

Reg. No. :



Question Paper Code : 30877

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019

Fourth Semester

Computer Science and Engineering

CS 2255 – DATABASE MANAGEMENT SYSTEMS

(Common to Information Technology)

(Regulation 2008)

(Also Common to PTCS 2255 – Database Management Systems for
B.E. (Part – Time) Third Semester – CSE – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is a data model? List the types of data model.
2. Is it possible for several attributes to have the same domain? Illustrate your answer with suitable examples.
3. Define tuple and attribute.
4. Differentiate static and dynamic SQL.
5. State the anomalies of 1NF.
6. What are the uses of functional dependencies?
7. What is meant by concurrency control?
8. Define the phases of two phase locking protocol.
9. What is the use of RAID?
10. Differentiate static and dynamic hashing.

PART B — (5 × 16 = 80 marks)

- 11. (a) (i) With help of a neat block diagram explain the basic architecture of a database management system. (10)
- (ii) What are the advantages of having a centralized control of data? Illustrate your answer with suitable example. (6)

Or

- (b) A Car rental company maintains a database for all vehicles in its current fleet. For all vehicles, it includes the vehicle identification number license number, manufacturer, model, date of purchase and color. Special data are included for certain types of vehicles.

Trucks : Cargo capacity

Sports Cars : horsepower, renter age requirement

Vans : number of passengers

Off-road vehicles : ground clearance, drivetrain (four-or two-wheel drive)

Construct an ER model for all operations.

- 12. (a) Consider the following relational schema
Sailors (SailorId, SailorName, Rating, Age)
Reserves (SailorId, BoatId, Day)
Boats (BoatId, BoatName, Color)
Express the following queries in Relational Algebra
- (i) Find the names of sailors who have reserved the same color boats as the sailor named 'John'. (2)
- (ii) Find the colors of boats reserved by sailor 'John'. (2)
- (iii) Find the names of sailors who have reserved a red or a green boat. (2)
- (iv) Find the names of sailors who have reserved at least two boats. (3)
- (v) Find the names of sailors who have reserved all boats. (2)
- (vi) Find the names of boats that are reserved by more than one sailor. (2)
- (vii) Give an SQL DDL definition of the above schema. (3)

Or

- (b) Consider the following relational schema:

Employee (empno, name, office, age)

Books (ISBN, title, authors, publisher)

Loan (empno, ISBN, date)

Write the following queries in relational algebra:

- (i) Find the names of employees who have borrowed all books published by McGraw Hill. (6)
- (ii) For each publisher, find the names of employees who have borrowed more than five books of that publisher. (10)

- 13. (a) What are the functional dependencies? Explain each of them with a suitable applicative example.

Or

- (b) Define normalization. Discuss the different normal forms upto BCNF with suitable examples.

- 14. (a) Discuss the key features of time-stamping locking protocol and explain the merits and demerits of this concurrency control protocol on comparison with two-phase locking protocol.

Or

- (b) (i) How does the recovery manager ensure the atomicity of transactions? How does it ensure durability? (12)
- (ii) What is the difference between a system crash and a media failure? (4)

- 15. (a) (i) Explain the different levels in RAID technology. (8)
- (ii) Illustrate the concept of indexes on multiple keys with a suitable example. (8)

Or

- (b) (i) Explain in detail about B+ tree index files with its merits and demerits. (8)
- (ii) Illustrate indexing and hashing techniques with suitable example. (8)