

[4]

Q.6

Attempt any two:

- Explain the concepts of authentication, authorization, and access control in database security. How do they differ from each other?
- What is SQL injection? How can it be prevented?
- What is data warehousing? Discuss the difference between a data warehouse and an operational database.

5 3 1,2
4 6 1,2
4

5 3 1,2
4 6 1,2
4

5 4 1,2
4 6 1,2
4

Total No. of Questions: 6

Total No. of Printed Pages: 4

Enrollment No.....



Knowledge is Power

Faculty of Engineering
End Sem Examination Dec 2024

CB3CO07 Database Management Systems

Programme: B.Tech.

Branch/Specialisation: CSBS

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

	Marks	BL	PO	CO	PSO
Q.1 i. Which of the following database models organizes data in a tree-like structure?	1	1	1-7 9-12	1	1-4
(a) Hierarchical database model					
(b) Relational database model					
(c) Network database model					
(d) Object-oriented database model					
ii. Which of the following languages is used to modify data within a database?	1	1	1-7 9-12	1	1-4
(a) Data Definition Language (DDL)					
(b) Data Control Language (DCL)					
(c) Data Manipulation Language (DML)					
(d) Query Language					
iii. Which of the following data models organizes data in a graph-like structure allowing multiple parent-child relationships?	1	1	1-7 9-12	1	1-4
(a) Relational model (b) Network model					
(c) Hierarchical model (d) Object-oriented model					
iv. Which of the following is an open-source DBMS?	1	1	1-7 9-12	1	1-4
(a) Oracle (b) DB2					
(c) MySQL (d) SQL Server					
v. Which of the following normal forms eliminates partial dependency?	1	2	1,2 4,5,6 9-12	3	1-4
(a) First Normal Form (1NF)					
(b) Second Normal Form (2NF)					
(c) Third Normal Form (3NF)					
(d) Boyce-Codd Normal Form (BCNF)					

P.T.O.

vi.	What is the purpose of Armstrong's Axioms in database design?	1	2	1,2 4-6 9-12	3	1-4	ii.	Explain the concept of database system architecture. How does data abstraction play a role in managing data complexity?	5	2	1-7 9-12	1	1-4
	(a) To define key constraints (b) To provide a set of rules for inferring all functional dependencies (c) To enforce referential integrity (d) To normalize relations						iii.	Explain Data Control Language (DCL) and its significance in database security. What are the key DCL commands?	5	2	1-7 9-12	1	1-4
vii.	Which of the following is NOT part of the ACID properties in transaction processing?	1	1	1,2 4,5 9,11	5	2-4	Q.3	Attempt any two:					
	(a) Atomicity (b) Consistency (c) Isolation (d) Distribution						i.	Explain the Entity-Relationship (ER) model with examples. How is it useful in database design?	5	2	1-5 9-12	2	1-4
viii.	In database recovery, what technique is commonly used to ensure that the database can be restored after a crash?	1	2	1,2 4,5 9,11	5	2-4	ii.	What are integrity constraints in a relational database? Explain the types of integrity constraints with examples.	5	2	1-5 9-12	2	1-4
	(a) B-trees (b) Shadow paging (c) Hashing (d) Data fragmentation						iii.	Compare Tuple Relational Calculus (TRC) and Domain Relational Calculus (DRC). Provide examples for both.	5	4	1-5 9-12	2	1-4
ix.	What is SQL injection?	1	2	1,2 4,5 9,11	5	2-4	Q.4	Attempt any two:					
	(a) A method to optimize SQL queries (b) A technique to insert unauthorized SQL commands into a database query (c) A form of database normalization (d) A way to distribute databases across multiple locations						i.	What is lossless decomposition in relational database design? Explain the conditions for achieving lossless join decomposition with examples.	5	3	1-2 4-6 9-12	3	1-4
x.	In data warehousing, what is the purpose of data mining?	1	2	1,2 4	6	1,2	ii.	What are the different join strategies used in query processing? Explain any two with examples.	5	2	1-2 4-6 9-12	3	1-4
	(a) To optimize query performance (b) To extract useful patterns and knowledge from large datasets (c) To ensure data integrity across multiple tables (d) To secure sensitive data against unauthorized access						iii.	Explain the role of dependency preservation in relational database design. Why is it important, and how does it relate to functional dependencies?	5	3	1-2 4-6 9-12	3	1-4
Q.2	Attempt any two:						Q.5	Attempt any two:					
i.	What is a database? Explain the differences between hierarchical, network, and relational database models.	5	4	1-7 9-12	1	1-4	i.	Explain the concept of indexing in databases. How do B-trees help in improving search performance?	5	3	1,2 4,5 9,11	5	2-4
							ii.	What is serializability in transaction processing? Explain how serial schedules differ from non-serial schedules with examples.	5	3	1,2 4,5 9,11	5	2-4
							iii.	Discuss two different concurrency control techniques (locking and timestamp-based) used in DBMS.	5	2	1,2 4,5 9,11	5	2-4

CB3C007 - DBMS

Q1.

- | | |
|-----------|------------|
| (i) - a | (VI) - b |
| (ii) - c | (VII) - d |
| (iii) - b | (VIII) - b |
| (iv) - c | (IX) - b |
| (v) - b | (X) - b |

Q2.

(i) What is database - 2

Difference between hierarchical, Network, and relational database models - 3

(ii) Concept of architecture - 2-5

How does abstraction play a role in managing data complexity - 2-5

(iii)

Data Control Language (DCL) - 3

Key DCL Commands - 2

Q3

(i) ER-Model - 3

How is it useful in DB design - 2

(ii)

Integrity Constraints - 2

Types with example - 3

(iii)

TRC with example - 2-5

DRC with example - 2-3

Q4

(i) Concept of lossless decomposition - 2-5

Conditions for achieving lossless join - 2-5

(iii) Strategies used in query processing - 3

Any Two example - 2

(iii) Role of dependency preservation - 2-5-

importance & how it is related to FD - 2-5-

Q.5

(i) Concept of indexing - 2-5-

How B-tree help in improving search performance - 2-5-

(ii) What is serializability in transaction processing

difference b/w serial and non serial schedules - 2-5

(iii)

locking based - 2-5-

Timestamp-based - 2-5-

Q.6

(i) Concepts of authentication - 1

Authorization - 1

Access Control - 1

How do they differ from each other - 2

(ii)

SQL injection - 2

How can it be prevented - 3

(iii)

Data warehousing - 2

Data warehousing Vs operational database - 3