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Siddaganga Institute of Technology, Tumakuru-572 103

(An Autonomous Institution affiliated to VTU, Belagavi, Approved by AICTE, New Delhi)

Fifth Semester B.E. Information Science Engineering Examinations Feb. - March 2023

Database Management System

Time: 3 Hours **Max. Marks: 100**

Note : 1. Revealing of Identity in any form in the answer book will be treated as malpractice.
2. Answer any five questions choosing one full question from each unit.

			M	BL	CO	PO	PSO
		Unit - I					
1	a)	Explain the main characteristics of database approach.	8	2	1	1	2
	b)	Discuss when database systems cannot be used.	4	2	1	1	2
	c)	Write an ER diagram for a banking system. Assume suitable entities (minimum 5), attributes and relations.	8	4	2	2	2
		OR					
2	a)	What is DBMS? Discuss the advantages of DBMS over the traditional file processing approach.	6	2	1	1	2
	b)	What is data independence? How this is achieved with three schema architecture?	6	2	1	1	2
	c)	Design an ER-diagram for circuit database system, with suitable entities (minimum 5), attributes and relations.	8	3	2	3	2
		Unit - II					
3	a)	Consider the following schema and specify the following queries in SQL: Sailors(Sid, Sname, rating, age) Boats(bid, bname, color) Reserves(Sid, bid, day) i) Find the age of sailors who reserved green boat. ii) Find the name of boats reserved by "Ram". iii)Find the names of sailors who have reserved a red or a green boat. iv)Find the sids of sailors with age over 20 who have not registered a red boat.	8	3	3	3	2
	b)	Differentiate between where clause and having clause. Explain both the clauses with an example for each.	6	2	1	2	2
	c)	What are sub queries? Discuss the types of sub queries with example.	6	2	2	2	2
		OR					
4	a)	Considering the following tables with their attributes, write the SQL queries: Employee(EmpNo, EName, Job, Hire date, Salary, deptno) Dept(deptno, dname, location) i) Find the employee details who are having salary between 3K and 5K & working for deptno 2. ii) Find the name of the employee getting highest salary in each department. iii)Find the employee details working in Bangalore. iv)Find the department name having employee with more than 20years of experience.	8	3	3	2	2
	b)	Explain the following commands with an example: Exists, Not exists, alter and drop.	8	2	3	2	2
	c)	What is the significance of views in SQL? Write the SQL statement to create a view.	4	2	3	2	2

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Unit - III

5	a)	Discuss the various types of JOINS with an example for each.	10	2	3	2	2
	b)	Explain the steps of ER-to–relational mapping.	10	2	3	2	2
		OR					
6	a)	Consider the schema given in the question 3a and write the relational algebra queries. i) List the details of sailor 'Sai' with boats that be reserved. ii) List the boat details reserved by sailor id=123. iii) List the boat which has been reserved by all sailors. iv) List the total number of boats reserved by each sailor.	8	3	3	2	2
	b)	Discuss select, project and division operations with an example.	6	2	3	2	2
	c)	What are constraints? Discuss the major types of constraints with an example.	6	2	3	2	2

Unit - IV

7	a)	Discuss the informal design guidelines for the good database design.	8	2	4	2	2
	b)	Explain the Armstrong's inference rules for functional dependencies.	6	2	4	2	2
	c)	What is normalization? Explain 2NF and 3NF with proper examples.	6	2	4	2	2
		OR					
8	a)	What is functional dependency? Write an algorithm to find a minimal cover for set of FD's.	6	2	4	2	2
	b)	Differentiate between BCNF and 3NF. Define 3NF and prove that a relation with two attribute is always in BCNF.	8	3	4	2	2
	c)	Discuss the concept on which 2NF is based on. Explain with an example the decomposition into 2NF.	6	2	4	2	2

Unit - V

9	a)	Define the following terms: i) Schedule ii) Active state iii) Failed state iv) Partially committed state v) Committed state vi) Aborted state	6	1	5	1	2
	b)	Explain the usage of AND and OR operations in MongoDB with syntax and an example for each	6	2	5	2	2
	c)	Discuss the different types of NoSQL databases.	8	2	5	1	2
		OR					
10	a)	Explain in detail why concurrency control and recovery is needed.	8	2	5	1	2
	b)	Consider the following collections: Book (ISBN, Title, Author, publisher) Student (USN, StudName, Class) Borrow (ISBN, USN, Borrowed Date) Write the queries in MongoDB for the following: i) List the author names who have authored more than 1 book. ii) List the book titles which have the word "DB". iii)List the student names who borrowed "DB" books.	6	3	5	2	2
	c)	Differentiate between SQL and NoSQL.	6	2	5	1	2