RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree in Applied Sciences
First Year Semester I Examination – April/May 2015

COM 1302 – DATABASE MANAGEMENT SYSTEMS

Time allowed: Three (03) Hours

Instructions for candidate

- This is a closed book examination.
- There are EIGHT pages in the question paper.
- Time allowed will be 3 hours.
- Question paper consists of 2 sections, Part A and Part B
- There are eight (8) questions, 4 questions from Part A and 4 from Part B.
- **Answer all questions under part A and any 3 from part B.**
- **Answer the questions on Part A in the paper itself.**
- This exam accounts for 70% of the subject assessment.

Part A

Answer all questions.

Q1. Underline the correct answer.

i. The disadvantage of the traditional file system used to store data is
   a. Data redundancy and inconsistency
   b. Difficulty in accessing data
   c. Data isolation
   d. All of the above

ii. DBMS acts as an interface between which of the below 2 components
   a. Data and the database
   b. Database and the database application
   c. Database and user
   d. Database and SQL

iii. Which of this is not a DBMS
   a. Oracle
   b. Access
   c. Windows xp
   d. My sql

iv. Before use of DBMS, people store data in
   a. Cloud
   b. Data system
   c. File systems
   d. None of these

v. Function/functions of information system
   a. Input and Output
   b. Process
   c. Store
   d. All the above

vi. Advantages of using database
   a. Provides backups and recovery
   b. Provide multiple user interface
   c. Control redundancy
   d. All the above

vii. SQL stands for
   a. Standard query language
   b. Sequential query language
   c. Structured query language
   d. Server side query language

viii. In Mysql the keyword use to find the number of values in a column
   a. Total
   b. Add
   c. Count
   d. Sum

ix. The collection of information stored in a database at a particular moment is called as
   a. Schema
   b. Instance of the database
   c. Data domain
   d. Independence

x. Data independence means
   a. Data is defined separately and not included in programs.
   b. programs are not dependent on the physical attributes of data
   c. programs are not dependent on the logical attributes of data
   d. both B and C

(1 x 10 Marks)

Q2. State whether the following statements are true or false (state T or F in front of the statement)

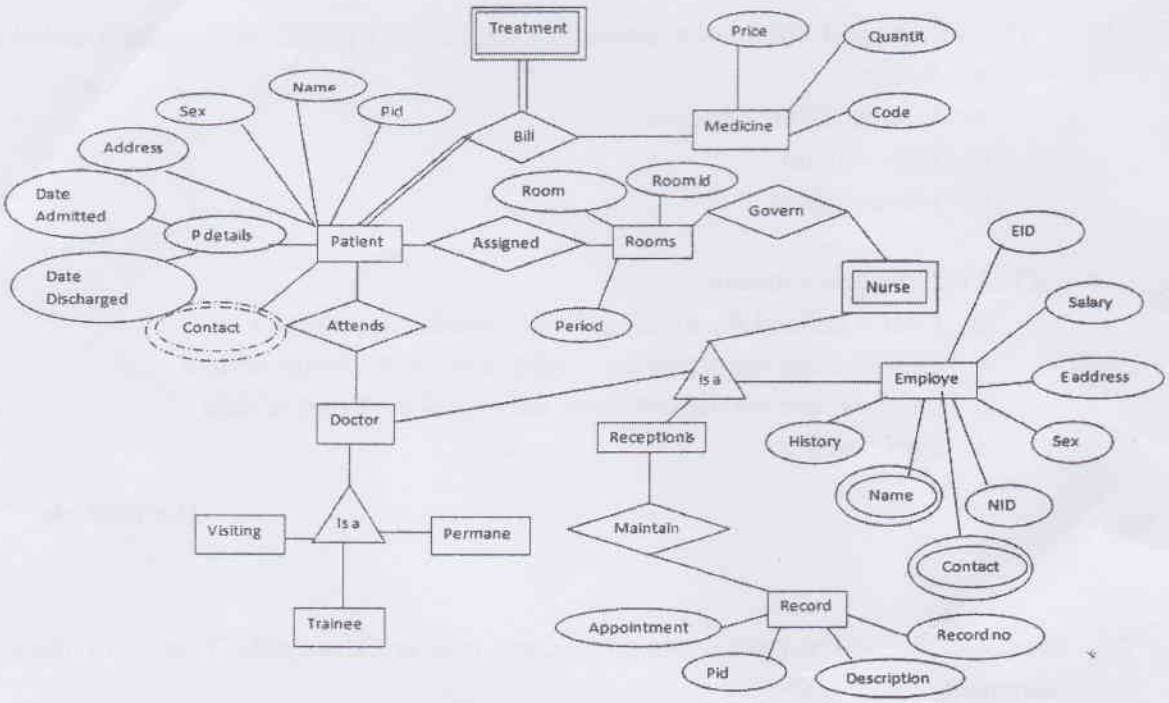
i. DBMS provides data duplication and inconsistency
ii. A DBMS is a collection of programs that enables users to create and maintain a database
iii. Database and the DBMS together make a database system
iv. Primary key is the key use to represent the relations between the tables in the database.
v. Update command can be used to modify a column name of a database table.
vi. A candidate key is a minimal super key.
vii. Weak entity Does not have a distinguishing attribute if its own and mostly are dependent entities, which are part of some another entity.
viii. Database normalization is the process of organizing the fields and tables of a relational database to minimize redundancy and dependency.

ix. Physical database schema is the level of the three schema architecture that is closest to the user

x. 'int' is the data type that can be taken to represent the age of a student in the student table in school database

(1 x 10 Marks)

Q3. Consider the following ER diagram drawn for a hospital and suggest examples for the followings (state any assumptions you make for your suggestions)



1. One entity and an attribute

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2. A weak entity

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3. A full participation relationship

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4. A multi valued attribute

.....

