



**SRM Institute of Science and Technology**  
**College of Engineering and Technology**  
**School of Computing**  
**Academic Year: 2022-23 (EVEN)**

**Answer Key**

**Test: CLA-T2**

**Date: 12-04-2023**

**Course Code & Title: 18CSC303J Database Management Systems**

**Duration: 12.30 pm to 2.15 pm**

**Year & Sem: III Year / VI Sem**

**Max. Marks: 50**

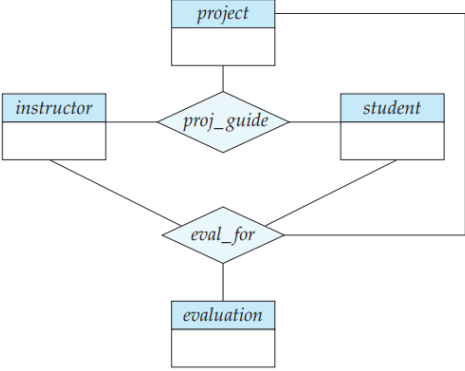
**Instruction: MCQs to be collected within first 15 minutes**

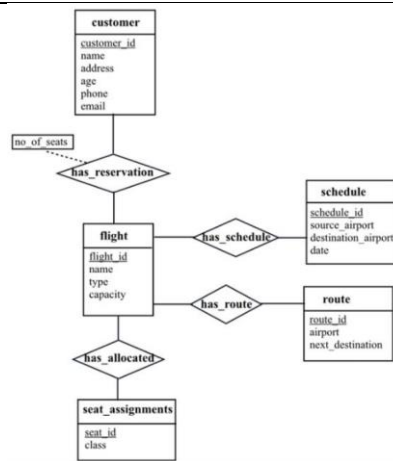
**Course Articulation Matrix:**

S.No.	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	CO2	H	M	L									
2	CO3	H	M	L									
3	CO4	H	M	L									

**Part – A MCQ (10 x 1 =10 Marks) Instructions: Answer all**

Q. No	Question	Marks	BL	CO	PO	PI Code
1	The process of moving from an abstract data model to the implementation of the database proceeds in two final design phases. <b>a.) Logical and Physical Design Phase</b> b.) Functional and Nonfunctional requirements phase c.) Conceptual and Nonfunctional design phase d.) View and Schema design phase	1	1	2	1	1.6.1
2	Which of the following statements is true about relationship sets in ER (Entity-Relationship) model? A. Relationship sets are used to represent the attributes of an entity. B. Relationship sets are used to represent the instances of an entity. <b>C. Relationship sets are used to represent the relationships between two or more entities.</b> D. Relationship sets are used to represent the primary keys of an entity.	1	2	2	1	1.6.1
3	Which of the following mapping cardinalities represents a mandatory relationship between two entities in ER (Entity-Relationship) model? A. One-to-One (1:1)      B. One-to-Many (1:N) <b>C. Many-to-One (N:1)</b> D. Many-to-Many (N:N)	1	1	2	1	1.6.1
4	Which of the following statements is true about keys in SQL? A. Primary key is a key that can have null values. B. Foreign key is used to link a table to itself. C. Candidate key is a key that is not selected as the primary key. <b>D. Composite key is a key that consists of two or more columns.</b>	1	2	2	1	1.6.1
5	Multiple sets permitted is called _____ specialization in extended ER. a. disjoint <b>b. overlapping</b> c. inheritance    d. participation	1	1	2	1	1.6.1
6	Domain constraints and referential-integrity constraints are special forms of _____. a. authorizations    b. violations <b>c. assertions</b> d. transactions	1	2	4	2	2.7.2
7	Which of the following is true about query processing in a database system? A. Query processing involves compiling and executing a single SQL statement. B. Query processing involves only executing the query plan generated by the query optimizer. <b>C. Query processing involves parsing the SQL statement, generating a query plan, and executing the plan.</b> D. Query processing involves only executing the query plan generated by the query parser.	1	1	4	1	1.6.1
8	Returns the number of rows affected by an INSERT, UPDATE, or DELETE statement, or returned by a SELECT INTO statement. a. %NOTFOUND    b. %ROWFOUND    c. %ISOPEN <b>d. %ROWCOUNT</b>	1	1	4	2	2.6.1
9	ORDER BY command cannot be used in a Subquery. The _____ command can be used to perform same function as ORDER BY command. a. <b>GROUPBY</b> b. Having    c. Asc and dsc    d. arrange	1	2	4	2	2.6.1
10	Establishing limits on allowable property values, and specifying a set of acceptable, predefined options that can be assigned to a property are examples of: a) Attributes <b>b) Data integrity constraints</b> c) Method constraints d) Referential integrity constraints	1	1	4	2	2.6.1

