2014

Database Management System - I

Time Allotted : 3 Hours *Full Marks : 70*

The figure in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable

GROUP-A

(Multiple Choice Type Questions)

1. **Choose the correct alternative of the following:** 10x1=10
   i. **The DBMS acts as an interface between what two components of an enterprise-class database system?**
      a. **Database application and the database**
      b. **Data and the database**
      c. **The user and the database application**
      d. **Database application and SQL**
   ii. **The following are components of a database except**
      a. **User data** b. **Metadata** c. **Reports** d. **Indexes**
   iii. **Every time attribute A appears, it is matched with the same value of attribute B, but not the same value of attribute C. Therefore, it is true that:**
      a. $A \rightarrow B$ b. $A \rightarrow C$ c. $A \rightarrow (B,C)$ d. $(B,C) \rightarrow A$
   iv. **Row is synonymous with the term:**
      a. **Record** b. **Relation** c. **Column** d. **Field**
   v. **The primary key is selected from the:**
      a. **Composite keys.** b. **Determinants.**
      c. **Candidate keys.** d. **Foreign keys.**

vi. A key of table in RDBMS :
   a. Must always be composed of two or more columns
   b. Can only be one column
   c. Identifies a row
   d. Identifies a column

vii. A recursive relationship is a relationship between an entity and_____,
   a. Itself
   b. A subtype entity
   c. An archetype entity
   d. An instance entity

viii. The DROP TABLE statement:
   a. Deletes the table structure only
   b. Deletes the table structure along with the table data
   c. Works whether or not referential integrity constraints would be violated
   d. Is not anSQL statement

ix. Which of the following is the original purpose ofSQL?
   a. To specify the syntax and semantics of SQL data definition language
   b. To specify the syntax and semantics of SQL manipulation language
   c. To define the data structures
   d. All of the above

x. Specialization is which of the following processes?
   a. Defining one or more subtypes of the supertype and forming supertype/subtype relationships
   b. Defining one or more supertypes of the subtype and forming supertype/subtype relationships
   c. Defining one or more subtypes of the supertype and not forming supertype/subtype relationships
   d. Defining one or more supertypes of the subtype and not forming supertype/subtype relationships

Group -B
(Short Answer Type Question)
Answer any *three* Questions 3x5=15

2) Explain Generalization, Specialization and Aggregation in E-R diagram. 2+3

3) What is a View? View does not take any memory space, Justify. How do you create an Insertable and Updatable view? 1+2+2

4) a) What is FD?
   b) What is the highest NF of each of the following relations?
      i) R1(A, B,C)with FDs are $A \rightarrow B$, $A \rightarrow C$, $C \rightarrow B$
      ii) R2(A, B,C,D)with FDs are$A \rightarrow BC$, $CD \rightarrow B$. 1+4

5) Define: Super key, Candidate key, Primary key, foreign key and Alternate key. 5

6) List all relational algebra operations and explain one of them. 5

7) Briefly explain different JOIN operation with example. 5

Group -C
(Long Answer Type Question)
Answer any *three* Questions 3x15=45

8. Can a relation have more than one foreign key? Explain with the help of an example. [3]

   Consider the following schema:

   Suppliers (sid: *number. sname: char,address: char)*

   Parts (pid: number. pname: char,color: char)

   Catalog (sid: number. pid:number. cost:number)

   The key fields are underlined, and the domain of each field is listed after the field name. Therefore sid is the key for Suppliers, pid is the key for Parts, and sid and pid together form the key for Catalog. The Catalog relation lists the prices charged for parts by Suppliers. Write any *four* queries from the following questions using relational algebra, tuple relational calculus, and domain relational

calculus:

(i) Find the names of suppliers who supply some red part.

(ii) Find the sids of suppliers who supply some red part or are at 221 Packer Street.

(iii) Find the sids of suppliers who supply some red part and some green part.

(iv) Find the sids of suppliers who supply every red part.

(v) Find the pids of parts supplied by at least two different suppliers.

(vi) Find the pids of the most expensive parts supplied by suppliers named Yosemite Sham. [4x3=12]

9. Discuss multi-level index with a suitable diagram.
Consider the following relation Banking and FDs- Banking {name, acc_no, opening_date, street, city, pin, balance} and acc_no->opening_date, {name, acc_no}->city, city->street, city->pin, acc_no->balance. Is the relation conform to 3NF? If it is not in 3NF then proceed upto 3NF. Consider name as an atomic attribute. [8+3+4]

10. State the lossless join property of decomposition. What is its significance? A relation schema R(A,B,C,D,E,F)has the following set of functional dependency: {A->CD, B->C, F->DE, F->A}. Is the decomposition of R in R1(A,B,C), R2(A,F,D) andR3(E,F) dependency preserving and lossless decomposition? [6+2+1+6]

11. What are the main problems associated with commonly used hash functions and how can it be resolved?
Write a PL/SQL code to calculate the total and percentage of marks of the students in four subjects from the table result, which has the following structure: *(rno, s1, s2, s3, s4, total, percentage)*. The roll no and marks in each subject are stored in database, PL/SQL code calculate the total and percentage of each student and update the database. [3+5+7]

12. What is query tree? How is it different from a query evaluation plan? Explain with the help of an example. List some advantages and disadvantages of extensible hashing. Define Serial Schedule. Why is it always considered to be correct? [1+2+3+5+4]

13. Explain the importance of view in providing security to the database. What are the importance of GRANT and REVOKE commands? How one can drop a trigger? Explain the concept of instead of trigger. [5+2+2+2+4]

____x-x-x____