



4. Which of the following operation is used if we are interested in only during columns of a table? CO2 [K2]  
 a) Projection B) Selection  
 c) Union D) Join
5. Assertion (A):Relational algebra is a non procedural query language CO2 [K3]  
 Reason (R): Relational algebra takes one or more relation as input and gives one relation as output  
 a) Both A and R are Individually true and R is the correct explanation of A b) Both A and R are Individually true but R is not the correct explanation of A  
 c) A is true but R is false d) A is false but R is true
6. Consider a schema R(A, B, C, D) and functional dependencies A -> B and C -> D. Then the decomposition of R into R1 (A, B) and R2(C, D) results is CO3 [K2]  
 a) dependency preserving and lossless join b) lossless join but not dependency preserving  
 c) dependency preserving but not lossless join d) not dependency preserving and not lossless join
7. Sequence the following query processing steps activities CO4 [K2]  
 1.Query execution plan  
 2.Compiler Processing  
 3.Data retrieval  
 4.Query evaluation engine  
 a) 4-3-2-1 b) 3-4-2-1  
 c) 2-3-4-1 d) 2-1-4-3
8. The relation schema Student\_Performance (name, courseNo, rollNo, grade) has the following FDs: CO3 [K3]  
 name,courseNo->grade  
 rollNo,courseNo->grade  
 name->rollNo, rollNo->name  
 The highest normal form of this relation scheme is  
 a) 1NF b) 3NF  
 c) 2NF d) BCNF
9. Assertion (A) : The logical schema describes the database design at the logical level CO1 [K2]  
 Reason (R) : which describes what data are stored in the database and what relationship exists among the data  
 a) Both A and R are Individually true and R is the correct explanation of A b) Both A and R are Individually true but R is not the correct explanation of A  
 c) A is true but R is false d) A is false but R is true
10. File organization in which any record can be placed anywhere in the file where there is space for the record is called as \_\_\_\_\_ CO5 [K1]  
 a) Heap file organization b) Sequential file organization  
 c) Hashing file organization d) Clustering file organization

**PART B (10 x 2 = 20 Marks)**

**(Answer not more than 40 words)**

11. Define single valued and multivalued attributes. CO1 [K2]
12. List the types of attributes present in the ER model CO1 [K2]
13. Consider the following relations: CO2 [K3]  
S (S#, SNAME, STATUS, CITY)  
SP (S#, P#, QTY)  
P (P#, PNAME, COLOR, WEIGHT, CITY)  
Give an expression in SQL for each of queries below:  
(i) Get supplier names for supplier who supply at least one red part  
(ii) Get supplier names for supplier who do not supply part P2.
14. Write the significance of Primary Key and Foreign Key in a relational database. CO2 [K2]
15. What are the properties of Armstrong's axioms are used to infer FDs from others? CO3 [K2]
16. Define Boyce codd normal form CO3 [K2]
17. What are the advantages of embedded query language? CO4 [K2]
18. Distinguish between static hashing and dynamic hashing. CO4 [K3]
19. Define the phases of two phase locking protocol CO5 [K2]
20. What are the drawbacks of shadow-paging technique? CO6 [K2]

**Answer any FIVE Questions:-**

**PART C (5 x 14 = 70 Marks)**

**(Answer not more than 300 words)**

**Q.No. 21 is Compulsory**

21. (i). Consider the following relational database: [8] CO2 [K2]  
STUDENT (name, student#, class, major)  
COURSE (course name, course#, credit hours, department)  
SECTION (section identifier, course#, semester, year, instructor)  
GRADE\_REPORT (student#, section identifier, grade)  
PREREQUISITE (course#, prerequisite#)  
Specify the following queries in SQL on the above database schema.  
Retrieve the names of all students majoring in 'CS' (Computer science).  
Retrieve the names of all courses taught by Professor King in 1998  
Delete the record for the student whose name is 'Smith' and whose student number is 17. CO1 [K2]  
Retrieve the names of all grade>7.5  
(ii). Discuss in detail about database system architecture with neat diagram [6]

22. (i). Consider the following relational schema: [7] CO2 [K3]  
PERSON (SS#, NAME, ADDRESS)  
CAR (REGISTRATION\_NUMBER, YEAR, MODEL)  
ACCIDENT (DATE, DRIVER, CAR\_REG\_NO)  
OWNS (SS#, LICENSE)  
Construct the following relational algebra queries:  
Find the names of persons who are involved in an accident.  
Find the registration number of cars which were not involved in any accident.
- (ii). A database is to be constructed to keep track of the teams and games of a sport league. A team has a number of players, not all of whom participate in each game. It is desired to keep track of the players participating in each game of each team and the result of the game. Create an ER diagram, completely with attributes, keys and constraints, for the above description. State any assumptions that you make. [7] CO1 [K3]
23. Explain about Second Normal Form and third normal form with suitable example (employee database). CO3 [K2]
24. (i). Define a view and a trigger. Construct a view for the above relations which has the information about suppliers and the parts they supply. The view contains the S#, SNAME, P# , PNAME renamed as SNO, NAME, PNO, PNAME [7] CO2 [K3]  
Describe the static hash file with buckets and chaining and show how insertion, deletion and modification of a record can be performed.
- (ii). Consider the universal relation R(A,B,C,D,E,F,G,H,I,J) and the set of FD's.  $G = (\{A,B\} \twoheadrightarrow \{C\} \twoheadrightarrow \{B,D\} \twoheadrightarrow \{E,F\} \twoheadrightarrow \{A,D\} \twoheadrightarrow \{G,H\} \twoheadrightarrow \{A\} \twoheadrightarrow \{I\} \twoheadrightarrow \{J\})$  what is the key of R? decompose R into 2NF, then 3NF relations. [7] CO3 [K3]
25. (i). What is RAID? List the different levels in RAID technology and explain its features [10] CO4 [K3]  
(ii). Describe about query processing structures [4] CO4 [K2]
26. Summarize about the B<sup>+</sup> - Tree index structure. How the B+ tree index is better than other indexing techniques? CO4 [K3]
27. (i). Explain two phase locking in detail. Also comment on the following 2PL. [8] CO5 [K3]  
• Strict two phase locking  
• Rigorous two phase locking
- (ii). Explain about four transaction properties in DBMS(ACID) [6] CO6 [K2]

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