: **(6 Marks)**
   i. Data and Information
   ii. Centralized and Decentralized Database Architecture
   iii. Client and Server System

f) Describe how to develop a form using a computer program that queries data from a relational database system and display the resulted. **(5 Marks)**

g) List four advantages of the database systems **(4 Marks)**

SECTION B - Answer ANY other TWO questions

QUESTION TWO (20 Marks)

a) Define: **(3 Marks)**
   i. Data Mining
   ii. Database View
   iii. Multiuser System

b) Differentiate between: **(6 Marks)**
   i. Primary Key and Foreign Key
   ii. Composite Key and Candidate Keys
   iii. Database Designer and Database Administrator

c) Describe a relational database model. **(3 Marks)**

d) Describe the Entity Relationship Diagram. Sketch the different types of entity relationships that are possible. **(6 Marks)**

e) List two benefits of database views **(2 Marks)**

QUESTION THREE (20 Marks)

a) Define: **(5 Marks)**

i. Database State
ii. Data Warehousing
iii. Single-user System
iv. Concurrency Control
v. Distributed Database System

b) Describe Object Oriented database model. **(3 Marks)**

c) What are the benefits of creating relationships in a relational database model? **(2 Marks)**

d) Differentiate between: **(4 Marks)**

i. Front End and Back End
ii. Parallel and Distributed database architecture.

e) The following tables represent information of a learning institution.

Faculties

Field Name	Data Type
FacultyName	Short Text
RegDate	Date/Time
RegBegin	Date/Time
RegEnd	Date/Time
RegPlace	Short Text
Contact	Short Text
MaxNumberOfStudents	Number
Fees	Currency
Webpage	Short Text

Students

Field Name	Data Type
StudentNumber	Short Text
FirstName	Short Text
MiddleNames	Short Text
LastName	Short Text
Subject	Short Text
Title	Short Text
YearNumber	Number
Sex	Short Text
Faculty	Short Text
DOB	Date/Time
Add1	Short Text

Subjects

Field Name	Data Type
Subject	Short Text
SubjectName	Short Text
SubjectDuration	Short Text
Subject Hours	Number

a) Write the SQL for the following queries.

i. Creating table Subjects. **(2 Marks)**
ii. Inserting data into table Subjects. **(2 Marks)**
iii. Display all the data in table Subject. **(2 Marks)**
iv. Deleting table Subjects. **(2 Marks)**

QUESTION FOUR (20 Marks)

a) Define: **(3 Marks)**

i. Data Analytics
ii. Remote Procedure Call (RPC)
iii. Database Management System(DBMS)

b) Describe the Hierarchy database model. **(3 Marks**)

c) Differentiate between: **(6 Marks)**

i. UML and EERD
ii. Physical and Logical Level Abstraction
iii. Transaction Servers and Data Servers

d) Explain normalization and the steps from 1NF to 3NF. Give examples. **(6 Marks)**

QUESTION FIVE (20 Marks)

a) Define: **(3 Marks)**

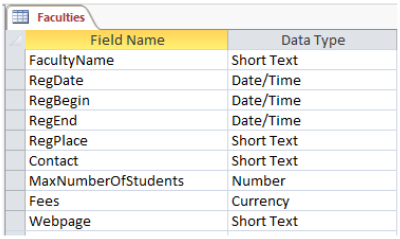
i. Metadata
ii. Abstraction
iii. Dirty Database Read

b) Describe what a database connector is. Give two examples. **(3 Marks)**

c) Differentiate between:

i. DML and DLL
ii. Open Source and Proprietary
iii. Authentication and Authorization

d) Draw an E-R diagram of the following system description, stating reasons and any assumptions you make. **(4 Marks)**



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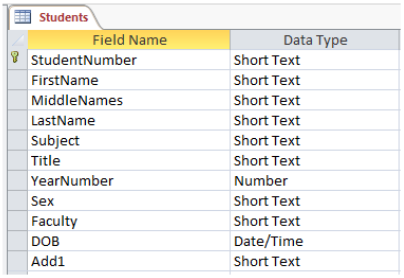

Students

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MiddleNames	Short Text
LastName	Short Text
Subject	Short Text
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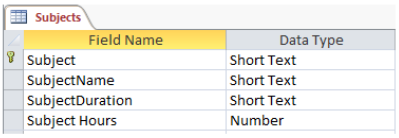
YearNumber	Number
Sex	Short Text
Faculty	Short Text
DOB	Date/Time
Add1	Short Text



Subjects

Field Name	Data Type
Subject	Short Text
SubjectName	Short Text
SubjectDuration	Short Text
Subject Hours	Number

e) Explain five types of threats that databases are normally exposed to.

(10 Marks)