A 303 (2)

Reg No.:_____ Name:_____

0720MCA102112402

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Second Semester MCA(Two Year) Degree (S,FE) Examination December 2024

**Course Code: 20MCA102**

**Course Name: ADVANCED DATABASE MANAGEMENT SYSTEMS**

Max. Marks: 60 Duration: 3 Hours

**PART A**

*Answer all questions, each carries 3 marks.* Marks

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|---|---|---|
| 1 | Differentiate Database schema and instance. | (3) |
| 2 | List down any three functions of database administrator (DBA). | (3) |
| 3 | Explain the issues that may occur if the relation is not normalized. | (3) |
| 4 | Give R(X, Y, Z, W) and Set of Functional Dependency FD = {X → Y, Y → Z, Z → X}. Find the candidate keys of above relation. | (3) |
| 5 | Does Two Phase locking protocol avoid deadlocks? Justify your answer with example. | (3) |
| 6 | How can the wait/die and wound/wait schemes be utilized to manage transaction concurrency effectively in a multi-user database environment? | (3) |
| 7 | Explain query processing with figure. | (3) |
| 8 | Explain any two types of indices used in databases. | (3) |
| 9 | Explain structured types in SQL with example. | (3) |
| 10 | List down any three non-relational databases. | (3) |

## PART B

*Answer any one question from each module. Each question carries 6 marks.*

### Module I

11 Consider the following schema. (6)

**Suppliers (SID, sname, address)**

**Parts(PID, pname, colour)**

**Catalog(SID, PID, price)**

**Catalog[SID] ⊂ Suppliers[SID]**

**Catalog[PID] ⊂ Parts[PID]**

Write relational algebra queries for the following:

(i) Find all prices for parts that are red or green. (A part may have different prices from different manufacturers)

(ii) Find the SIDs of all suppliers who supply a part that is red or green.

(iii) Find the names of all suppliers who supply a part that is red or green.

(iv) Find the name and address of all suppliers who supply a part that price greater than 100.

**OR**

12 Explain Entity Relationship model and different symbols used in ER diagram. (6)

### Module II

13 a) Consider a relation R(A,B,C,D,E,F) with A as the only key. Assume that the dependencies E→F and C→DE hold on R. Is R in 2NF? If not, decompose to 2NF. (3)

b) Let E= {B→A, D→A, AB→D} is a set of Functional Dependencies. Find a minimal cover for E. (3)

**OR**

14 Define 2NF. Consider relational schema Student(StudentID, CourseID, StudentName, CourseName, Grade) with functional dependencies {StudentID, CourseID} → Grade, StudentID → StudentName, CourseID → CourseName. Check whether this relation is in 2NF? If not convert into 2NF. Justify your answer. (6)

**Module III**

15 What are the possible issues that may arise if concurrent execution of transactions is not controlled? With the help of example, explain any three such issues. (6)

**OR**

16 a) Explain ACID properties of transaction. (4)

b) How would you apply the ACID properties in transactions to ensure data integrity in banking application? (2)

**Module IV**

17 Explain various file organization methods with figures. (6)

**OR**

18 What is the purpose of RAID? Explain various levels of RAID. (6)

**Module V**

19 Explain MongoDB sharding and replication with figure. (6)

**OR**

20 Explain 'shared disk' and 'shared nothing' architecture with figures. (6)

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