

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FOURTH SEMESTER B.TECH DEGREE EXAMINATION (R,S), MAY 2024

COMPUTER SCIENCE AND ENGINEERING

(2020 SCHEME)

Course Code : 20CST204

Course Name: Database Management Systems

Max. Marks : 100

Duration: 3 Hours

PART A

(Answer all questions. Each question carries 3 marks)

1. List out any three characteristics of Database Management Systems.
2. 'Railway ticket booking by an user' comment to which category of database user the following belong and justify the same.
3. Discuss the need of Primary Key and Foreign Key in a Relational Database Management System with example.
4. Compare and contrast DELETE and DROP commands used in SQL with proper syntax.
5. Write a SQL query to get the unique count of countries for the following relation Customer and predict the output

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden

6. Write a SQL query to find the average of Price attribute and predict the output for the following relation Products and comment how it will treat NULL values if it is present in it.

ProductID	ProductName	SupplierID	CategoryID	Unit	Price
1	Chais	1	1	10 boxes x 20 bags	18
2	Chang	1	1	24 - 12 oz bottles	19
3	Aniseed Syrup	1	2	12 - 550 ml bottles	10
4	Chef Anton's Cajun Seasoning	2	2	48 - 6 oz jars	22
5	Chef Anton's Gumbo Mix	2	2	36 boxes	21.35

7. Define insert anomaly, delete anomaly and update anomaly in database management system.
8. Suppose R(A B C D E) is relational schema and set of functional dependency :
FDs: A → B
B → E
C → D
Find out the relation R is in 2NF or not? If not decompose it in 2NF.
9. Explain ACID properties for a database management system.
10. Describe the need of NoSQL databases in real world problems with suitable example.

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Design an E R for keeping track of the scoring statistics of your favorite sports team. You should store the matches played, the scores in each match, the players in each match and individual player scoring statistics for each match. Summary statistics should be modelled as derived attributes with an explanation as to how they are computed. (8)
- b) With a neat sketch explain three schema architecture and explain how it achieves data independence (6)

OR

12. a) Design an ER diagram for the following design statement a university registrar's office maintains data about the following entities: (a) courses, including number, title, credits, syllabus, and prerequisites; (b) course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom; (c) students, including student-id, name, and program; and (d) instructors, including identification number, name, department, and title. Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modelled. (8)
- b) Compare structured and unstructured data models in database (6)

management systems with proper example.

MODULE II

13. Consider a database with the following schema:
 Person (name, age, gender) name is a key
 Frequent (name, pizzeria) (name, pizzeria) is a key
 Eats (name, pizza) (name, pizza) is a key
 Serves (pizzeria, pizza, price) (pizzeria, pizza) is a key

Write relational algebra expressions for the following seven queries

- Find all pizzerias frequented by at least one person under the age of 18.
- Find the names of all females who eat either mushroom or pepperoni pizza (or both). (14)
- Find the names of all females who eat both mushroom and pepperoni pizza.
- Find all pizzerias that serve at least one pizza that Amy eats for less than \$10.00.
- Find all pizzerias that are frequented by only females or only males.
- For each person, find all pizzas the person eats that are not served by any pizzeria the person frequents. Return all such person (name) / pizza pairs.
- Find the names of all people who frequent only pizzerias serving at least one pizza they eat

OR

14. For the following relation student write the SQL queries

Stu_Id	Name	Marks	City	State
100	Abhay	80	Noida	U.P
101	Sushil	75	Jaipur	Rajasthan
102	Ankit	90	Gurgaon	Haryana
103	Yogesh	93	Lucknow	U.P

(14)

- Create the above schema with the relation name as student
- Select the name of the student from the above relation whose city name contain third character as 'i'
- Delete the entire record of student from the relation whose name is 'Abhay'
- Select the name of student from the relation who does not belongs to either Rajasthan, Haryana

- e. Delete the entire data from the relation permanently
- f. Add a new attribute l_name to the existing relation
- g. Update the name of the student from the relation whose state belong to Haryana with a new name "Kanth'.

MODULE III

15. a) Compare and contrast between single level indices and multi-level indices. (6)
- b) Write the SQL queries for the following relation order

ord_no	purch_amt	ord_date	customer_id	salesman_id
70001	150.5	2012-10-05	3005	5002
70009	270.65	2012-09-10	3001	5005
70002	65.26	2012-10-05	3002	5001
70004	110.5	2012-08-17	3009	5003
70007	948.5	2012-09-10	3005	5002
70005	2400.6	2012-07-27	3007	5001
70008	5760	2012-09-10	3002	5001

(8)

- a. To calculate total purchase amount of all orders
- b. To count the number of unique salespeople
- c. To sort the relation in descending order based on customer id
- d. To display the maximum purchased amount by a customer

OR

16. a) For the given relation 'agents', write an SQL query to get data of 'working_area' and number of agents for this 'working_area' from the 'agents' table with the following condition: 'working_area' should come uniquely, and also predict the output.

AGENT_CODE	AGENT_NAME	WORKING_AREA	COMMISSION	PHONE_NO	COUNTRY
A007	Ramasundar	Bangalore	0.15	077-25814763	
A003	Alex	London	0.13	075-12458969	
A008	Alford	New York	0.12	044-25874365	
A011	Ravi Kumar	Bangalore	0.15	077-45625874	
A010	Santakumar	Chennai	0.14	007-22388644	
A012	Lucida	San Jose	0.12	044-52981425	
A005	Anderson	Brisban	0.13	045-21447739	
A001	Subbarao	Bangalore	0.14	077-12346674	

(6)

- b) Explain the insertion and deletion process on B+ Tree in database management system. (8)

MODULE IV

17. Explain 1NF,2NF,3NF and BCNF with suitable examples in Database management systems. (14)

OR

18. a) Explain functional dependency and lossless join in normalization. (8)
- b) Explain Armstrong Axioms in database management systems (6)

MODULE V

19. Explain transaction processing concepts in Database Management Systems (14)

OR

20. Explain the need of No SQL Databases in the current environment (14)
