Reg. No.										

MANIPAL UNIVERSITY

FIRST SEMESTER MSc. INFORMATION SCIENCE DEGREE EXAMINATION – NOVEMBER 2015

SUBJECT: MIS 503 – DATABASE MANAGEMENT SYSTEMS

Wednesday, November 25, 2015

Time: 10:00 – 13:00 Hrs. Max. Marks: 100

1. Explain three level architecture of Database Management Systems.

(10 marks)

2. Define the terms:

2A. Data redundancy
2B. Databases
2C. Data Model
2D. Data Isolation

(2½ marks × 4 = 10 marks)

3. Assume the university computing services (UCS) administers all campus computer networks. Each computer in a network is uniquely identified by an inventory number, and also has a name (e.g., ise.gmu.edu) and a model (e.g., Dell Laptop). Computers are connected via networks. Each network has an identification number (id) and a capacity. Each computer is connected to a single network. The number of computers that are connected to a network may not exceed the capacity of the network. Each computer can have several peripheral devices. Each peripheral is installed in a specific io-port (e.g., USB slot #1); io-port numbers are unique within the computer, and has device name for the device currently associated with it (e.g, external disk drive). Users are identified by a social security number, and also have a name. Users can access the computers assigned to them; users are guaranteed access to at least one computer. For each computer that a user may access, the user is assigned a user-id and a password. Construct a clean and concise ER diagram. List your assumptions and clearly indicate the cardinality mappings as well as any role indicators in your ER diagram.

(10 marks)

4. Write the steps with relevant example to map ER diagram into Relational Model:

4A. Multi value attribute
4B. Weak entity
4C. Composite attribute
4D. Derived attribute

(2½ marks × 4 = 10 marks)

5. Discuss five aggregation functions in relational algebra with an example.

(10 marks)

6. Use the below relation schema write relational algebra query:

Book(b_id, title, author, category, year, location)
Student(s_id, name, major, gender)
Borrow(s_id, b_id, date)
Library(name, address)

/*location refers to Library.name*/
/*s_id refers to Student.s_id and b_id refers to Book.b_id */

6A. List out the students' names of whose major is 'Computer Science'.

6B. Output the names of students who have borrowed at least one book within this year. (This year begins at '01/01/2015'.)

6C. Output the majors of students who have borrowed 'Database System'.

6D. Output the majors in which none of the students have borrowed any book in the category 'Computer Science'

(2½ marks × 4 = 10 marks)

7. Define Sub queries. List out the advantage and drawbacks of using sub queries. Explain sub-queries using EXISTS and IN.

(2+2+6 = 10 marks)

8. Write short notes on Triggers and Views.

(10 marks)

9. Account (account-number,branch-name,balance)
Increase all accounts with balances over 10,000 by 6%, all other accounts receive 5%.

9A. Write two sql **update** statements.

9B. Write query using sql case statement.

(5 marks × 2 = 10 marks)

10. Compare 3 NF with BCNF.

(10 marks)