Reg. No.																

Question Paper Code	13966

B.E. / B.Tech. / M.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Third Semester

Computer Science and Engineering

(Common to M.Tech. - Computer Science and Engineering (5 Years Integrated))

24CSPC301 - DATABASE MANAGEMENT SYSTEMS

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Data independence refers to (a) Data stored independently on devices (b) Programs stored separately from data (c) Data unaffected by changes in storage structure (d) Having no database constraints	1	K1	CO1
2.	The relational model represents data as (a) Objects and classes (b) Graphs (c) Files (d) relational Tables	1	K1	CO1
3.	Weak entities are converted into relations by (a) Creating a table with a foreign key referencing the owner entity (b) Ignoring dependent entities (c) Merging with a strong entity, only (d) Using derived attributes	1	K1	CO2
4.	A relation is in BCNF if (a) Every determinant is a candidate key (b) It is 3NF only (c) It has no multi-valued dependency (d) Every attribute is atomic	1	K1	CO2
5.	A Candidate key is (a) Always a foreign key (b) A derived key (c) A super key with redundant attributes removed (d) a NULL key	1	K1	CO3
6.	Embedded SQL allows (a) SQL statements to be included within a host programming language (b) Executing SQL from the command line (c) Only DDL operations (d) Dynamic creation of databases.	1	K2	CO3
7.	Atomicity in a transaction means (a) Transaction executes partially (b) Transaction is treated as a single unit (c) Transaction is executed in parallel (d) Transaction cannot be executed	1	K1	CO4
8.	A shared lock (S-lock) allows (a) Multiple transactions to read (b) Only one transaction to read (c) Only one transaction to write (d) Both read and write	1	K1	CO4
9.	The primary index is built on (a) Non-key attributes (b) Candidate Key (c) Primary Key field (d) Foreign key field	1	K1	CO5
10.	XML Schema differs from DTD because it (a) Use only plain text (b) supports data types and namespaces (c) cannot validate XML (d) is less expressive	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	What is metadata? Give an example.	2	K1	CO1
12.	Bring out any two components of the database environment.	2	K2	CO1
13.	What are the notations used in an Entity-Relationship (ER) diagram?	2	K1	CO2
14.	Explain Multi-valued dependencies with an example.	2	K2	CO2
15.	List the advanced SQL features.	2	K1	CO3

16.	Differentiate Embedded SQL Vs. Dynamic SQL.	*2*	*K2*	*CO3*
17.	State the ACID properties.	*2*	*K1*	*CO4*
18.	Write the procedure to handle a deadlock during two transactions in the database.	*2*	*K2*	*CO4*
19.	Give an example of Static hashing.	*2*	*K2*	*CO5*
20.	Explore the steps involved in query Processing.	*2*	*K1*	*CO5*
21.	Define data fragmentation.	*2*	*K2*	*CO6*
22.	What is the role of a coordinator in distributed transactions?	*2*	*K1*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Give details of the following concepts with examples: (i) Data Definition Language (ii) Data control Language	*11*	*K2*	*CO1*
		OR			
	b)	Explain the database management architecture with a neat sketch.	*11*	*K2*	*CO1*
24.	a)	Design and draw a detailed Enhanced Entity-Relationship (EER) diagram for the university examination system described above. Ensure all entities, attributes (including Composite, multi-valued and derived), relationships, mapping cardinalities and constraints (Participation, generalization with disjoint or overlapping and total or partial constraints) are clearly represented using standard notation.	*11*	*K3*	*CO2*
		OR			
	b)	Examine the Functional Dependencies with a necessary example.	*11*	*K3*	*CO2*
25.	a)	Analyze the different types of relationships represented during ER to relational mapping. Provide suitable examples.	*11*	*K4*	*CO3*
		OR			
	b)	Describe the process of normalization (1NF,2NF, 3NF) with suitable examples.	*11*	*K4*	*CO3*
26.	a)	Discuss the states of a transaction with a neat state diagram.	*11*	*K2*	*CO4*
		OR			
	b)	Give an example of a Scenario where two-phase locking leads to Deadlock.	*11*	*K2*	*CO4*
27.	a)	Explain different file organization techniques and analyze the advantages and disadvantages of them.	*11*	*K2*	*CO5*
		OR			
	b)	Compare heuristic-based query optimization techniques with suitable examples.	*11*	*K2*	*CO5*
28.	a)	Consider the following schedules. The actions are listed in the order they are scheduled, and prefixed with the transaction name. T1: r1(X) ,r1(Z),w1(X),w1(Z) T2: r2(Y),r2(Z),w2(Z) T3: r3(Y),r3(X),w3(Y) S1: r1(X),r3(Y).r3(X),r2(Y),r2(Z) w3(Y),w2(Z),r1(Z),w1(X),w1(Z) S2: r1(X),r3(Y),r2(Y),r3(X),r1(Z) r2 (Z),w3(Y),w1(X),w2(Z),w1(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*	*K5*	*CO6*
		OR			
	b)	Analyze the hierarchical structure of XML databases. How does XML store and represent complex data relationships?	*11*	*K5*	*CO6*