5. A composite attribute

.....

6. A specialization

.....

7. A primary key

.....

8. A many to many relationship

.....

9. A derived attribute

.....

10. One to many relationship

.....

(1 x 10 Marks)

Q4. Following tables in a database represent the information about some A/L class students in a particular school and the details of the subjects they do.

Reg No	Name	City	Phone	S_Code
111	Kamal	Anuradhapura	0252243234	BIO
112	Nimal	Colombo	0112342343	COM
113	Amali	Kurunegala	0373421421	BIO
114	Kasun	Kurunegala	0377624354	MAT
115	Ajith	Mathara	0417652435	SSH
116	Mala	Gall	0918724356	SSH
117	Saama	Jaffna	0219876543	COM

Subject Name	Subject Code	Hours allocated
Biology	BIO	220
Arts	SSH	300
Maths	MAT	250
Commerce	COM	280

Studying the given example, write sql queries for the following statements

1. Update City of the student called 'Nimal' to 'Kurunegala'.

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2. What is the allocated hour for commerce?

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3. What is the subject done by the student with Reg no 114?

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4. How many students are doing Bio Science?

.....

.....

.....

5. Who are the students following Commerce?

.....

.....

.....

(2 x 5 Marks)

Part B

Answer Three (03) questions only.

Q1. Following shows a small description of a restaurant.

Chefs who work at the restaurant, prepare meals. Each meal consists of number of ingredients. When a customer visits for the restaurant, a supplier attends to him/her. Then the customer orders meals through the supplier. A particular meal can be prepared by number of chefs and those chefs can be uniquely identified by chefid. In addition to that, they have their names and their levels (positions). Further, each meal has its name and the price. Ingredients of a particular meal can be recognized by a name and a description related to them. Suppliers who are working in the restaurant have their supplier id, city and name. For each customer who visits the restaurant are given an id. In addition to that, their addresses, phone and the name are taken when they visit the restaurant.

i. Draw a suitable ER diagram for the given scenario. **(10 marks)**
ii. Write relational schemas for the ER you have drawn in the above. Clearly specify the primary keys and the foreign keys in the resulting schema. **(5 marks)**
iii. Write 2 DDL statements to implement 2 of the relations of the schemas you have mentioned. **(5 marks)**

(Total: 20 Marks)

Q2. Consider the following schemas and write down relational algebraic notations for the given statements.

Teacher (T_ID, name, address, major)

Subject (s_code, title)

Teaches (T_ID, s_code)

i. List the codes of subjects which are taught by at least one teacher. **(2 marks)**
ii. List the titles of subjects which are taught by teachers. **(2 marks)**
iii. List the codes of subjects to which the teachers are not allocated. **(3 marks)**
iv. List the titles of subjects to which the teachers are not allocated. **(2 marks)**
v. Name of the teachers who teaches the subjects with titles 'Database Systems' or 'Introduction to computer'. **(3 marks)**
vi. Name of the teachers who teaches 'Database Systems' and 'Introduction to computer'. **(2 marks)**
vii. Name of the teacher or teachers who teach all the subjects. **(3 marks)**
viii. Name of the teachers who teach at least 2 subjects. **(3 marks)**

(Total: 20 Marks)

Q3. Describe and illustrate the process of normalizing the table shown in Figure to 3NF. State any assumptions you make about the data shown in this table.

Project Code	Project Name	Project Manager	Project Budget	Employee Number	Employee Name	Department No	Department Name	Hourly Rate
PC010	Reservation System	Mr Ajaya	120500	S100	Mohan	D03	Database	21.00
PC010	Reservation System	Mr Ajaya	120500	S101	Saman	D02	Testing	25.00
PC010	Reservation System	Mr Ajaya	120500	S102	Amila	D01	IT	31.00
PC011	HR System	Mr Kamal	500500	S103	Pooja	D03	Database	45.00
PC011	HR System	Mr Kamal	500500	S104	Rizvi	D02	Testing	23.00
PC011	HR System	Mr Kamal	500500	S315	Damith	D01	IT	30.00
PC012	Attendance System	Mr Nimal	710100	S137	Geetha	D03	Database	33.00
PC012	Attendance System	Mr Nimal	710100	S218	Nalin	D02	Testing	20.00
PC012	Attendance System	Mr Nimal	710100	S109	Kasun	D01	IT	24.00

(Total: 20 marks)

Q4.

i. Mention 4 constraints on relational model of databases and briefly explain them. **(04 marks)**

ii. Define the following. **(08 marks)**

a. Weak entity
b. Derived attribute
c. Cardinality ratio
d. Super key

iii. Explain the terms specialization and generalization with respect to Entity Relationship Model. **(4 marks)**

iv. Briefly explain 3 types of file organization methods you know. **(4 marks)**

(Total: 20 Marks)

END OF THE PAPER