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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belagavi)
Second Semester, Master of Computer Applications (MCA)
Semester End Examination; October - 2022
Database Management Systems

Time: 3 hrs   *Max. Marks: 100*

Course Outcomes

The Students will be able to:
CO1: Demonstrate the basic concepts of DBMS with data model.
CO2: Construct an ER diagram for a given problem description.
CO3: Identify appropriate primary key and foreign key in an ER model, specify structural constraints on each relationship.
CO4: Formulate data retrieval queries in SQL based on assumptions and requirements.
CO5: Design and Develop a database application using the relation schema with the help of normalization and explain transaction processing, concurrency control and crash recovery.

Note: *I) Answer any **FIVE** full questions, selecting **ONE** full question from each unit.*
    *II) Any **THREE** units will have internal choice and remaining **TWO** unit questions are compulsory.*
    III) Each unit carries 20 marks.

Q. No.	Questions	Marks	BLs	COs	POs
	UNIT - I	**20**			
1 a.	Define DBMS. Discuss the characteristics of Database approach.	10	L2	CO1	PO2,3,4
b.	Discuss different categories and end users of database.	6	L2	CO1	PO2,3
c.	Differentiate between physical and logical data independence.	4	L2	CO1	PO1,2,3
	UNIT - II	**20**			
2 a.	Define the following terms with an example with respect to ER-model: i) Entity set ii) Cardinality ratio iii) Weak entity set iv) Recursive Relationship v) Participation	10	L1	CO2	PO1,2
b.	Define degree of relationship. Describe different types of relationship with example.	6	L2	CO2	PO2,3
c.	State any four differences between Strong entity and Weak entity with an example.	4	L2	CO2	PO2,3
	UNIT - III	**20**			
3 a.	Highlight the steps carried out in mapping ER-model to relational schema.	10	L2	CO3	PO2,3
b.	Explain Left and Right Outer Join with examples.	6	L2	CO3	PO2,3
c.	Illustrate Entity integrity constraint and Referential Integrity (foreign key constraint) with an example.	4	L2	CO3	PO2,3

<div align="center">**OR**</div>

3 d.	Discuss the type of constraint violation that can occur during insert operation, delete operation and update operation.	10	L2	CO3	PO2,3

e.	Explain the following relational Algebraic operations with an example: i) SELECT
	                ii) PROJECT
	                iii) Cartesian product
		10	L2	CO3	PO2,3

<div align="center">**UNIT - IV**   **20**</div>

4 a.	Explain all options of SELECT statements in SQL, give example for each.	10	L2	CO4	PO1,2,3
b.	Explain DDL statements in SQL with example.	10	L3	CO4	PO1,2,3

<div align="center">**OR**</div>

4 d.	Discuss aggregate functions in SQL with an example.	10	L6	CO4	PO1,2,3
e.	Consider the Airline-flight information schema. Write the following Queries in SQL,	10	L1	CO4	PO1,2,3

Flights(no: integer, from: string, to: string, distance: integer,

       Departs: time, arriver: time, price: real)

Aircraft(aid: Integer, aname: string ,cruising range: integer)

Certified(eid: integer, aid : integer)

Employees (eid: integer, ename: string; salary: integer)

i) Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs. 80,000/-

ii) For each pilot who is certified for more than 3 aircrafts, find the eid and maximum cruising range of the aircraft for which he/she is certified

iii) Find the names of all pilots whose salary is less than price of the cheapest route from Bangalore to Frankfurt

<div align="center">**UNIT - V**   **20**</div>

5 a.	Define Normalization. Explain 1NF, 2NF, 3NF and BCNF with example.	10	L1,2	CO5	PO1,2,3
b.	Discuss ACID properties of Database transaction.	10	L6	CO5	PO2

<div align="center">**OR**</div>

5 d.	Explain full and partial functional dependency with example.	10	L2	CO5	PO2
e.	Identify the rules to be applied for every transaction when Binary Locking Scheme and Shared / Exclusive Locking Scheme is followed.	10	L2	CO5	PO2

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