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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

April 2024 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Artificial Intelligence and Machine Learning **Duration: 3 hrs.**
Course Code: 23AM3PCDBM **Max Marks: 100**
Course: Database Management Systems

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Compare the characteristics that distinguish the database approach from traditional file processing method.	CO1	PO1	**6**
	b)	Differentiate Centralized and Client/Server architectures of DBMS. Discuss their advantages and disadvantages.	CO1	PO2	**7**
	c)	Describe the Component modules of a Database environment and their interactions with a neat diagram.	CO1	PO1	**7**
		UNIT - II			
2	a)	Design an entity-relationship diagram for a Banking database application, depicting entity sets, attributes, relationship sets, roles and structural constraints.	CO2	PO3	**10**
	b)	Explain the characteristics of Relations.	CO1	PO1	**4**
	c)	Summaries the following keys with suitable examples. i) super key ii) primary key iii) candidate key	CO1	PO2	**6**
		OR			
3	a)	Design a database schema for the following requirements that stores information about students, courses and enrollments. STUDENT (snum: integer, sname: string, major: string, level: string, age: integer) CLASS (cname: string, meets at: string, room: string, d: integer) ENROLLED (snum: integer, cname: string) FACULTY (fid: integer, fname: string, deptid: integer)	CO3	PO3	**8**
	b)	Explain schema-based Relational Model Constraints with suitable example.	CO1	PO1	**6**
	c)	Differentiate between Strong and Weak Entities with examples for each.	CO1	PO2	**6**

			UNIT - III			
	4	a)	Consider the following relation: CAR_SALE(Car#, Date_sold, Salesperson#, Commission%, Discount_amt) Assume that a car may be sold by multiple salespeople, and hence {Car#, Salesperson#} is the primary key. Additional dependencies are: Date_sold → Discount_amt and Salesperson# → Commission% Based on the given primary key, check whether the above relation is in 1NF, 2NF, or 3NF. If not normalize the relation?	*CO3*	*PO3*	**10**
		b)	Describe the informal design guidelines for relation schemas. Justify how these guidelines contribute to the normalization process.	*CO1*	*PO1*	**10**
			OR			
	5	a)	Summarize the desirable properties of a transaction.	*CO1*	*PO1*	**6**
		b)	Illustrate Boyce-Codd Normal Form with suitable example.	*CO1*	*PO1*	**6**
		c)	Define functional dependencies. Consider the following relation: **A** **B** **C** **D** a1 b1 c1 d1 a1 b2 c2 d2 a2 b2 c2 d3 a3 b3 c3 d3 Which of the following dependencies may hold in the above relation? If doesn't hold, explain specifying the tuples that cause the violation. i) A → B ii) B → A iii) B → C iv) D → C v) {A, B} → C vi) {C, D} → B	*CO3*	*PO2*	**8**
			UNIT - IV			
	6	a)	Discuss the objectives of the RAID technology with suitable example.	*CO1*	*PO1*	**6**
		b)	Distinguish between the operational mechanisms of dynamic hashing and static hashing with a neat diagram.	*CO2*	*PO2*	**8**
		c)	Demonstrate B^+ tree structure with a suitable example.	*CO1*	*PO2*	**6**
			UNIT - V			
	7	a)	List and Explain different types of Database system supported by NoSQL.	*CO1*	*PO2*	**7**
		b)	Discuss the implications of the CAP theorem in database systems and provide an overview of MongoDB.	*CO2*	*PO2*	**6**
		c)	Compare the characteristics of NoSQL systems with traditional SQL systems.	*CO2*	*PO2*	**7**

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