

Basavarajeswari Group of Institutions
BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT
 (Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN

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Course Code

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Fifth Semester B.E. Degree Examinations, April/May 2024

DATABASE MANAGEMENT SYSTEMS

(Common to CSE & AIML)

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions choosing ONE full Question from each Module.
 2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO:PI)</u>
Module-1			
1.	a. Explain the following terms with suitable example for each: (i) Database (ii) Strong Entity (iii) Cardinality ratio (iv) Snapshot (v) Schema	05	(2 : 1 : 1.6.1)
	b. Classify the different types of data models and explain each one with example.	07	(2 : 1 : 1.6.1)
	c. Describe the characteristics of database approach.	08	(2 : 1 : 1.6.1)
(OR)			
2.	a. List and discuss database languages and interfaces.	06	(3 : 1 : 1.6.1)
	b. Explain with a neat diagram client/server architecture and three tier architecture.	07	(2 : 1 : 1.6.1)
	c. Develop an ER diagram for keeping track of information about a company database taking into account atleast five entities.	07	(3 : 1 : 1.7.1)
Module-2			
3.	a. Discuss all forms of ALTER command with syntax, illustrate with example.	06	(2 : 2 : 2.7.1)
	b. Discuss nested subqueries with example.	06	(2 : 2 : 2.7.1)
	c. Illustrate the steps involved in converting the ER constructs to corresponding relational tables.	08	(2 : 2 : 3.6.2)
(OR)			
4.	a. Write a syntax of Insert and update command. Illustrate both with example.	05	(2 : 2 : 2.7.1)
	b. Explain the usage of aggregate functions in SQL. Write SQL query to find minimum, maximum, and average marks of all students	05	(2 : 2 : 2.7.1)
	c. Tables used in this note: Sailors(sid: integer, sname: string, rating: integer, age: real); Boats(bid: integer, bname: string, color: string); Reserves (sid: integer, bid: integer, day: date). Solve the following SQL queries: (i) Find all information of sailors who have reserved boat number 101 (ii) Find the age of all sailors whose name begin with A and has atleast 3 characters (iii) Find the id and name of sailors who have reserved boat between 5-9-2009 to 9-9-2009 (iv) Find the names of sailors who have reserved at least one boat. (v) Find the ids and names of sailors who have reserved two different boats on the same day.	10	(3 : 2 : 2.7.1)

Note: (RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI- Performance Indicator)

Module-3

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| 5. | a. Interpret the six clauses in SQL retrieval query syntax. Show what type of constructs can be specified in each of six clauses. Which of the clauses are required and which are optional. Give an example for each of the clause | 06 | (2 :3 : 2.6.2) |
| | b. Demonstrate the following concepts with syntax and example
(i) Triggers in SQL (ii) Assertions in SQL | 06 | (2 :3 : 2.7.1) |
| | c. Illustrate how EXISTS, NOT EXISTS and UNIQUE functions are used in SQL | 08 | (2 :3 : 3.6.2) |

(OR)

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| 6. | a. Demonstrate the concept of <i>rank ()</i> - advanced aggregation using suitable example. | 06 | (2 :3 : 3.6.2) |
| | b. Write a note on :
(i) JDBC (ii) ODBC | 04 | (2 :3 : 2.7.1) |
| | c. Consider the schema for College Database:
STUDENT(USN, SName, Address, Phone, Gender)
SEMSEC(SSID, Sem, Sec)
CLASS(USN, SSID)
IAMARKS(USN, Subcode, SSID, Test1, Test2, Test3, FinalIA)
Solve the following SQL queries:
(i) List all the student details studying in fourth semester 'A' section.
(ii) Create a view of Test1 marks of student USN '3BR21CS101' in all subjects.
(iii) Calculate the FinalIA (average of best two test marks).
(iv) Categorize students based on the following criterion:
If FinalIA = 17 to 20 then CAT = 'Outstanding'
If FinalIA = 12 to 16 then CAT = 'Average'
If FinalIA < 12 then CAT = 'Weak'
Give these details only for 8th semester A, B, and C section students. | 10 | (3 :3 : 3.6.2) |

Module-4

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| 7. | a. Explain the informal guidelines to determine the quality of relations schema design with suitable example. | 06 | (2 :4 : 2.7.1) |
| | b. Consider example with two functional dependencies.
R=(A,C,D,E,H)
F={A→C, AC→D, E→AD, E→H},
G={A→CD, E→AH}
Show whether F and G are equivalent or not? | 06 | (2 :4 : 3.7.1) |
| | c. Explain 1NF, 2NF and 3NF with suitable example | 08 | (2 :4 : 3.7.1) |

(OR)

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| 8. | a. Write an algorithm to determine X^+ , the Closure of X under F. Give an example | 05 | (2 :4 : 2.7.1) |
| | b. What is functional dependency? Explain the inference rules for functional dependency with proof. | 05 | (2 :4 : 2.6.2) |
| | c. Given a relation R(P, Q, R, S, T) and Functional Dependency set FD = { PQ → R, S → T }, show whether the given R is in 3NF? If not convert it into 3NF. | 10 | (2 :4 : 3.7.1) |

Module-5

9. a. Define transaction. List and explain ACID properties of transaction. **06** (2 :5 : 2.7.2)
- b. With a neat diagram explain transition diagram of a transaction. **06** (2 :5 : 2.7.2)
- c. Show whether the given schedule S is view serializable or not **08** (2 :5 : 2.7.1)

T1	T2	T3	T4
R(X)			
	R(X)		
		R(X)	
			R(X)
W(Y)			
	W(Y)		
		W(Y)	
			W(Y)

(OR)

- 10 a. Write a short notes on: **06** (2 :5 : 1.6.1)
- (i) Single user and Multiuser System
- (ii) Lock compatibility matrix for multiple granularity locking
- b. With an example, explain basic Timestamp Ordering algorithm for Concurrency Control. **06** (2 :5 : 2.7.2)
- c. Why concurrency control and recovery is needed in DBMS? Explain types of problems that may occur when two transactions run concurrently. **08** (2 :5 : 2.7.2)

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