R20 Regulation

Subject code:3P3ED

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech III Semester Regular/Supplementary Examinations, March/April 2023

DATABASE MANAGEMENT SYSTEMS

(Common to CSE, CSE(AI&ML) and CSE(DS))

Maximum Marks: 70

Date:04.04.2023 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

1 Differentiate DDL and DML
2 What is logical data independence and why it is important?
3 How week entities are represented in database?
4 State about SELECT operation in Relational algebra.
5 What are the steps involved in processing a query?
6 Why NULL values are needed in databases?
7 What are ACID properties?
8 What is lock used for?
9 What is tree indexing?
10 Why is B+ tree efficient than B tree?

Part-B

Answer All the following questions. (5X10M=50Marks)

11 (a)What are the main differences between a file processing system and a database management system? Describe the overall system architecture of a database system. Also show the connection system. Also show the connection amongst its various components. 5M
(b)Define View? Explain about how to create a view using a single table and multiple tables

OR

12 (a) What are the responsibilities of a DBA? If we assume that the DBA is never interested in running his or her own queries, does the DBA still need to understand query optimization? Why? 5M
(b)Who are the different database users? Explain their interfaces to database management systems. 5M

13 (a)How relational algebra is different from relational calculus. 5M
(b)Construct an E-R diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents 5M

OR

14 (a) Draw an ER Diagram for BANK database schema with at least five entity types. Also specify Primary Key and Structural Constraints 5M

(b) Distinguish between ER model and relational model 5M

15 (a) Consider the following relational database: 5M

Dept(Deptno, Dname, Location)

Emp(Empno, Empname, Job, Salary, MGR, Hiredate, Deptno)

Write SQL statements to the following queries.

i)Find the details of employees who are managers.

ii) Count the distinct salaries of the employees.

iii) Find the department name of the employee: 'Scott'.

iv) For each Job, list the number of employees in the company.

v) Display the details of top three salaried employees

(b) What is functional dependency? With respect to FD: 5M

i) Mention the conditions to be satisfied by sets of FDs to be minimal.

ii) Write an algorithm to compute the attribute closure of attribute set X

iii) List the inference rules for FDs

OR

16 (a) "Redundancy is the back bone of reliability; therefore, a reliable database system should not attempt normalization beyond 3NF". Comment on the above statement. Give reason in support of or against the above statement 5M

(b) Suppose that we decompose the scheme R=(A,B,C,D,E) into (A,B,C) and (A,D,E). Show that this decomposition is a lossless join decomposition if the following functional dependencies hold: 5M

$A \rightarrow BC$, $CD \rightarrow E$, $B \rightarrow D$

Show that this decomposition is dependency preserving decomposition.

17 How concurrency is performed? Explain the protocols that are used to maintain the concurrency concept. 10M

OR

18 How do optimistic concurrency control techniques differ from other concurrency control techniques? Why they are also called validation or certificate techniques? Discuss the typical phases of an optimistic concurrency control method. 10M

19 (a) What is an index? Discuss important properties of an index that affect the efficiency of searches using the index. 5M

(b) Compare and contrast extendable and linear hashing. 5M

OR

20 Describe a B+ tree for the following set of key values:(2,3,5,7,11,17,19,23,29,31) Assume that the tree is initially empty and values are added in ascending order. Construct B+ tree for the case where the number of pointers that will fit in one node is six. 10M