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# SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FOURTH SEMESTER B.TECH DEGREE EXAMINATION (R), MAY 2023
COMPUTER SCIENCE AND ENGINEERING
(2020 SCHEME)

Course Code :   20CST204

Course Name: Database Management Systems

Max. Marks :   100   **Duration: 3 Hours**

PART A
(Answer all questions. Each question carries 3 marks)

1. Explain responsibilities of DBA
2. Compare total and partial participation .
3. Differentiate between cartesian product and join.
4. Briefly explain ALTER TABLE command.
5. Explain views in SQL.
6. Compare clustering and secondary indexing.
7. Explain 2NF.
8. Distinguish between minimal cover and equivalence in FDs.
9. Explain log based recovery.
10. Compare two phase locking and strict two phase locking protocols.

PART B
(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Explain Three schema architecture with a neat diagram   (9)

     b) Create a database schema using the following ER diagram.
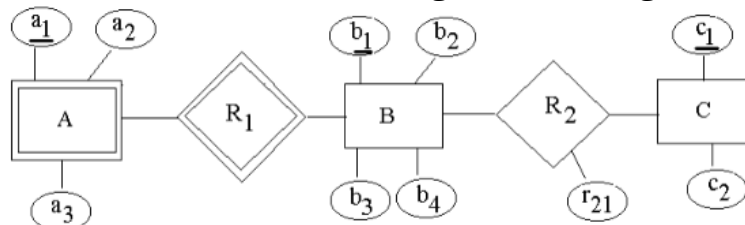
      (5)

OR

12. a) Design an ER diagram to represent the following scenario:
A company has many employees working on a project. An
employee can be part of one or more projects. Each employee
works on a project for certain amount of time. Assume suitable
attributes for entities and relations. Mark the primary key(s)
and the cardinality ratio of the relations.   (9)

b) How foreign key is used to implement referential integrity constraint. Explain   (5)

MODULE II

13. a) The relational schema for a library describing members, books and issue information is given below. Foreign keys have the same name as primary keys.

    BOOKS(ACC-NO, , ISBN, TITLE, EDITION, YEAR)
    MEMBERS(MEMBERID, MEMEBERNAME, MEMBERTYPE)
    ISSUEDTO(ACC-NO, MEMBERID MEMBERID, MEMBERNAME, MEMBERTYPE) NO, MEMBERID, DATE OF ISSUE) NAME, MEMBERTYPE)   (9)
    Write relational algebra
    i) Accession Number(s) and Name(s) of third edition books published in 2018.
    ii) Names and dates of issue of books taken by a member named 'Antony'.
    iii) Names of books not taken by any member

b) Consider the join of a relation R with a relation S. If R has m tuples and S has n tuples find out the maximum and minimum sizes of the join.   (5)

OR

14.

  a) In a database write the SQL queries for the following Use appropriate datatypes
      i) Create a database named 'College'
      ii) Create a table named 'Student' with attributes ID (Primary Key), name, DOB, semester, department.   (10)
      iii) Add a column named mark to the above table.
      iv) Delete the column named DOB from the above table.
      v) Remove the table from database.

  b) Explain project operation with example   (4)

MODULE III

15. a) Consider the following table
    STUDENT (ID, name, dept, sem)
    FACULTY(faculty_id, name, dept)
    TEACH (faculty_id,stud_id, subject_name)

                    (10)

    Write the SQL queries for the following
     i. Get the names of student in department "CS'
     ii. Get the count of students in department 'ME'
     iii. Get the count of students in each department with

     department   name.

     iv.   Get the details of the students taught by faculty with id 'CSD006'

     v.   Get the name of students taught by faculty named 'Siva'

   b)   Compare the structure of B tree and B+ tree   (4)

OR

16.   a)   Consider an EMPLOYEE file with 10000 records where each record is of size 80 bytes. The file is sorted on employee number (15 bytes long), which is the primary key. Assuming un-spanned organization, block size of 512 bytes and block pointer size of 5 bytes, compute the number of block accesses needed for retrieving an employee record based on employee number if (i) No index is used (ii) Multi-level primary index is used   (9)

   b)   Explain Trigger with example   (5)

MODULE IV

17.   a)   i) What are Armstrong's axioms.

      ii) Write an algorithm to compute the attribute closure of a set of attributes (X) under a set of functional dependencies (F)   (9)

      iii) Explain the uses of attribute closure algorithm

   b)   Explain dependency preserving decomposition with example   (5)

OR

18.   a)   Consider the relation **R = {A, B, C, D, E, F, G, H}** and the setof functional dependencies **F = {A→DE, B→F, AB→C, C→GH, G→H}.** What is the key for R? Decompose R into 3NF relations.   (9)

   b)   Analyze BCNF and 3NF with a relation which is already 3NF but no in BCNF   (5)

MODULE V

19.   a)   i) Check if the following schedules are conflict-serializable using precedence graph. If so, give the equivalent serial schedule(s). r3(X), r2(X), w3(X), r1(X), w1(X). (Note: ri(X)/wi(X) means transaction Ti issues read/write on item X.)   (9)

      ii) Explain Dirty read and lost update problem with example

   b)   With help of suitable logs explain how recovery is done in deferred database modification scheme.   (5)

OR

20. a) Write explanatory notes on the following: (8)
      i) GIS ii) Big Data
   b) Explain ACID properties (6)

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