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Paper Code : PCC-CS601/PCC-CS603/PCCAI601/PCCCS601 Database Management Systems

UPID : 006577

Time Allotted : 3 Hours *Full Marks : 70*

The Figures in the margin indicate full marks.

Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer *any ten* of the following : [1 x 10 = 10]

(i) What is a Multivalued Attribute in an ERD?

(ii) Are NULL values in a Database equivalent to zero or blank space?

(iii) In which indexing, the total number of records in both the index table and the database table is same ?

(iv) The two-phase locking (2PL) protocol consists of _____phase and _____ phase.

(v) What does RBAC stand for ?

(vi) What is the difference between homogeneous and heterogeneous DBMS?

(vii) What do you mean by Strong Entity in an ER Diagram? Give an example.

(viii) Which operator performs pattern matching in SQL?

(ix) What is the main advantage of using sparse matrices for storing Data ?

(x) Define Checkpoint used in Database Recovery?

(xi) What does MAC stand for in context of Database Security?

(xii) _____ refers to the act of maintaining duplicate copies of a database across multiple locations.

Group-B (Short Answer Type Question)

Answer *any three* of the following : [5 x 3 = 15]

2. Which mechanisms are typically used to provide security in a database? Explain each in brief. [5]

3. Explain the types of data fragmentation in Distributed Database. [5]

4. What do you mean by generalization and specialization? Give examples. [5]

5. What are the differences between DROP, TRUNCATE, and DELETE commands? Give Examples. [5]

6. What are the different types of JOINs supported by SQL? Give an overview of each type . [5]

Group-C (Long Answer Type Question)

Answer *any three* of the following : [15 x 3 = 45]

7. (a) Discuss the ACID properties of the transactions with example. [10]

   (b) How does a dirty read occur? Explain with an example. [5]

8. (a) Explain subsystems of a typical database system structure. [9]

   (b) Write a short explanation of various responsibilities of a DBA concerning database security. [6]

9. (a) How does data abstraction help in managing complexity in database design? [7]

   (b) Explain the extended features of the Entity-Relationship model using an example. [8]

10. (a) What role do "keys" serve in DBMS ? Explain the commonly used keys in DBMS? [7]

    (b) What do you mean by the "degree of relationship" used in DBMS? Explain its types briefly with a graphical representation. [8]

11. Consider the following relational schema : [2+2+2 +3+3+3]

Student (Stid, Stname, Marks, Course_Id)

Course (Course_Id, Course_Title, Credit, Duration)

Instructor (Instructor_Id, Instructor_Name, Course_Id)

a) Solve the following queries using Relational algebra ;

i) Retrieve the names and IDs of students enrolled in the MBA course.

ii) Identify instructors who teach classes in both BTech (CSE) and BTech (IT) courses.

iii) Find the name of the professor who taught a course with duration longer than that of Professor S. Gupta.

b) For the same schema, solve the following queries using SQL :

i) Display the number of total students enrolled in each course.

ii) List the courses that have the same duration.

iii) Provide the information of the student who achieved the second highest marks in the "Network Security" course.

*** END OF PAPER ***