RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree in Applied Sciences
First Year - Semester I Examination – June /July 2018

COM 1302 – DATABASE MANAGEMENT SYSTEMS

Time: Three (03) hours

Answer all Questions.

1.

a) Explain the advantages of using the database approach to store data over the file based approach. (4 marks)

b) **"Three-schema architecture makes the physical database independent from the user applications".** Explain how this is achieved in three schema architecture. (4 marks)

c) Explain the following terms with examples. (8 marks)

i. Primary key
ii. Super key
iii. Candidate key
iv. Foreign key

d) **"Data duplication enhances the performance of data access"** Discuss with related to data replication. (4 marks)

(Total: 20 marks)

2. Consider the following scenario and answer the questions given.

Alice has a large DVD movie collection. Her friends like to borrow her DVD's, and she needs a way to keep track of borrowers. She maintains a list of friends, identified by unique FID's (friend identifiers) and a list of DVD's, identified by DVDID's (DVD identifiers). Name and the all-important telephone numbers of each are also recorded. With each DVD the star actor name and title are recorded. Whenever a friend borrows a DVD, Alice will enter that fact into her database along with the date borrowed. Whenever the DVD gets returned, that fact, too, gets noted along with the date returned. Alice wants to keep a complete history of her friends' borrowing habits so that she can ask favors of the heavy borrowers (or perhaps refuse to make further loans to those who habitually don't return them quickly).

a) Draw a suitable ER diagram for DVD management of Alice. (10 marks)
b) What is the specialty you see on the attributes of borrowing and returning dates of the DVDs than the other attributes? (4 marks)
c) Convert the ER diagram you drew in part a) above into a relational database schema. Be certain to indicate primary keys and referential integrity constraints. (6 marks)

(Total: 20 marks)

3. Following 3 tables are extracted from a part of the product sales database. The part consists of the tables of supplier, product and the product_supplier. By studying the tables, write My SQL queries for the given scenarios.

Product_ID	Supplier_ID
2001	501
2002	501
2003	501
2004	502
2001	503

Supplier_ID	Name	Phone
501	ABC Traders	88881111
502	XYZ Company	88882222
503	QQ Corp	88883333

Product_ID	Product_CODE	Name	Quantity	Price	Supplier_ID
2001	PEC	Pencil 3B	500	0.52	501
2002	PEC	Pencil 4B	200	0.62	501
2003	PEC	Pencil 5B	100	0.63	501
2004	PEC	Pencil 6B	500	0.47	503

a) Write SQL statements to create the table of suppliers and insert the given data to the table. (4 marks)
b) Write a DML statement to get the product names of which the quantities are greater than 500 and the names consist with the text 'pen'. (4 marks)
c) Write a DML statement to get the product with highest quantity, provided by the supplier 501. (4 marks)
d) Select the names of suppliers who supply the product called 'Pencil 4B'. (use join operation) (5 marks)
e) Get the maximum price of the product. (3 marks)

(Total: 20 marks)

4. Consider the relational schemas given below and answer the questions by writing the correct algebraic queries.

student (id, name)

enrolledIn (student_id, subject_code)

subject (code, lecturer)

a) Retrieve the names of all students. (2 marks)
b) Find the lecturer who teaches the subject COM 1302. (3 marks)
c) Find the names of students who take a subject of lecturer "Kamal". (3 marks)
d) Find the names of the students who take both COM 1302 and FDN1202. (3 marks)
e) Find the names of students who take COM1302 but not COM 1402. (3 marks)
f) Find the students who are enrolled in all the subjects (6 marks)

(Total: 20 marks)

5.

a) **"Database normalization is the process of minimizing redundancy and dependency"** Discuss with suitable examples. (4 marks)
b) Give the types of dependencies exist in relational databases and explain each dependency briefly using suitable examples. (4 marks)
c) Consider the following relation and answer the questions below.

StudentCourseEnrollment (Student_ID , course_ID , course_Instructor , Student_Name , Student_Degree, Student_ADD, course_Name , Instructor_Name , Instructor_Office , Grade)

i. Which normal form is this relation in? Give the reasons for your answer (2 marks)
ii. Decompose the above relation in to third normal form (3NF). Clearly show all dependencies and state the reasons for each decomposition. (10marks)

(Total: 20 marks)