

4E1305

Roll No.

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B. Tech. IV - Sem. (Main) Exam., - 2022
Computer Science & Engineering
4CS4 – 05 Database Management System
CS, IT, AID, CAI

Time: 3 Hours

Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A. Five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[10×2=20]

All questions are compulsory

Q.1 Which data independence is difficult to achieve and why?

(a) Physical data independence

(b) Logical data independence

Q.2 Consider the following schedule for three transactions T1, T2, T3, where R indicates a read of a Data item, W indicates a write of a data item and COM indicates a commit.

T1	R(A)						R(C)	W(B)	COM		
T2				R(A)	W(A)	COM					
T3		R(A)	R(C)							W(B)	COM

(a) Draw the dependency graph for this schedule.

(b) Whether the schedule is conflict serializable?

Q.3 What is the difference between strict two phase locking and simple two phase locking protocols?

Q.4 Which out of these are Data Manipulation Language (DML) commands and why?
Create, Update, Alter, Delete, Drop, Insert .

Q.5 What are the properties of a weak entity? How the primary key of weak entity is defined when it is converted to a relation in relational model?

Q.6 What is the upper limit on number of primary keys and candidate keys for any relation in relational model?

Q.7 How does aggregate operators of SQL treat NULL values? Explain with example.

Q.8 Difference between Join and Cartesian product. Explain with an example.

Q.9 Draw a neat diagram of database system architecture.

Q.10 Draw a labeled transaction state diagram.

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PART – B

(Analytical/Problem solving questions)

[5×4=20]

Attempt any five questions (Word limit 100)

Q.1 Explain the role and importance of relational algebra. Also, explain six basic operators of relational algebra with example.

Q.2 Consider a relation R (ABCDEF) where, A, B, C, D, E are the attributes of R. Consider functional dependency set $F = \{A \rightarrow EC, C \rightarrow D, B \rightarrow F\}$. Find out candidate key(s) and check the highest normal form.

Q.3 Differentiate View and Conflict Serializability with an example.

Q.4 Consider two relation customers and orders with values as follows. What will be the result of natural join, left outer join, right outer join, and full outer join.

Customers	
Customer Id	Name
1	Shreeram
2	Anubhuti
3	Jaya

Orders	
Order Id	Customer Id
100	1
200	4
300	3

Q.5 Define briefly with example –

- (a) Data Integrity
- (b) Aggregation in E – R model
- (c) Tuple relational calculus
- (d) Cascadeless schedules

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Q.6 Explain ternary relationship with example. Can we represent every ternary relationship with multiple binary relation?

Q.7 Differentiate Dynamic and Embedded SQL. Give example of Dynamic SQL.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [3×10=30]

Attempt any three questions

Q.1 Write the algorithm for basic time stamp ordering protocol. For the below schedule S with transactions T1, T2, T3, whether the timestamp order T1, T2, T3 will successfully execute this schedule using basic time stamp protocol?

S: r1(A), r2(B), w1(C), r3(B), r3(C), w2(B), w3(A)

Here, ri and wi denote the read and write operations respectively by transaction Ti. A, B, C, are three data items.

Q.2 Explain shadow paging recovery protocol along with its pros and cons. How does this differ from log based recovery scheme?

Q.3 What is the role of normalization in database design? Explain first normal form, second normal form, third normal form and BCNF with example of each?

Q.4 Draw the E-R diagram for University management system with complete labeling Convert the drawn E-R diagram into relational model. For each relation in relational model, clearly specify primary key and foreign keys.

Q.5 Consider the following three relations with attributes shown in brackets for an organization.

employee (eno, ename, esalary, dcode),

dept (dcode, dname)

dependent (depndtname, eno, relation).

Here primary keys are underlined

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Write SQL queries for the following –

- Show the names of employees with at least one dependent.
- List names of department(s) for which average salary for department is more than 10,000.
- Find the number of employees in each department.
- Find the name of department which have less than 10 employees.
- List all employees whose name contain at least one 'a' and one 'h' at any position.
- Find the total salary paid to employees of "accounts" department.
- Print the total number of employees whose salary is more than 40,000.
- Find the average salary of complete organization.
- Update the dcode of employee having eno = 101 to dcode = 10.
- Change the datatype of ename from char(20) to char(30).