Part – B (4 x4= 16 Marks) Instructions: Answer any 4					
11.	<p>We can convert any weak entity set to a strong entity set by simply adding appropriate attributes. Why, then, do we have weak entity sets?</p> <p>i. Though weak entity set can be converted into strong entity set by simply adding appropriate attributes, this approach results in the redundant storage of primary key.</p> <p>ii. The primary key of a weak entity set can be inferred from its relationship with the strong entity set. If we add primary key attributes to the weak entity set, they will be present in both the entity set and the relationship set and they have to be the same.</p>	4	3	2	2.7.2
12.	<p>Provide an example for aggregation in extended ER model and Illustrate. (Any example can be provided for illustration) Aggregation is an abstraction through which relationships are treated as higher-level entities.</p> 	4	3	2	1.6.1
13.	<p>For a binary relationship set “Assign” between entity sets Programmer and Project, what are all the mapping cardinality possible and brief any 2. Four types are possible: (Brief any 2 for the given example) Binary relationship with cardinality ratio 1:1 Binary relationship with cardinality ratio 1:m Binary relationship with cardinality ratio m:1 Binary relationship with cardinality ratio m:m</p>	4	3	2	2.6.1
14.	<p>Write a PL/SQL code block that declares a variable called "sales_total" of type NUMBER, and assigns it a value of 500. Then, using an IF statement, check if the sales_total is greater than or equal to 1000. If it is, display a message "Great job! You exceeded your sales goal." If it's not, display a message "Keep pushing! You still have work to do."</p> <pre> DECLARE     sales_total NUMBER := 500; BEGIN     IF sales_total &gt;= 1000 THEN         DBMS_OUTPUT.PUT_LINE('Great job! You exceeded your sales goal.');</pre>	4	3	4	2.6.1
15.	<p>List any 4 aggregation functions in SQL with its purpose. <b>Count()</b> : COUNT function is used to Count the number of rows in a database table. <b>Sum()</b>:Sum function is used to calculate the sum of all selected columns . <b>Avg()</b> : The AVG function is used to calculate the average value of the numeric type. <b>Min()</b>:This function determines the smallest value of all selected values of a column. <b>Max()</b>:This function determines the largest value of all selected values of a column.</p>	4	3	4	2.6.1
Part – C (2 x 12 = 24 Marks) Answer All					
16.	<p>a. Design a database for an airline. The database must keep track of customers and their reservations, flights and their status, seat assignments on individual flights, and the schedule and routing of future flights. Your design should include an E-R diagram, a set of relational schemas, and a list of constraints, including primary-key and foreign-key constraints. (ER Diagram: 8 marks , list Relation schema and constraints:primary key, foreign key:4 marks)</p>	12	4	3	3.6.2



The relation schemas are as follows:

customer(customer\_id, name, address, age, phone, email)  
 flight(flight\_id, name, type, capacity)  
 schedule(schedule\_id, source\_airport, destination\_airport, date)  
 route(route\_id, airport, next\_destination)  
 seat\_assignments(seat\_id, class)  
 has\_reservation(customer\_id, flight\_id, no. of seats)  
 has\_allocated(flight\_id, customer\_id, seat\_id)  
 has\_schedule(flight\_id, schedule\_id)  
 has\_route(flight\_id, route\_id)

The foreign keys of the relation schemas are as follows:

