

**BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT**

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

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Course Code 

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Third Semester MBA Degree Examinations, April 2023

**DATABASE MANAGEMENT SYSTEM**

Duration: 3 hrs

Max. Marks: 100

*Note: 1. Answer any FOUR full questions from Question No. 1 to 7.**2. Question No. 8 is compulsory**3. Missing data, if any, may be suitably assumed*

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTl:CO:PO)</u>
1.	a. Define the following terms: i) weak entity ii) Degree of relation iii) participation constraint	03	(1 : 1 : 1)
	b. Discuss the main characteristics of database approach and how it differs from traditional file system.	07	(2 : 1 : 1)
	c. List the advantages of DBMS. Discuss any five advantages with example.	10	(2 : 1 : 1)
2.	a. Explain different types of attributes in ER model.	03	(1 : 2 : 1)
	b. Explain three Schema architecture. Why do we need the mappings between schema levels? Differentiate between logical data independence and physical data independence.	07	(2 : 2 : 1)
	c. Draw block diagram and explain the different phases of Database design.	10	(2 : 2 : 1)
3.	a. Why are duplicate tuples not allowed in a Relation?	03	(2 : 2 : 1)
	b. Discuss the characteristics of relations that make them different from ordinary tables and files.	07	(2 : 2 : 1)
	c. Discuss the various steps involved in the relational database design using ER-to-Relational mapping.	10	(3 : 2 : 1)
4.	a. What is the difference between a key and a super key?	03	(2 : 2 : 1)
	b. Discuss the entity integrity and referential integrity constraints. Why each one is considered important?	07	(2 : 2 : 1)
	c. Consider the following schema for Banking database. Write Create Command and insert commands Employee (Name, SSN, address, Sex, salary, DNo) Department (DName, DNumber, MGRSSN, St_Date) Project (Pname, pnumber, plocation, Dnum) Work_on (ESSN, PNO, Hours) Dependent (ESSN, Dependent name, sex, B_date, Relationship)	10	(3 : 2 : 1)
5.	a. Describe the six clauses in the syntax of an SQL retrieval query. Which of the six clauses are required and which are optional?	03	(2 : 3 : 2)
	b. What are the basic data types available for attributes in SQL?	07	(2 : 3 : 2)

**Note: (RBTl - Revised Bloom's Taxonomy Level: CO - Course Outcome: PO – Programme Outcome)**

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|----|--|----|------------|
| c. | Consider the following schema for Banking database. Write Create Command and insert commands               | 10 | (3 :3 : 2) |
|    | Branch (Bname, Bcity, Assets)  |    |            |
|    | Loan (Loan_no., Loan_amt, Bname)   |    |            |
|    | Borrow (Loan_no, Cname)  |    |            |
|    | Account (Accno, Accbal, Bname)   |    |            |
|    | Depositor (Accno, Cname)   |    |            |
|    | Customer (Cname, Street, City)   |    |            |
| 6. | a. List all the inference rules for functional dependencies.   | 03 | (2 :4 : 2) |
|    | b. Define Boyce-Codd normal form. How does it differ from 3NF? Why is considered a stronger form of a 3NF? | 07 | (2 :4 : 2) |
|    | c. Explain fourth & fifth normal form with example.  | 10 | (3 :4 : 2) |
| 7. | a. What are the Two phases locking Protocol?   | 03 | (2 :5 : 2) |
|    | b. With an example explain serial and non serial schedules.  | 07 | (2 :5 : 2) |
|    | c. What is serializability? Explain with example conflict serializable schedule.                           | 10 | (2 :5 : 2) |

8. **Case Study**

Requirements of the COMPANY Database:

- The company is organized into DEPARTMENTS. Each department has a name, number and an employee who manages the department. We keep track of the start date of the department manager. A department may have several locations.
- Each department controls a number of PROJECTs. Each project has a unique name, unique number and is located at a single location
- We store each EMPLOYEE's social security number, address, salary, sex, and birthdate. Each employee works for one department but may work on several projects. We keep track of the number of hours per week that an employee currently works on each project. We also keep track of the direct supervisor of each employee.

Each employee may have a number of DEPENDENTS. For each dependent, we keep track of their name, sex, birthdate, and relationship to the employee.

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|----|---|----|------------|
| a. | Design a conceptual schema for Company Database and draw an ER diagram for your schema. Be sure to indicate all key and cardinality constraints and any assumptions you make. | 10 | (4 :3 : 2) |
| b. | Write the SQL queries for the following   | 10 | (4 :3 : 2) |
|    | i. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000.  |    |            |
|    | ii. Retrieve all employees who were born during the 1990s.  |    |            |
|    | iii. Retrieve the names of all employees who do not have supervisors.   |    |            |
|    | iv. Retrieve the name and address of all employees who work for the 'Research' department.  |    |            |
|    | v. The names of employees whose salary greater than the salary of any employee in department 10.  |    |            |

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