U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

December 2023 Supplementary Examinations

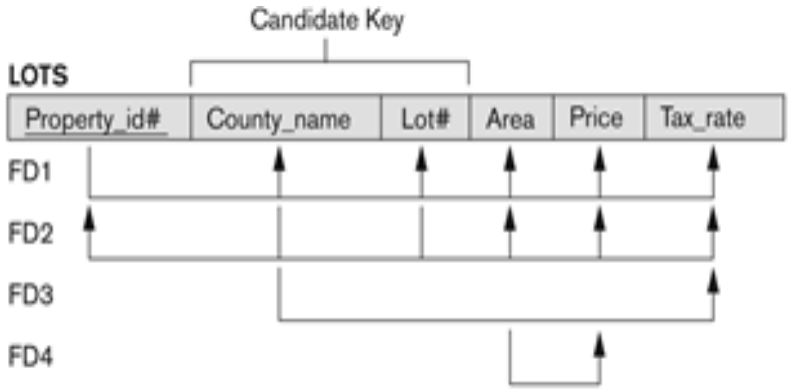
Programme: B.E. **Semester: IV**
Branch: Information Science and Engineering **Duration: 3 hrs.**
Course Code: 22IS4PCDBM **Max Marks: 100**
Course: Database Management System

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	*CO*	*PO*	Marks
1	a)		With a neat diagram explain Database Three Schema Architecture.	CO1	-	08
	b)		Define Data Independence. Categorize and discuss the types of Data Independence.	CO1	-	06
	c)		Define the following terms: i) Catalog ii) Database state iii) Data Model	CO1	-	06
			UNIT - II			
2	a)		Draw ER diagram for the following requirements (capture all the relationship constraints in the diagram): Consider order database in which employees take orders for product from customers. The requirements are: a. Each Employee is identified by EMP_ID, EMP_Name and Address (Street num, area name, city). b. Each Customer is identified by CUST_ID, CUST_Name, Mobile Number (multiple values). c. Each Product is identified by Product_ID, Product_name, Price and Quantity. d. Each Employee can take order from more than one Customer. e. Each Customer can place request for more than one Product. f. Each Employee can deliver more than one Product.	CO2	PO1	10
	b)		Give the ER-to-Relational Mapping Algorithm. Discuss each step with an example.	CO2	PO2	10
			UNIT - III			
3	a)		Consider the following tables **WORKS** (Pname, Cname, Salary) **LOCATED**_IN(Cname,City) **LIVES** (Pname, Street,City) **MANAGER** (Pname,Mgrname) Where Pname=Person name, Cname=Company name, Mgrname=Manager name.	CO3	PO4	10

			Write the SQL query for the following i) List the names of the people, who work for the company Infosys along with the cities they live in. ii) Find the people, who work for the company" Wipro" with a salary more than Rs 50000/-. iii) Find the names of people, who live and work in the same city. iv) Find the persons, whose salaries are more than that of all of the "Oracle" employees. v) Find the names of persons, who do not work for "Wipro".			
	b)		Discuss the integrity constraints: Not Null, Unique, Primary Key with an example each. Is the combination 'Not Null, Primary Key' a valid combination. Justify.	**CO2**	**PO2**	**06**
	c)		**Customer** CustID | CustName | AccntNo. 100 | Joe Smith | 010839 101 | Andy Blake | 111248 102 | Sue Brown | 061544 **BookOrders** **OrderID | Title | CustID | Price** **1001** | The Dark Tower | **102** | **12.00** **1002** | Incubus Dreams | **101** | **19.99** **1003** | Song of Susannah | **102** | **23.00** **1004** | The Time Traveler's Wife | **100** | **21.00** **1005** | The Dark Tower | **101** | **12.00** **1006** | Tanequil | **102** | **15.00** **1007** | Song of Susannah | **101** | **23.00** 1.Create the tables using DDL command. 2. Insert one row of data in each table using DML command. 3.Update the title of the book for a particular CustID. 4. List all the details from bookorders where OrderID=1006	**CO3**	**PO4**	**04**
			UNIT - IV			
4	a)		Consider the following relational database schema consisting of the four relation schemas: **passenger** (pid, pname, pgender, pcity) **agency** (aid, aname, acity) **flight** (fid, fdate, time, src, dest) **booking** (pid, aid, fid, fdate) **Answer the following questions using Relational Algebra Queries** 1. Get the complete details of all flights to New Delhi. 2. Get the details about all flights from Chennai to New Delhi 3. Find only the flight numbers for passenger with pid 123 for flights to Chennai before 06/11/2020. 4. Find the passenger names for passengers who have bookings on at least one flight. 5. Find the passenger names for those who do not have any bookings in any flights.	**CO3**	**PO4**	**10**

