

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)

CLASS: IMSc  
BRANCH: MATHS & COMP.

SEMESTER : VI  
SESSION : SP/2023

SUBJECT: CS301 DATABASE MANAGEMENT SYSTEM

TIME: 3 Hours

FULL MARKS: 50

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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		CO	BL
Q.1(a)	Suppose you are given the following requirements for a simple database for the National Hockey League (NHL): <ul style="list-style-type: none"><li>• the NHL has many teams,</li><li>• each team has a name, a city, a coach, a captain, and a set of players,</li><li>• each player belongs to only one team,</li><li>• each player has a name, a position (such as left wing or goalie), a skill level, and a set of injury records,</li><li>• a team captain is also a player,</li><li>• a game is played between two teams (referred to as host_team and guest_team) and has a date (such as May 11th, 1999) and a score (such as 4 to 2).</li></ul> <i>Construct a clean and concise ER diagram for the NHL database.</i>	[5]	CO3 4
Q.1(b)	Reduce the above (Q.1(a)) E-R diagram into their equivalent tables.	[5]	CO4 3
Q.2(a)	Discuss the following with suitable examples: a) Primary key & foreign key b) Candidate key & alternate key	[5]	CO2 2
Q.2(b)	Consider the following schema. Suppliers (s-id, s-name, address) Parts (p-id, s-name, color) Catalog (s-id, p-id, cost) Write the following query in Relational Algebra where keys are s-id, p-id, & s-id+p-id keys for Suppliers, Parts, and Catalog respectively. 1. Find the supplier name who supplies some red or green part. 2. Find the s-ids of suppliers who supply some red part and live at Delhi. 3. Find s-id of suppliers who supply red part of cost 5000/-.	[5]	CO4 3
Q.3(a)	What is normalization? Explain its need.	[5]	CO2 2
Q.3(b)	Differentiate between 3NF and BCNF with suitable examples	[5]	CO3 2
Q.4(a)	Discuss the process of Query processing and Optimization.	[5]	CO4 4
Q.4(b)	Differentiate between Static and Dynamic Hashing with suitable example.	[5]	CO4 2
Q.5(a)	Discuss Transaction Concept & their ACID properties.	[5]	CO5 2
Q.5(b)	Discuss detailed diagram of the database architecture.	[5]	CO1 2

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