Reg. No.															

Question Paper Code	13601

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Fourth Semester

Computer Science and Business Systems

20CBPC401 - DATABASE MANAGEMENT SYSTEMS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	What is an advantage of the Object-Oriented Data Model over the Relational Model? (a) It stores data in normalized tables (b) It allows storing objects with complex relationships directly (c) It supports standard SQL for queries (d) It is easier to implement than relational databases	1	K1	CO1
2.	The ER model is a _____. (a) Record-based data model (b) Representational data model (c) Conceptual data model (d) All of the above	1	K1	CO1
3.	If A → B, it means that _____. (a) A functionally determines B (b) A is a super key (c) B determines A (d) A is a foreign key	1	K1	CO2
4.	Which of the following is NOT one of Armstrong's Axioms? (a) Reflexivity (b) Augmentation (c) Transitivity (d) Redundancy	1	K1	CO2
5.	The optimizer in a DBMS estimates query cost based on ____. (a) CPU cost (b) Disk I/O cost (c) Network cost (d) All of the above	1	K1	CO3
6.	Query optimization aims to_____. (a) Minimize the number of tuples in the output (b) Reduce query execution time and resource usage (c) Convert relational algebra to SQL (d) Increase query execution cost	1	K1	CO3
7.	In hash join, the relation that is hashed and fits in memory is called _____. (a) Outer relation (b) Inner relation (c) Intermediate relation (d) None of the above	1	K1	CO4
8.	In a clustered index, how is data stored? (a) Data is stored randomly in memory (b) Data is stored in a separate index structure (c) Data is stored in the same order as the index (d) Data is stored in a hash table	1	K1	CO4
9.	In the event of a system crash, which database recovery mechanism ensures that all committed transactions are reapplied? (a) Undo logging (b) Redo logging (c) Normalization (d) Fragmentation	1	K1	CO5
10.	A developer is designing a web-based e-commerce system that requires complex queries and transactions. Which type of database should be used? (a) Graph Database (b) Relational Database (c) Key-Value Store (d) Time-Series Database	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	What is domain Integrity? Give example.	2	K1	CO1
12.	Classify different types of attributes.	2	K2	CO1
13.	List the different types of key.	2	K1	CO2

14.	Illustrate CROSS PRODUCT operation in Relational algebra.		*2*	*K2*	*CO2*
15.	What are the types of Join strategies?		*2*	*K1*	*CO3*
16.	Classify 3NF and BCNF.		*2*	*K2*	*CO3*
17.	When is it preferable to use a dense index rather than a sparse index?		*2*	*K1*	*CO4*
18.	Compare Static Hashing and Dynamic Hashing.		*2*	*K2*	*CO4*
19.	List the properties of transaction.		*2*	*K1*	*CO5*
20.	Show the reasons for allowing concurrency.		*2*	*K2*	*CO5*
21.	What are the components of Data warehousing?		*2*	*K1*	*CO6*
22.	Compare Distributed and Web databases.		*2*	*K2*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Demonstrate Data Manipulation Commands with example.	*11*	*K2*	*CO1*
		OR			
	b)	Outline an ER diagram for Hospital management system.	*11*	*K2*	*CO1*
24.	a)	Construct Selection, Projection, Rename, Union, SetOperation and Cartesian product operations in relational algebra with an example.	*11*	*K3*	*CO2*
		OR			
	b)	With the data given below, construct the relational table and develop the following SQL queries. Employee (Empno, Name, Department, Salary). (i) List all the students whose name starts with the letter 'A'. (ii) Find the maximum CGPA obtained in each department. (iii) Find the number of students studying in 'CSBS department. (iv) Find the second maximum CGPA from the table. (v) Find the employee who is getting the minimum CGPA.	*11*	*K3*	*CO2*
25.	a)	Explain briefly about Query Optimization techniques with an example.	*11*	*K2*	*CO3*
		OR			
	b)	Summarize in detail about Heuristic optimization algorithms.	*11*	*K2*	*CO3*
26.	a)	Outline the different kinds of indexing with example in detail.	*11*	*K2*	*CO4*
		OR			
	b)	Demonstrate B+ tree indexes with a suitable example.	*11*	*K2*	*CO4*
27.	a)	Make use of the following schedules. The actions are listed in the order they are scheduled, and prefixed with the transaction name. S1 : T1:R(X), T2:R(X), T1:W(Y), T2:W(Y), T1:R(Y), T2:R(Y) S2: T3:W(X), T1:R(X), T1:W(Y),T2:R(Z), T2:W(Z), T3:R(Z) For each of the schedules, answer the following questions: i) What is the precedence graph for the schedule? ii) Is the schedule conflict-serializable? If so, what are all the conflict equivalent serial schedules? Iii) Is the schedule view-serializable? If so, what are all the view equivalent serial schedules?	*11*	*K3*	*CO5*
		OR			
	b)	Identify which protocol is more advantageous over the other in the strict, two-phase locking protocol and time stamp-based protocol. Justify the same in detail.	*11*	*K3*	*CO5*
28.	a)	Demonstrate the Extract, Transform, Load (ETL) process in detail and illustrate it with a clear and labelled diagram.	*11*	*K2*	*CO6*
		OR			
	b)	Outline a detailed explanation of the object-relational database features and their significance in modern database systems.	*11*	*K2*	*CO6*