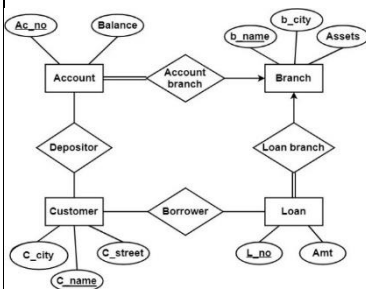
- In has\_reservation relation, customer\_id and flight\_id are foreign keys.
  - o customer\_id references customer\_id in customer relation.
  - o flight\_id references flight\_id in flight relation.
- In has\_allocated relation, customer\_id and flight\_id are foreign keys.
  - o customer\_id references customer\_id in customer relation.
  - o flight\_id references flight\_id in flight relation.
- In has\_schedule relation, flight\_id and schedule\_id are foreign keys.
  - o flight\_id references flight\_id in flight relation.
  - o schedule\_id references schedule\_id in schedule relation.
- In has\_route relation, flight\_id and route\_id are foreign keys.
  - o flight\_id references flight\_id in flight relation.
  - o route\_id references route\_id in route relation.

The primary keys of the relation schemas are as follows:

- customer with the primary key customer\_id.
- flight with the primary key flight\_id.
- Schedule with the primary key schedule\_id.
- route with the primary key route\_id.
- seat\_assignments with the primary key seat\_id.
- has\_reservation with the composite primary key customer\_id, flight\_id.
- has\_allocated with the composite primary key customer\_id, flight\_id.
- has\_schedule with the composite primary key flight\_id, schedule\_id.
- has\_route with the composite primary key flight\_id, route\_id.

(OR)

b. How can a company convert an ER (Entity Relationship) diagram to a relational table? Reduce the following ER diagram to Relational Schema using the standard rules and brief them.



Applying the rules, minimum 6 tables will be required- (8 marks)

- Account (Ac\_no, Balance, b\_name)
- Branch (b\_name, b\_city, Assets)
- Loan (L\_no, Amt, b\_name)
- Borrower (C\_name, L\_no)
- Customer (C\_name, C\_street, C\_city)
- Depositor (C\_name, Ac\_no)

Explanation of rules for conversion: 4 marks

17. a. Create two tables Employee and Department with necessary attributes and values.  
 i.) Write a SQL subquery to find those employees who receive a higher salary than the employee with ID 163. Return first name, last name. (3marks)  
 ii.) Write a SQL subquery to find those employees who report to that manager whose first name is 'Ram'. Return first name, last name, employee ID and salary. (3 marks)  
 iii.) Write a SQL subquery to find those employees who work in a department where the employee's first name contains the letter 'T'. Return employee ID, first name and last name. (3 marks)  
 iv.) Write a SQL subquery to find those employees who earn more than the average salary. Return employee ID, first name, last name. (3 marks)  
 Ans: Create two tables and insert necessary attributes and values.  
 i.)       SELECT first\_name, last\_name  
 FROM employees  
 WHERE salary >  
 ( SELECT salary  
 FROM employees  
 WHERE employee\_id=163  
 );  
 ii.)       SELECT first\_name, last\_name, employee\_id, salary  
 FROM employees  
 WHERE manager\_id =  
 (SELECT employee\_id  
 FROM employees

12	4	4	3	3.6.2
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<p>WHERE first_name = 'Ram'</p> <p>iii.)      SELECT employee_id, first_name, last_name FROM employees WHERE department_id IN ( SELECT department_id FROM employees WHERE first_name LIKE '%T%' ); );</p> <p>iv.)      SELECT employee_id, first_name,last_name FROM employees WHERE salary &gt; ( SELECT AVG(salary) FROM employees );</p> <p style="text-align: center;"><b>OR</b></p> <p>b. Assume you have two tables Sales2019 and Sales2020, which contain sales data for a company for the respective years. Each table has the following columns: product_name, sales_amount, and sales_date. Explain set operations used to perform the following tasks and illustrate with proper input and output.</p> <p><b>Explanation of respective set operation and queries and output carries marks</b></p> <p>i.) Find the names of products that were sold in both 2019 and 2020. (4 marks) SELECT product_name FROM sales2019 INTERSECT SELECT product_name FROM sales2020;</p> <p>ii.) Find the names of products that were sold in 2019 but not in 2020. (4marks) SELECT product_name FROM sales2019 EXCEPT SELECT product_name FROM sales2020;</p> <p>iii.) Find the names of products that were sold either in 2019 or in 2020, or both. (4 marks) SELECT product_name FROM sales2019 UNION SELECT product_name FROM sales2020;</p>					
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### Course Outcome (CO) and Bloom's level (BL) Coverage in Questions

