



**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY :: PUTTUR
(AUTONOMOUS)**

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QUESTION BANK (DESCRIPTIVE)

Subject with Code : Database Management System (19CS0506)

Course & Branch : B.Tech – CSE

Year & Sem : II-B.Tech I-Sem

Regulation : R19

UNIT – I

INTRODUCTION TO DATABASE SYSTEM AND DATA BASE DESIGN

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|----|-----------------------------------------------------------------------------------------------------------------------------------|-----------|-------|
| 1 | (a) Define Database? Discuss about applications of Database Systems? | [L1][CO1] | [6M] |
| | (b) List out the purpose of Database Systems. | [L1][CO1] | [6M] |
| 2 | (a) Explain about Views of data. | [L2][CO1] | [6M] |
| | (b) Explain about various data models. | [L2][CO1] | [6M] |
| 3 | (a) Explain the Architecture of Database with a neat diagram. | [L4][CO1] | [6M] |
| | (b) Write a short note on Database users and administrators? | [L3][CO1] | [6M] |
| 4 | Explain about Database languages with examples? | [L4][CO1] | [12M] |
| 5 | (a) Classify i) Database ii) DBMS iii) List the database Applications | [L4][CO1] | [6M] |
| | (b) Outline the Data Abstraction and discuss levels of Abstraction? | [L2][CO1] | [6M] |
| 6 | (a) Explain about ER model and Component of ER Diagram. | [L4][CO1] | [12M] |
| 7 | (a) Write about logical database design (ER to Relational) with suitable examples? | [L3][CO2] | [6M] |
| | (b) Give an example of Attribute and List various types of attributes. | [L2][CO1] | [4M] |
| | (c) Define Relationship set. | [L1][CO1] | [2M] |
| 8 | Compare Relationship and Relationship set. | [L2][CO1] | [12M] |
| 9 | Construct ER Diagram for University(i.e. Banking system, Hospital management system, Railway Reservation system, Online Shopping) | [L6][CO2] | [12M] |
| 10 | (a) Create the DDL Commands – Table Creation, Altering the table structures, truncating a table and dropping a table. | [L6][CO1] | [6M] |
| | (b) Implement the DML Commands – Insert, Select Commands, update & delete Commands. | [L6][CO1] | [6M] |

UNIT – II
RELATIONAL ALGEBRA AND CALCULUS, FORM OF BASIC SQL QUERY

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|----|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1 | (a) Identify relational database query? | [L2][CO2] [6M] |
| | (b) Distinguish GROUP by and HAVING clauses with examples? | [L5][CO2] [6M] |
| 2 | (a) Illustrate different operations in Relational algebra with an example? | [L2][CO2] [6M] |
| | (b) Discuss about Complex integrity constraints in SQL? | [L2][CO2] [6M] |
| 3 | Classify the Relational calculus in detail? | [L2][CO2] [12M] |
| 4 | (a) Define NULL VALUE? Describe the effect of null values in database? | [L1][CO2] [6M] |
| | (b) Distinguish different types of aggregate operators with examples in SQL? | [L4][CO2] [6M] |
| 5 | (a) Evaluate project, join, select and product set operators with examples. | [L5][CO2] [6M] |
| | (b) Describe the SET operators with example. | [L1][CO2] [6M] |
| 6 | (a) Develop the working of union, intersection and except operations | [L6][CO2] [6M] |
| | (b) Give an examples of clauses SELECT with an example. | [L2][CO2] [6M] |
| 7 | (a) Distinguish between two set theoretic operations of relational algebra with an example. | [L2][CO2] [6M] |
| | (b) Create a sub query to establish the WHERE, ANY, AS and ALL sub queries with example. | [L6][CO2] [6M] |
| 8 | (a) Discuss the candidate key, primary key, super key, composite key and alternate key.
Explain the following terms:
Data Redundancy and consistency | [L2][CO2] [6M] |
| | (b) Referential Integrity
Data atomicity
Domain
constraints
Data models | [L4][CO2] [6M] |
| 9 | Categorize the types of joins? | [L4][CO2] [12M] |
| 10 | (a) Express a nested query? | [L2][CO2] [2M] |
| | (b) Create a nested query to find the names of sailors who have reserved both a red and Green boat? | [L6][CO2] [5M] |
| | (c) Construct a nested query to find the names of sailors who have reserved all boats? | [L6][CO2] [5M] |

