NARULA INSTITUTE OF TECHNOLOGY

An Autonomous Institute under MAKAUT

B. TECH/CSE/ODD/SEM_5/CS503/2021-2022
REGULAR/BACKLOG
YEAR: 2022

DATA BASE MANAGEMENT SYSTEM
CS503

TIME ALLOTTED: 3 HOURS FULL MARKS: 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable

GROUP – A
(Multiple Choice Type Questions)

1. Answer any ten from the following, choosing the correct alternative of each question: **10×1=10**

SL. NO.	Question	Marks	CO No
i)	For R = {J, K, L} F = {JK –>L L –> K } the candidate keys are (a) J and K (b) JK (c) only J (d) JK and JL.	1	CO1
ii)	Which of the following is Database Language? (a) Data Definition Language (b) Data Manipulation Language (c) Query Language (d) All of the above	1	CO1
iii)	_____ refers to the correctness and completeness of the data in a database? (a) Data security (b) Data integrity (c) Data constraint (d) Data independence	1	CO1
iv)	An attribute of one table matching the primary key of another table, is called as (a) Foreign key (b) secondary key (c) candidate key (d) composite key	1	CO1
v)	SELECT operation in SQL is a (a) data query language (b) data manipulation language (c) data definition language (d) data control language	1	CO5
vi)	Which of the following is TRUE? (a) Every relation in 3NF is also in BCNF (b) A relation R is in 3NF if every non-prime attribute of R is fully functionally dependent on every key of R (c) Every relation in BCNF is also in 3NF	1	CO2

(d) No relation can be in both BCNF and 3NF

vii)	The concurrency control has the problem of (a) lost updates (b) dirty read (c) unrepeatable read (d) all of these	1	CO3
viii)	Which one of the following statements about normal forms is FALSE? (a) BCNF is stricter than 3NF (b) Lossless, dependency-preserving decomposition into 3NF is always possible (c) Lossless, dependency-preserving decomposition into BCNF is always possible (d) Any relation with two attributes is in BCNF	1	CO2
ix)	Consider a "CUSTOMERS" database table having a column "CITY" filled with all the names of Indian cities (in capital letters). The SQL statement that finds all cities that have "GAR" somewhere in its name, is: (a) Select * from customers where city = '%GAR%'; (b) Select * from customers where city = 'GAR'; (c) Select * from customers where city like '%GAR%'; (d) Select * from customers where city as '%GAR';	1	CO3
x)	A command to remove a relation from an SQL database (a) Delete table <table name> (b) Drop table <table name> (c) Erase table <table name> (d) Alter table <table name>	1	CO2
xi)	Which of the following is not binary operation? (a) Union (b) Project (c) Set Difference (d) Cartesian Product	1	CO3
xii)	A top-to bottom relationship among the items in a database is established by a (a) hierarchical schema (b) relational schema (c) network schema (d) all of these.	1	CO3

GROUP – B
(Short Answer Type Questions)

Answer any ***three*** from the following: **3×5=15**

SL. NO.		Question	Marks	CO No
2.	a)	What is the need for normalization?	2	CO2
	b)	Find out the highest normal form of relation scheme R(A, B, C, D) along with the set of functional dependencies F = {AB → C, AB → D, C → A, D → B}.	3	CO2
3.	a)	What is primary key? Give example.	2	CO1
	b)	Discuss in detail the operators SELECT, PROJECT, UNION with suitable example?	3	CO1
4.		Consider the following relations for a database that keeps track of business trips of salesperson in a sales office : SALESPERSON (SSN Name, Start_ Year, Dept_No) TRIP (SSN, From_City, To_City, Departure_Date, Return_Date, Trip ID) EXPENSE (Trip ID, Account#, Amount) Specify the following queries in either relational algebra or in SQL :		
	a)	Give the details (all attributes of TRIP relation) for trip that exceeded Rs. 3,000 in expenses.	2	CO2
	b)	Print SSN of salesman who took trips to 'New York'.	3	CO2
5.	a)	Define BCNF.	2	CO2
	b)	Why BCNF is stricter than 3NF?	3	CO2
6.	a)	What is difference between ‘strong entity set’ and ‘weak entity set’?	2	CO2
	b)	What is entity integrity and referential integrity?	3	CO4

GROUP – C
(Long Answer Type Questions)

Answer any ***three*** from the following: **3×15=45**

SL. NO.		Question	Marks	CO. NO.
7.	a)	What is entity and attributes?	2	CO1
	b)	Explain cardinality of relationship?	4	CO1
	c)	AC prides itself on having up-to-date information on the processing and current location of each shipped item. To do this, AC relies on a company-wide information system. Shipped items are the heart of the AC product tracking information system. Shipped items can be characterized by item number (unique), weight, dimensions, insurance amount, destination, and final delivery date. Shipped items are received into the AC system at a single retail center. Retail centers are characterized by their type, uniqueID, and address. Shipped items make their way to their destination via one or more standard AC transportation events (i.e., flights, truck deliveries). These transportation events are characterized by a unique scheduleNumber, a type (e.g, flight, truck), and a deliveryRoute. Draw an Entity Relationship diagram that captures this information about the AC system. Be certain to indicate identifiers and cardinality constraints.	9	CO1
8.		lives (person-name,street,city) works (person-name, company-name,salary) located-in(company-name,city) manages(person-name,manager-name) For the above schema (the primary key for each relation is denoted by the underlined attribute), provide relational algebra expressions for the following queries - 1 Find the name and city of all employees who work for City Bank 2 Find the name, street and city of all employees who work for City Bank and earn more than $10,000 3 Find all employees who live in the same city as the company they work for. 4 Find all persons who do not work for City Bank. 5 Find all employees who live in the same city and on the same street as their manager.	15	CO3

9.	a)	What is ternary relationship?	3	CO4
	b)	Consider the following Schema: Customer (custname, street, city) Branch (branchname, branchcity) Account (accno,branchname, balance) Loan (loanno, branchname, amount) Borrower (custname, loanno) Depositor (custname, accno) Answer the following queries in relational algebra. i) Find the loan no, branch and amount of loans where amount is greater than 1000$. ii) Find the names of all customers who have a loan and an account at the bank. iii) Find the loan no. for each loan of an amount greater than 10000.	6	CO3
	c)	Describe ACID properties of transaction.	6	CO3,CO5
10	a)	What is aggregation?	3	CO3
	b)	What is specialization?	3	CO3
	c)	What is functional dependency?	2	CO2
	d)	Consider the relation scheme R = {E, F, G, H, I, J, K, L, M, M} and the set of functional dependencies {{E, F} -> {G}, {F} -> {I, J}, {E, H} -> {K, L}, K -> {M}, L -> {N} on R. What is the key for R?	3	CO2
	e)	Given a relation R={A, B, C, D, E}, and the corresponding set of FDs: F={A-> BC, CD->E, B->D, E-> A}. Determine whether the decomposition of R into R1(ABC) and R2(ADE) is dependency preserving and lossless or not.	4	CO2
11		Short Note(Answer any ***three***)	3*5	
	a)	Query optimization		CO1
	b)	2-phase locking protocol		CO2
	c)	Fourth Normal Form		CO2

d)	Deadlock in Transaction	CO2
e)	B and B+ Tree	CO2

Course Outcome:

CO1	To apply the knowledge of Entity Relationship (E-R) diagram for an application.
CO2	To create a normalized relational database model
CO3	To analyze real world queries to generate reports from it.
CO4	To determine whether the transaction satisfies the ACID properties.
CO5	To create and maintain the database of an organization.