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Question Paper Code : 20359

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Third/Fifth/Eighth Semester

Computer Science and Engineering

CS 6302 – DATABASE MANAGEMENT SYSTEMS

(Common to Mechanical and Automation Engineering, Mechatronics Engineering and Information Technology)

(Regulations 2013)

(Also common PTCS 6302 – Database Management System for B.E. (Part-Time) Second Semester – Computer Science and Engineering – Regulations 2014)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention some of the major responsibilities of a database administrator.
2. Give an example for one to one and one to many relationships.
3. What are aggregate functions? And list the aggregate functions supported by SQL?
4. Write a SQL statement to find the names and loan numbers of all customers who have a loan at XYZ branch.
5. Highlight the role of a recovery management component.
6. Give the drawbacks of shadow-paging technique.
7. Why is a B+ tree usually preferred as an access structure to a data file?
8. What are the ways in which the variable-length records represented in database systems?
9. How are transactions performed in Object oriented database?
10. How spatial databases are more helpful than active database?

PART B — (5 × 13 = 65 marks)

11. (a) 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. State any assumptions you make.

Or

- (b) Suppose that we have the following three tuples in a legal instance of a relation schema S with three attributes ABC (listed in order): (1,2,3), (4,2,3), and (5,3,3).

- (i) Which of the following dependencies can you infer does not hold over, schema S ?

(1) $A \rightarrow B$ (2) $BC \rightarrow A$ (3) $B \rightarrow C$.

- (ii) Can you identify any dependencies that hold over S ?

12. (a) Consider the following relational schema:

Employee (empno, name, office, age)

Books (isbn, title, authors, publisher)

Loan (empno isbn, date)

Write the following queries in relational algebra.

- (i) Find the names of employees who have borrowed a book Published by XYZ Ltd.,
- (ii) Find the names of employees who have borrowed all books Published by XYZ Ltd.,
- (iii) Find the names of employees who have borrowed more than five different books published by XYZ Ltd.,
- (iv) For each Publisher, find the names of employees who have borrowed more than five books of that Publisher.

Or

- (b) (i) Since indices speed query processing why might they not be kept on several search keys? List as many reasons as Possible.
- (ii) How does a DBMS represent a relational query evaluation plan?

13. (a) Explain the methods used to handle Deadlock.

Or

- (b) (i) Differentiate strict two phase locking protocol and rigorous two phase locking protocol. (6)
- (ii) How the time stamps are implemented? Explain. (7)

14. (a) (i) Explain why allocations of records to blocks affect database system performance significantly. (5)

- (ii) Explain the concept of Deadlock avoidance and prevention in detail. (8)

Or

- (b) (i) Explain how reliability can be improved through redundancy? (6)

- (ii) How the records are represented and organized in files. Explain with suitable example. (7)

15. (a) Discuss the issues and steps involved in building a data warehouse. How the concept of relational view is related to data warehouse and data marts?

Or

- (b) (i) Compare and contrast between object oriented and XML databases. (7)

- (ii) Give XML representation of bank management system and also explain about Document Type Definition and XML schema. (6)

PART C — (1 × 15 = 15 marks)

16. (a) Given: VAR Exam_Marks BASE RELATION { Student_ID SID, Course_ID CID, Mark INTEGER} KEY {Student ID, Course ID};

Write down the relational algebra expression to give, for each pair of students sitting in the same exam, the absolute value of difference between the marks. Assume you can write $ABS(x)$ to obtain the absolute value of x .

Or

- (b) Give an example of a relation that is in 3NF but not in BCNF. How will you convert that relation into BCNF.