Reg. No. : | | | | | | | | | | | | |

Question Paper Code: R3F06S

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

Third Semester

Computer science and Engineering

R21UCD306-DATABASE SYSTEM DESIGN

Common to (IT, AIDS,CSD, CSE(AIML) and CSE(IOT)) Branches

(Regulations R2021)

Duration: Three hours | Maximum: 100 Marks

Answer All Questions

PART A - (10 x 2 = 20 Marks)

1.	Explain the different types of attributes with example.	CO1- U
2.	Describe the three levels of views used in DBMS	CO1- U
3.	Explain about Functional Dependency.	CO1- U
4.	Explain the types of joins in SQL	CO1- U
5.	What do you mean by Serializability and list the types of Serializability.	CO1- U
6.	How does Pipelining improve query evaluation efficiency? Explain.	CO1- U
7.	What is B+ tree index structure?	CO1- U
8.	What is meant by query optimization?	CO1- U
9.	What are the features of NoSQL?	CO1- U
10.	Define CRUD operation in MongoDB.	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)	Define relational database and the function of relational database.	CO1- U	(16)

12. (a) Solve the statement by using Relation R = (A, B, C, D) with Functional dependency F = {C→D, C→A, B→C}. CO2- App (16)

- Identify all candidate keys for R.
- Identify the best normal form that R satisfies.
- Decompose R into a set of BCNF relations.

Decompose R into a set of 3NF relations.

Or

(b) We wish to develop a database to keep track of persons, their children and their cars. For this purpose, we will use the following relation: CO2- App (16)

PersonData(pNbr, pName, pAddress, cNbr, cName, cAddress, aLic, aMake)

pNbr, pName, pAddress is the person number, name and address of a person. cNbr, cName, cAddress is the corresponding information for a child. Each person has exactly one address. aLic, aMake is the license number and make of a car. A car may be owned by more than one person.

i) What are the functional dependencies in this relation?

ii) Find the keys of the relation and show that the relation is not in BCNF.

iii) Decompose the relation into relations that are in 3NF.

13. (a) Describe the concept of serializability with suitable examples. CO1-U (16)

Or

(b) What is deadlock? When does it occur? How is it detected in database system? How can it be avoided? Discuss in detail. CO1-U (16)

14. (a) Construct 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+-trees for the cases where the number of pointers that will fit in one node is as follows: CO1-U (16)

a. Four b. Six c. Eight

Show the form of the tree after each of the following series of operations:

i) Insert 9. ii) Insert 10. iii) Insert 8.

Or

	(b)	Construct a B+-tree for the following set of key values:(4, 5, 6, 7, 10, 12, 14, 19, 20, 21, 23) Assume that the tree is initially empty and values are added in ascending order. Construct B+-trees for the cases where the number of pointers that will fit one node is as follows: i) Five ii) Seven	CO1-U	(16)
15.	(a)	Explain in detail about Mongodb architecture with CURD operations.	CO1-U	(16)
		Or		
	(b)	Explain CQL in detail with an example.	CO1-U	(16)