

B.Sc./4th Sem (H)/COMS/24(CBCS)

2024

4th Semester Examination
COMPUTER SCIENCE (Honours)

Paper : C 10-T

(Database Management Systems)

[CBCS]

Full Marks : 40

Time : Two Hours

*The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.*

Group - A

Answer any *five* questions : 2×5=10

1. Consider the following set of functional dependencies on the relational schema (A, B, C)

A→BC

B→C

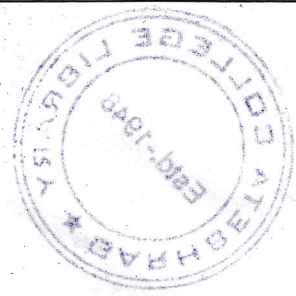
A→B

AB→C

Find the canonical cover for this set.

P.T.O.

(2)



2. What is integrity constraint?
3. Explain lossless decomposition.
4. Write any two comparison operators in SQL.
5. What is transitive dependency?
6. If a SQL query involves NOT, AND, OR with no parenthesis, then which operator evaluated first and which one evaluated last?
7. Why an alternate key is a candidate key other than a primary key?
8. What are the objectives of normalization?

Group - B

Answer any *four* questions : $5 \times 4 = 20$

9. (a) The following functional dependencies hold for relations $R(A,B,C)$ and $S(B,D,E)$

$B \rightarrow A$

$A \rightarrow C$

The relation R contains 200 tuples and the relation S contains 100 tuples. What is the maximum number of tuples possible in the natural join $R \bowtie S$?

- (b) Manager's salary details are hidden from the employees, what type of data hiding is considered here?

- (c) What is foreign key? Explain with suitable example.
2+1+2
10. (a) Define insert anomaly in relational data model.
(b) Define Domain and Entity. 3+2
11. (a) Draw a diagram for ANSI/SPARC three level architecture of DBMS.
(b) Define logical data independency. 3+2
12. Explain Generalization and Specialization of database design. 5
13. (a) Construct 1NF, 2NF of the following schema :
Sale_Person {E_no, E_name, S_branch, dept, item_no, item_details, Price}
(b) Explain index sequential file access method. 3+2
14. (a) Find out the primary key of the relation R(A,B, C,D), where
 $F = \{A \rightarrow BCD, BC \rightarrow A, BC \rightarrow D, D \rightarrow B\}$
(b) Which integrity refers to that 'If the base relation include a foreign key then it is must be primary key of another relation'?
(c) Write the difference between strong entity and weak entity. 3+1+1

P.T.O.

Group - C

Answer any *one* question : $10 \times 1 = 10$

15. (a) 'A relation schema in BCNF is automatically in 3NF but a relation in 3NF may or may not be in BCNF' — Explain it with suitable example.

- (b) Consider the following relational table

S-Person (S-no, S-name, Commission)

Product (P-id, Description)

Sale (Date, C-no, S-no, P-id, Qty)

Customer (C-no, C-name, C-add)

- (i) Find out the relational algebra SQL expression for get name of salesman who sold product number 48.
- (ii) Find out the relational algebra SQL expression to get the name of customer who bought the product 'national flag'.
- (iii) Find out the relational algebra SQL expression for find out the customer number who have never bought any product.
- (iv) Find out the relational algebra SQL expression for find out the customer number who have never bought product number 10. $4 + (4 \times 1\frac{1}{2})$

16. (a) Explain ACID properties of transaction.

(5)

- (b) Explain Lock-Based protocols for concurrency control.
- (c) Design ER diagram among Teachers, Student, and Course table. A teacher teaches only one course but a student can study in many courses.

Teacher (T-id, T-name, T-add, C-id)

Student (Roll, Name, Address)

Course (C-id, C-name, C-details)

3+3+4
