CBCS SCHEME

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18CS53

Fifth Semester B.E. Degree Examination, July/August 2021
Database Management Systems

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions.

1 a. List and briefly explain the characteristics of database approach. **(08 Marks)**

b. Define a data model. Discuss the main categories of data model with examples. **(08 Marks)**

c. Explain the different types of end users with examples. **(04 Marks)**

2 a. What are the advantages of using DBMS? Briefly explain them. **(08 Marks)**

b. Describe the three-schema architecture. Why do we need mapping between schema levels? **(06 Marks)**

c. List and explain the different types of attributes with examples. **(06 Marks)**

3 a. Define the following with examples:
(i) Super key
(ii) Candidate key
(iii) Primary key
(iv) Foreign key **(08 Marks)**

b. Summarize the steps involved in converting the ER constructs to relational schemas. **(06 Marks)**

c. Explain the various inner join operations in relational algebra with examples. **(06 Marks)**

4 a. Describe the six clauses in the syntax of an SQL retrieval query. **(06 Marks)**

b. How the aggregate functions and grouping are specified in relational model? Explain. **(06 Marks)**

c. Consider the following schemas :
SAILOR (SID, SNAME, RATING, AGE)
BOAT (BID, BNAME, COLOR)
RESERVE (SID, BID, DAY)
Specify the following queries in relational algebra:
(i) Retrieve the sailor names that have reserved red and green boats.
(ii) Retrieve the colors of boats reserved by Raj.
(iii) Retrieve the SIDs of sailors with age over 20, who have not reserved a red boat.
(iv) Retrieve the names of sailors who have reserved all boats. **(08 Marks)**

5 a. Explain the schema change statements in SQL with examples. **(06 Marks)**

b. What are views? Explain the specification and implementation of views in SQL. **(08 Marks)**

c. Describe the concept of cursor and how it is used in embedded SQL. **(06 Marks)**

6 a. With a neat diagram, explain the Three-Tier architecture and the technology relevant to each tier. What are the advantages of Three-Tier architecture? **(08 Marks)**

b. How are triggers and assertions specified in SQL? Explain with examples. **(06 Marks)**

c. What is dynamic SQL? How it differs from embedded SQL? **(06 Marks)**

7 a. Discuss the informal design guidelines for relation schemas with examples. **(08 Marks)**
b. Explain first, second and third normal forms with examples. **(06 Marks)**
c. What is functional dependency? Write an algorithm to find a minimal cover for a set of functional dependencies. **(06 Marks)**

8 a. Which normal form is based on the concept of transitive functional dependency? Explain the same with an example. **(06 Marks)**
b. State and prove the inference rules for functional dependencies. **(06 Marks)**
c. Define multivalued dependency. Explain 4NF with examples. **(08 Marks)**

9 a. What are the anomalies due to interleaved execution of transactions? Explain with examples. **(08 Marks)**
b. Define locking protocol. Describe the strict Two Phase Locking (2PL) protocol. **(06 Marks)**
c. Explain the three phases of the ARIES recovery technique. **(06 Marks)**

10 a. With a neat diagram, explain the typical states that a transaction goes through during execution. **(08 Marks)**
b. Discuss the problems of dead lock and starvation and the different approaches to dealing with these problems. **(06 Marks)**
c. Illustrate with precedence graph, which of the following schedules is conflict serializable:
(i) $R_1(X)$; $R_3(X)$; $W_1(X)$; $R_2(X)$; $W_3(X)$;
(ii) $R_3(X)$; $R_2(X)$; $W_3(X)$; $R_1(X)$; $W_1(X)$; **(06 Marks)**

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