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Question Paper Code: R4D01

B.E./B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Fourth Semester

Computer Science and Business Systems

R21UCB401– DATABASE MANAGEMENT SYSTEMS

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Outline the three important facts about DBA. CO1- U
2. Compare weak and strong entity sets. CO1- U
3. Outline the use of Commit and Rollback. CO1- U
4. Consider the following relation: CO2-App
Customer (Custid, Custname, Age, phno)
Loan (Loanid, Amount, Custid, EMI)
 - a) Display Customerids who have not taken Loan.
 - b) List of the customerids and total Loan amount taken
5. What is the purpose of normalization? How does it help in improving database design? CO1- U
6. Difference between partial dependency and transitive dependency in the context of normalization. CO1- U
7. Outline the ACID properties. CO1- U
8. Classify the types of two-phase locking protocols. CO1- U
9. Identify the importance of cost estimation in query optimization and how it influences query execution plans. CO2-App
10. Consider a B+ tree in which the maximum number of keys in a node is 5. What is the minimum number of keys in any non-root node? CO2- App

PART – B (5 x 16 = 80 Marks)

11. (a) Draw an ER diagram for the given scenario; CO2- App (16)
Suppose that you are designing a schema to record information about reality shows on TV. Your database needs to record the following information:
- i. For each reality show, its name, genre, basic_info and participants name. Any reality show has at least two or more participants.
 - ii. For each producer, the company name, company country. A show is produced by exactly one producer. And one producer produces exactly one show.
 - iii. For each television, its name, start year, head office. A television may broadcast multiple shows. Each show is broadcasted by exactly one television.
 - iv. For each user, his/her username, password, and age. A user may rate multiple shows, and a show may be rated by multiple users. Each rating has a score of 0 to 10.
- Draw an entity relationship diagram for this database.
- Or
- (b) Construct an E-R diagram for a car insurance company whose CO2- App (16)
customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. Each insurance policy covers one or more cars, and has one or more premium payments associated with it. Each payment is for a particular period of time, and has an associated due date, and the date when the payment was received.
12. (a) What is data integrity? Explain the types of integrity constraints. CO1- U (16)
Or
- (b) Write notes on join. How join can be expressed with basic CO1- U (16)
relational algebra operators? Justify with example.
13. (a) Consider a relation R(A,B). R is in first normal form. Justify R is CO2- App (16)
in second normal form, third normal form and BCNF.

Or

- (b) Solve the statement by using Relation $R = (M, N, O, P)$ with CO2- App (16)
Functional dependency $F = \{O \rightarrow P, O \rightarrow M, N \rightarrow O\}$.
- 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 2NF relations.
14. (a) What is concurrency control? Explain the two phase locking CO1- U (16)
protocol with an example.
- Or
- (b) Explain the different types of schedules are acceptable for CO1- U (16)
recoverability.
15. (a) Demonstrate the different types of file organization with their CO1- U (16)
advantages and disadvantages.
- Or
- (b) Summarize the steps in query processing with the help of a neat CO1- U (16)
diagram.

