

ANNA UNIVERSITY OF TECHNOLOGY, COIMBATORE
B.E. / B.TECH. DEGREE EXAMINATIONS : NOV / DEC 2011
REGULATIONS : 2008
FOURTH SEMESTER

080250009 - DATABASE MANAGEMENT SYSTEMS
(COMMON TO CSE / INFORMATION TECHNOLOGY)

Time : 3 Hours

Max.Marks : 100

PART - A

(10 x 2 = 20 Marks)

ANSWER ALL QUESTIONS

1. List four significant differences between a file-processing system and a Database Management System.
2. State any four functions of a DBA.
3. Differentiate the terms primary key, candidate key, and super key with examples
4. Consider the table Employee with attributes EmpNo(primary key), Ename, PhoneNo, and Address. A view TMP is created from the table with attributes EmpNo, Ename and Address. What will happen when you insert values only for Ename and Address on view?
5. In what sense does relational calculus differ from relational algebra and in what sense are they similar?
6. Compare 3NF and BCNF with respect to lossless join decompositions and dependency preservation with the help of an example.
7. Consider the relation schema R(P, Q, R, S) and the Functional Dependencies S R, R P Q \rightarrow \rightarrow and P S \rightarrow holds on R. List all the keys of relation R.
8. Why is deferred update called the NO-UNDO/REDO method?
9. How does multilevel indexing improve the efficiency of searching an index file?
10. How is insertion and deletion performed in heap file?

PART - B

(5 x 16 = 80 Marks)

ANSWER ALL QUESTIONS

11.a) A Company database needs to store information about employees (identified by ssn, with salary and phone as attributes); departments (identified by dno, with dname and budget as attributes); and children of employees (with name and age as attributes). Employees work in departments; each department is managed by an employee; a child must be identified uniquely by name when the parent (who is an employee; assume that only one parent works for the company) is known. The information about a child is not required once the parent leaves the company.

- i) Draw an E-R diagram.
- ii) Map the E-R diagram into relational model.

(OR)

11.b) The musical company wants to store information about the musicians who perform on its albums. Each musician has a musician id, a name, an address, and a phone number. Some musicians may have the same address and some of them may have more than one phone number. Each musician may play several instruments and an instrument and may be played by several musicians. Each instrument has name and a musical key. The album recorded has a title, a copyright date, a format and an album identifier. Each album has a number of songs where a song has a title and an author. Each song may be performed by several musicians and a musician may perform a number of songs. One of the musicians of the song acts as a producer. A producer may produce several albums.

- i) Draw an E-R diagram.
- ii) Transform the E-R diagram to a Relational Schema.

12.a) Consider the following relational schema

Sailors (SailorId, SailorName, Rating, Age)

Reserves (SailorId, BoatId, Day)

Boats (BoatId, BoatName, Color)

Express the following queries in Relational Algebra

- i) Find the names of sailors who have reserved the same color boats as the sailor named 'John'.
- ii) Find the colors of boats reserved by sailor 'John'.
- iii) Find the names of sailors who have reserved a red or a green boat.
- iv) Find the names of sailors who have reserved at least two boats.

(OR)

12.b) SUPPLIER (SupplierNo, SupplierName, SupplierCity)

PART (PartNo, PartName, Weight, Quantity, Color)

SUPPLY (SupplierNo, PartNo, Quantity)

Express the following queries in SQL:

- i) Find the names of parts which are supplied by more than one supplier.
- ii) Find the name of suppliers who have supplied all the red colored parts.
- iii) Find the names of supplier who has supplied blue parts more than average number of the blue parts supplied by the supplier in the same city.
- iv) Find the names of supplier who supply atleast two parts.

13. a) Employee:

EmpID	Branchno	Branch Address	Name	Position	Hours/Week
E101	B02	Sun Plaza, Atlanta,46277	Steve	Assistant	15
E101	B04	2/3UT, New York, 46328	Steve	Assistant	10
E122	B02	Sun Plaza, Atlanta,46277	John	Assistant	14
E122	B04	2/3UT, New York, 46328	John	Engineer	9

- i) Is this table in 2NF? If not, Why?
- ii) Describe the process of normalizing the data shown in the table to 3NF.
- iii) Identify the primary and foreign keys in 3NF relations.

(OR)

- b) A table includes 3 attributes: Child, Hobby and Teacher One child can have many hobbies. Many teachers can teach the child. Is this table in 4NF? If yes how would you bring it into 5NF. If not how would you bring it into 4NF and 5NF.

14. a) Consider a Data base with objects X and Y. Suppose that there are two transactions T1 and T2. Transaction T1 reads object X and Y and then performs write X. Transaction T2 reads object X and Y and write X and Y
- Give an example schedule with actions of transaction T1 and T2 on object X and Y that results in
- i) Read write conflict
 - ii) Write read conflict
 - iii) Write write conflict

(OR)

- b) Explain two phase locking protocol with the help of an example. What are its advantages and disadvantages? How can these disadvantages be overcome?

15. a) Suppose that we are using extendable hashing on a file that contains records with the following hash value. 1,4,5,7,10,12,15,16,19,21,32.
- i) Show the extendable hash structure for this file. [Total number of buckets = 4. Each can hold 4 records] (8)
 - ii) Show how the extendable hash structure changes as the result of insertion of hash key value 13 and 20. (8)

(OR)

- b) i) Construct a B tree for the following set of key values: (Brighton, Clearview, Downtown, Mianus, Perryridge, Redwood, RoundHill). Assume that the tree is initially empty and values are added in ascending order and the number of points that will fit in one node is 3. Also show the structure of the tree after deleting the key "Downtown". (8)
- ii) How does the Buffer Manager handle the access request of a block? When does the transfer of blocks take place between buffer and disk? (8)

****THE END****