KUMARAGURU college of technology
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Register Number: ……

B.E DEGREE EXAMINATIONS: MAY 2015

(Regulation 2013)

Fourth Semester

COMPUTER SCIENCE AND ENGINEERING

U13CST404: Database Management Systems

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Data Definition Language (DDL) is used to
   a) Express database queries and updates
   b) Specify the database schema
   c) Specify database queries and joins
   d) Specify database schema and queries
2. The overall design of the database is called _____.
3. Given the basic ER and relational models, which of the following is incorrect?
   a) An attribute of an entity can have more than one value
   b) An attribute of an entity can be composite
   c) In a row of a relational table, an attribute can have more than one value
   d) In a row of a relational table, an attribute can have exactly one value or a NULL value
4. The relation book (title, price) contains the titles and prices of different books. Assuming that no two books have the same price, write the SQL query to extract Titles of the five most expensive books_____.
5. Which one of the following statements about normal forms is FALSE?
   a) BCNF is stricter than 3NF
   b) Lossless, dependency-preserving decomposition into 3NF is always possible
   c) Lossless, dependency-preserving decomposition into BCNF is always possible
   d) Any relation with two attributes is in BCNF
6. The relation schema Student_Performance (name, courseNo, rollNo, grade) has the following FDs:

name,courseNo->grade

rollNo,courseNo->grade

name->rollNo

rollNo->name

The highest normal form of this relation scheme is_____

7. Which of the following is a key factor for preferring B+ tree to binary search trees for indexing database relations

   a) database relations have a large number of records
   b) database relations are sorted on the primary key
   c) B+ trees require less memory than binary search trees
   d) data transfer from disk is in blocks

8. The blocks residing temporarily in main memory are referred to as_____

9. Which of the following scenarios may lead to an irrecoverable error in a database system?

   a) A transaction writes a data item after it is read by an uncommitted transaction
   b) A transaction reads a data item after it is read by an uncommitted transaction
   c) A transaction reads a data item after it is written by a committed transaction
   d) A transaction reads a data item after it is written by an uncommitted transaction

10. _____ concurrency control protocols ensure both conflict serializability and freedom from deadlock

PART B (10 x 2 = 20 Marks)

(Not more than 40 words)

11. List any four applications of DBMS.
12. What is the significance of foreign key?
13. Compare partial participation with total participation.
14. Given two relations R (A,B) and S (B,C) with number of tuples in R and S equal to 500 and 1000 respectively and B is the foreign key in R, Identify the number of tuples in R natural join S.
15. Suppose that we decompose the scheme R = (A,B,C,D,E) into (A,B,C) and (A,D,E). Construct decomposition for this and show it is a lossless-join decomposition if the following set F of functional dependencies holds: A->BC, CD->E, B->D, E->A
16. Compare fixed length record representation with variable length record representation.
17. Outline the factors to be considered to estimate the cost of query evaluation plan.
18. Define fudge factor.
19. Pictorially depict the relationship between transaction states.

20. List the factors to be considered for selection of victim transactions in deadlock recovery.

PART C (5 x 14 = 70 Marks)

(Not more than 400 words)

Q.No. 21 is Compulsory

21. (i) Consider relations given below (8)

Student (name, stud_no, class, major)

Course (course_name, Course_no, credit_hours, dept)

Section (section_id, Course_no, semester, year, instructor)

Grade_report (Stud_no, section_id, grade)

Prerequisite (course_no, pre_reg_no)

Write the relational algebra, SQL Expressions for the following queries

(i) Retrieve the names of all senior students majoring in 'CS'

(ii) Retrieve the names of all courses taught by Prof King in 1998 and 1999

(iii) Retrieve the name and transcript of each senior student(class=5) majoring in CS.A transcript includes course name, course number, credit hours, semester, year, and grade for each course completed by the student

(iv) Retrieve the names and major departments of all Grade-A students.

(ii) Normalize the following table (up to 3rd normal form) (6)
Customer(cust#,name,ord#,date,part#,desc,qty,price,supp#,name)

22. a) (i) Outline the disadvantages of conventional file systems? Discuss how these disadvantages are rectified in database systems. (8)

(ii) Draw the E-R diagram for the following company database. (6)

The details are

Employee (eno, name(firstname, middle_name,last_name), sex,
address (address1,address2,city,state), salary,bdate,age (derived attribute))
Department(name,number,location,no_of_employees)
Project(name.number,location)
Dependent(name,sex,birthdate,relationship)

(OR)

b) (i) Illustrate a typical system architecture for DBMS (8)

(ii) Consider the following relations (6)

Vehicle (reg_no, make, colour)

Person(eno, name, address)

Owner(eno, reg_no)

Write expressions in the relational algebra to answer the following queries:-

(i) List the reg_no of vehicles owned by John

(ii) List the names of persons who own Maruti cars.

(iii) List the entire red coloured vehicle.

23. a) (i) Compare heap, sequential and hash file organizations. (8)

(ii) Outline the concepts of triggers with examples. (6)

(OR)

b) Explain how RAID technology can be used to improve the reliability and performance of a database.

24. a) (i) Summarize the concept of evaluation of expressions. (8)

(ii) Summarize how the B+ tree index is better than other indexing techniques. Justify. (6)

(OR)

b) (i) Explain the primary indexing techniques with examples. (8)

(ii) Outline the causes of bucket overflow in a hash file organization. What can be done to reduce the occurrence of bucket overflow? (6)

25. a) Explain two phase locking protocol and time stamp based protocol with illustrates.

(OR)

b) Describe immediate log based and deferred log based recovery approaches in databases. Also compare & contrast them.

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