		b)	For the relations R and S given below R A | B | C 1 | 2 | 3 4 | 5 | 6 7 | 8 | 9 S B | C | D 2 | 3 | 10 2 | 3 | 11 6 | 7 | 12 Compute **(i)** $\Pi_{A,C}(R)$ **(ii)** $\sigma_{B=2}(S)$ **(iii)** natural join **(iv)** outer join	**CO2**	**PO2**	**04**
		c)	Given Primary Key {Property_id#} Candidate key {County_name,Lot#}  **Convert the given table into 2NF.**	**CO2**	**PO1**	**06**
			OR			
	5	a)	Consider the relations **City** (city_name, state) **Hotel** (name, address) **City_**hotel (hotel_name, city_name, owner) Answer the following queries in relational algebra **(i)** Find the names and address of hotels in Agra. **(ii)** List the names of cities which have no hotel. **(iii)** List the names of the hotels owned by 'Taj Group'.	**CO3**	**PO4**	**06**
		b)	Perform the following relational algebra operations on the given table. P ID | NAME 10 | Jones 103 | Smith 104 | Lalonde Q ID | NAME 100 | John 104 | Lalonde 1. R= PUQ 2. R= P-Q 3. R=P X Q	**CO2**	**PO2**	**06**

<table>
<tr><td></td><td></td><td>c)</td><td>Consider the relation R = {A, B, C, D, E, F, G, H, I, J} and the set of functional dependencies F = {{A, B} → {C}, {A} → {D, E}, {B} → {F}, {F} → {G, H}, {D} → {I, J}}. Given the Key of R as {AB}
i)Decompose R into 2NF.
ii) Decompose R into 3NF.</td><td>CO2</td><td>PO2</td><td>08</td></tr>
<tr><td></td><td></td><td></td><td>UNIT - V</td><td></td><td></td><td></td></tr>
<tr><td></td><td>6</td><td>a)</td><td>Discuss the Document-Based Data Model in detail.</td><td>CO1</td><td></td><td>10</td></tr>
<tr><td></td><td></td><td>b)</td><td>Analyze the working of two phase locking system in detail with an example.</td><td>CO2</td><td>PO2</td><td>10</td></tr>
<tr><td></td><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td></td><td>7</td><td>a)</td><td>Construct precedence graph for the following schedule
Schedule S1<table><tr><th>T1</th><th>T2</th><th>T3</th></tr><tr><td>Read(A)</td><td></td><td></td></tr><tr><td></td><td>Write(A)</td><td></td></tr><tr><td>Write(A)</td><td></td><td></td></tr><tr><td></td><td></td><td>Write(A)</td></tr></table></td><td>CO2</td><td>PO2</td><td>05</td></tr>
<tr><td></td><td></td><td>b)</td><td>Illustrate with an example the Problems that occurs when there is access to same database record in an uncontrolled manner.</td><td>CO2</td><td>PO2</td><td>10</td></tr>
<tr><td></td><td></td><td>c)</td><td>Check whether the given Two schedules are conflict equivalent?
Schedule S1<table><tr><th>T1</th><th>T2</th></tr><tr><td>Read(A)</td><td></td></tr><tr><td>Read(B)</td><td></td></tr><tr><td></td><td>Write(A)</td></tr><tr><td></td><td>Write(B)</td></tr></table>Schedule S2<table><tr><th>T1</th><th>T2</th></tr><tr><td>Read(A)</td><td></td></tr><tr><td></td><td>Write(A)</td></tr><tr><td>Read(B)</td><td></td></tr><tr><td></td><td>Write(B)</td></tr></table></td><td>CO2</td><td>PO2</td><td>05</td></tr>
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