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Question Paper Code: U3F06

B.E./B.Tech. DEGREE EXAMINATION, APRIL 2024

Third Semester

Computer science and Engineering

21UCD306- DATABASE SYSTEM DESIGN

(Common to IT,CSD & AI&DS)

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10x 2 = 20 Marks)

1. Describe the three levels of views used in DBMS CO1- U
2. Express the following query in Relational Algebra for the relations given. CO2- App
“Find the names of all customers who have a loan at the bank and find the amount of the loan”.
Loan = (loanno, branch_name, amount)
Borrower = (custid, loanno)
3. State the differences between BCNF and 3NF. CO1- U
4. Explain about Functional Dependency. CO1- U
5. How does Pipelining improve query evaluation efficiency? Explain CO1- U
6. What is meant by log based recovery? CO1- U
7. What is indexing and what are the different kinds of indexing? CO1- U
8. List out the various properties of B trees. CO1- U
9. Define CRUD operation in MongoDB. CO1- U
10. List the different types of NoSQL databases CO1- U

PART – B (5 x 16= 80 Marks)

11. (a) With relevant examples discuss the various fundamental operations in Relational Algebra. CO1-U (16)
- Or
- (b) (i) Explain various keys with examples CO1-U (8)

- (ii) Explain the disadvantages of using file processing systems. CO1-U (8)
12. (a) Solve the statement by using Relation $R = (A, B, C, D)$ with Functional dependency $F = \{C \rightarrow D, C \rightarrow A, B \rightarrow C\}$. CO2-App (16)
- i. Identify all candidate keys for R.
 - ii. Identify the best normal form that R satisfies.
 - iii. Decompose R into a set of BCNF relations.
- Decompose R into a set of 3NF relations.
- Or
- (b) Create tables as follows by choosing appropriate data type and set the necessary primary and foreign key constraints. Write SQL statements to answer the following queries. CO2-App (16)
- Product (Prodid, Prodesc, Price, Stock)
Purchase (Purid, Proid, qty, supname)
Sales (Saleid, Proid, qty, custname)
- i. Update the Stock of all products by 10.
 - ii. Display products whose stock is <15 and order it by stock.
 - iii. Display list of product details (Prodid, Prodesc, Price) supplied by a particular supplier("ABC").
 - iv. Product ids and Sum of quantity purchased
 - v. Product details (Prodid, Prodesc, Price) of products which are purchased as well as sold.
13. (a) Describe the concept of serializability with suitable examples. CO1-U (16)
- Or
- (b) Explain Timestamp based concurrency control algorithm with an example. CO1-U (16)
14. (a) With simple algorithms explain the concepts of Nested-loop join and Block Nested-loop join. CO1-U (16)
- Or
- (b) Explain about B trees indexing concept with an example. CO1-U (16)

15. (a) Explain detail about the Cassandra NoSQL databases with neat diagram CO1- U (16)

Or

(b) Compare the different NoSQL databases and list all its merits and demerits of NoSQL databases CO1- U (16)