UNIT – III**INTRODUCTION TO SCHEMA REFINEMENT, PROPERTIES OF DECOMPOSITIONS:**

1. a) Illustrate redundancy and the problems that it can cause. [L2][CO3] [6M]
 b) Explain about Functional Dependency. [L4][CO3] [6M]
2. Explain in detail about 1NF, 2NF, 3NF and BCNF with example. [L6][CO3] [12M]
3. Discuss about 4NF/MVD with example. [L2][CO3] [12M]
4. Discuss about 5NF/PJNF with example. [L2][CO3] [12M]
5. a) Discuss about Armstrong Axiom's in functional Dependency. [L4][CO3] [6M]
 b) Define Decomposition. List out the properties of decomposition. [L4][CO3] [6M]
6. a) Illustrate the types of anomalies with example. [L4][CO3] [6M]
 b) Let $R(A, B, C)$ and $F = (A \rightarrow B)$. Prove that the decomposition of R into $R_1(A, B)$ and $R_2(A, C)$ is lossless - join decomposition. [L3][CO3] [6M]
7. a) Consider the schema: $R(A, B, C, G, H, I)$ and the set of FD's $(A \rightarrow B, A \rightarrow C, CG \rightarrow H, CG \rightarrow I, B \rightarrow H)$. Prove the members of F^+ : $A \rightarrow H, CG \rightarrow HI, AG \rightarrow I$ with axioms is true. [L3][CO3][6M]
 b) Consider the relation scheme $R = \{E, F, G, H, I, J, K, L, M, N\}$ and the set of functional dependencies $\{\{E, F\} \rightarrow \{G\}, \{F\} \rightarrow \{I, J\}, \{E, H\} \rightarrow \{K, L\}, K \rightarrow \{M\}, L \rightarrow \{N\}\}$ on R . What is the key for R ? [L5][CO3] [6M]
8. a) What is Normalization? List out the purpose normalization. [L1][CO3] [6M]
 b) Outline the terminologies: Partial Dependency, Transitive Dependency, Determinant, MVD, Join Dependency [L2][CO3] [6M]
9. a) Compare 3NF and BCNF with example. [L4][CO3] [6M]
 b) The relation schema Student_Performance (name, courseNo, rollNo, grade) has the following FDs:
 name, courseNo \rightarrow grade
 rollNo, courseNo \rightarrow grade
 name \rightarrow rollNo
 rollNo \rightarrow name
 What is the highest normal form of this relation scheme? [L3][CO3] [6M]
10. a) Compare Trivial and Non – Trivial Functional Dependencies with example. [L4][CO3] [6M]
 b) Explain the following with suitable example. [L4][CO3] [6M]
 (i) Full functional dependency. (ii) Partial dependency.

UNIT – IV**TRANSACTION AND CONCURRENCY**

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|----|---------------------------------------------------------------------------------------------------------------------------------|-----------|-------|
| 1 | (a) Define a Transaction? List the properties of transaction | [L1][CO4] | [6M] |
| | (b) Write briefly about serializability with example. | [L3][CO4] | [6M] |
| 2 | (a) Discuss How do you implement Atomicity and Durability | [L6][CO4] | [6M] |
| | (b) What is a Transaction? Explain the properties of the transaction. Explain the States of the transaction with a neat sketch. | [L4][CO4] | [6M] |
| 3 | (a) Discuss different phases (states) of transaction? | [L2][CO4] | [6M] |
| | (b) Define Schedule? What is a serial schedule? | [L1][CO4] | [6M] |
| 4 | (a) Demonstrate Conflict Serializability? | [L2][CO4] | [6M] |
| | (b) Illustrate Concurrent execution of transaction with examples | [L3][CO4] | [6M] |
| 5 | (a) What are the states of transaction? | [L1][CO4] | [6M] |
| | (b) What are the two statements regarding transaction? | [L1][CO4] | [6M] |
| 6 | Discuss various concurrency control protocols. | [L2][CO4] | [12M] |
| 7 | Analyze the Validation based protocols. | [L4][CO4] | [12M] |
| 8 | Explain ACID properties and illustrate them through examples? | [L4][CO4] | [12M] |
| 9 | Explain Timestamp-Based Concurrency control protocol and the modifications implemented in it. | [L4][CO4] | [12M] |
| 10 | Identify the deadlock and 2-phase locking to ensure serializability in concurrency control with locking methods. | [L3][CO4] | [12M] |

UNIT – V**RECOVERABILITY, PHYSICAL STORAGE AND DATABASE CONCEPTS**

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|----|-------------------------------------------------------------------------------|-----------|-------|
| 1 | (a) Discuss how do you recover from failure? | [L6][CC] | [6M] |
| | (b) Explain about the deadlock prevention schemes. | [L2][CO5] | [6M] |
| 2 | (a) Write short note on Buffer management for management of data. | [L3][CO5] | [6M] |
| | (b) Explain in detail about ISAM | [L4][CO5] | [6M] |
| 3 | (a) Illustrate classification of storage structure | [L2][CO5] | [6M] |
| | (b) Explain concurrency control with lock based protocols | [L4][CO5] | [6M] |
| 4 | (a) Explain different types of locks. | [L2][CO5] | [6M] |
| | (b) Discuss about Times tamp based locking protocols? | [L6][CO5] | [6M] |
| 5 | (a) What are the storage types? | [L1][CO5] | [3M] |
| | (b) Define blocks? | [L1][CO5] | [3M] |
| | (c) What is meant by Physical blocks? | [L1][CO5] | [3M] |
| | (d) What is meant by buffer blocks? | [L1][CO5] | [3M] |
| 6 | (a) What are the types of storage devices? | [L1][CO5] | [6M] |
| | (b) Explain Buffer Management in concurrency control system | [L2][CO5] | [6M] |
| 7 | Classify various levels of RAID with neat diagrams | [L4][CO5] | [12M] |
| 8 | (a) What are the factors to be taken into account when choosing a RAID level? | [L1][CO5] | [6M] |
| | (b) Distinguish between fixed length records and variable length records. | [L2][CO5] | [6M] |
| 9 | (a) Explain how recovery is done using undo logging and redo logging. | [L3][CO5] | [6M] |
| | (b) Which level of RAID is best? Why? | [L1][CO5] | [6M] |
| 10 | (a) Explain about failure with loss of non-volatile storage. | [L2][CO5] | [6M] |
| | (b) What are the methods that are used in log based recovery? | [L1][CO5] | [6M] |

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