V Semester B.E. (CSE/ISE) Examination, Dec. 2018/Jan. 2019
(2K11 Scheme)
CI 51 : DATABASE MANAGEMENT SYSTEMS

Time : 3 Hours   Max. Marks : 100

Instruction : *Answer **any five** questions. Choosing atleast **two** from* ***each** Part.*

PART – A

1. a) Define the following terms :

   data, database, DBMS, database systems, database catalog, program-data independence, DBA, meta-data, user view, end user.   **10**

   b) Discuss the main characteristics of the database approach and how it differs from traditional file systems.   **10**

2. a) Define the following and give an example.
   i) Composite attribute
   ii) Multivalued attribute
   iii) Derived attribute
   iv) Complex attribute
   v) Key attribute.   **10**

   b) Write the E-R to relational mapping algorithm, showing each step with an example.   **10**

3. a) What are the various update operations on relations and the type of integrity constraints that must be checked for each update operation ?   **8**

   b) Consider the following relations for a database that keep track of business trips of sales persons in a sales office :

   SALESPERSON (SSN, Name, Start-Year, Dept-No.)

   TRIP (SSN, From-City, To-City, Departure-Date, Return-Date, Trip-ID)

   EXPENSE (Trip-ID, Account#, Amount)

                                                                                    P.T.O.

Specify the following queries in relational algebra :

i) Give the details for trips that exceeded Rs. 2,000 in expenses

ii) Print the SSN of salesman who took trips to 'Honolulu'

iii) Print the total trip expenses incurred by the salesman with SSN= '234-56-7890'.   12

4. a) Explain the following SQL commands with an example for each :   8

   i) Create

   ii) Drop

   iii) Alter

   iv) Select.

b) Consider the following relational schema :

   STUDENT (Name, StudentNumber, Class, Major)

   COURSE (CourseName, CourseNumber, CreditHours, Department)

   SECTION (SectionIdentifier, CourseNumber, Semester, Year, Instructor)

   GRADE-REPORT (StudentNumber, SectionIdentifier, Grade)

   PREREQUISITE (CourseNumber, PrerequisiteNumber)

   Write SQL update statements to do the following on the relational schema :

   i) Insert a new student <'Johnson', 25, 1, 'MATH'> in the database.

   ii) Change the class of student 'Smith' to 2.

   iii) Insert a new course <'Knowledge Engineering', 'CS4390', 3, 'CS'>.

   iv) Delete the record for the student whose name is 'Smith' and whose student number is 17.   12

PART – B

5. a) Write the inference rules for functional dependencies. Explain. What are Armstrong's inference rules ?   8

b) Consider the following relation :

   CAR-SALE (Car#, Date-Sold, Salesman#, Commission%, Discount-amt)

   Assume that a car may be sold by multiple salesmen and hence {Car#, salesman #} is the primary key.

   Additional dependencies are :

Date-sold → Discount-amt

Salesman# → Commission%

Based on the given primary key, is this relation in 1NF, 2NF or 3NF ? Why or why not ? How would you successively normalize it completely ?   12

6. a) What are the main goals of RAID technology ? How does it achieve them ? What are the techniques used to improve performance of disks in RAID ?   10

b) What are the differences among primary, secondary and clustering indexes ? How does multilevel indexing improve the efficiency of searching an index file ?   10

7. a) With a diagram, explain the Oracle architecture.   10

b) Discuss the various features of MS-Access.   10

8. a) Draw the block diagram for the overall process of data warehousing and explain.   10

b) What are the types of knowledge discovered during Data Mining ? Explain each one.   10