GURU NANAK INSTITUTE OF TECHNOLOGY
An Autonomous Institute under MAKAUT
2022
DATABASE MANAGEMENT SYSTEM
IT601

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

			Marks	CO No
1.	(i)	When a program is abnormally terminated, the equivalent of a ____ command occurs.? a) COMMIT b) ROLLBACK c) QUIT d) EXIT	1	CO1
	(ii)	Fourth Normal form is dependent on- a) Multivalued Dependency b) Non-Trivial FD c) All of these d) None	1	CO2
	(iii)	A domain is _____ if elements of the domain are considered to be indivisible units. a) Atomic b) Subatomic c) Substructure d) Subset	1	CO1
	(iv)	A transaction processing system is also called as _____? a) processing monitor b) transaction monitor c) TP monitor d) Monitor	1	CO2
	(v)	The term for information that describes what type of data is available in a database is: a) Data dictionary b) data repository c) Index data d) Metadata	1	CO1

(vi)	The CREATE TRIGGER statement is used to create the trigger. THE _____ clause specifies the table name on which the trigger is to be attached. The _____ specifies that this is an AFTER INSERT trigger. a) for insert, on b) On, for insert c) For, insert d) None of the mentioned	1	CO-
(vii)	All lock information is managed by a ____, which is responsible for assigning and policing the locks used by the transactions.? a) scheduler b) DBMS c) lock manager d) locking agent	1	CO2
(viii)	An _____ consists of a search-key value and pointers to one or more records with that value as their search-key value. a) Index entry b) Index hash c) Index cluster d) Index map	1	CO1
(ix)	For like predicate which of the following is true: 1. % matches zero of more characters 2. _ matches exactly one character a) 1-only b) 2-only c) Both d) None	1	CO2
(x)	In case the indices values are larger, index is created for these values of the index. This is called a) Pointed index b) Sequential index c) Multilevel index d) Multiple index	1	CO3
(xi)	What are the after triggers? a) Triggers generated after a particular operation b) These triggers run after an insert, update or delete on a table c) These triggers run after an insert, views, update or delete on a table d) All of the mentioned	1	CO4
(xii)	State true or false: 1. Select operator is not a unary operator 2. Project operator chooses subset of attributes or columns of a relation a) i-True, ii-False b) i-True, ii-True c) i-False, ii-True d) none	1	CO2

GROUP – B
(Short Answer Type Questions)
Answer any ***three*** from the following: **3×5=15**

			Marks	CO No
2.	(a)	Describe various indexes based on ordering of the key field.	3	CO5
	(b)	Explain the roles and responsibilities of DBA.	2	CO3
3.	(a)	Consider the following "Sailor" and "Reserve" relation: Reserve (sid, bid, day) Sailor (sid, sname, rating, age) Formulate relational algebra Query: i> Find names of sailors who have reserved boat #xxx. ii> Find names and ages of sailors who have reserved a boat.	4	CO2
	(b)	What is Blocking factor? What is block anchor?	1	CO5
4.	(a)	What is view?	2	CO2
	(b)	Describe the procedure of View creation.	3	CO3
5.	(a)	Define growing and shrinking phase of two phase locking protocol with proper example.	3	CO4
	(b)	Explain Dirty Read problem with example.	2	CO4
6.	(a)	Explain Incorrect Summary problem and Lost update problem	5	CO3

GROUP – C
(Long Answer Type Questions)
Answer any ***three*** from the following: **3×15=45**

			Marks	CO No.
7.	(a)	Consider the following transactions: T1: r1(x); r1(z); w1(x); T2: r2(z); r2(Y);w2(z);w2(y); T3: r3(x); r3(Y); w3(Y); & consider the given schedule S1: r1(x); r2(z); r1(z); r3(x); r3(Y); w1(x); w3(Y); r2(Y); w2(z);w2(y); Draw the serializability(precedence) graphs for S1 & state whether the schedule is serializable or not. If the schedule is serializable then write down the equivalent serial schedule.	5	CO4
	(b)	Explain the process of Check-point based recovery with suitable example.	4	CO3
	(c)	With proper example explain how recovery in a database system can be done using LOG files when the following techniques are used- Immediate update technique Deferred update technique.	6	CO3
8.	(a)	Explain ACID property and its importance	5	CO5
	(b)	Explain Wait-Die & Wound Wait protocols.	4	CO2

(c) Consider the relation R={A,B,C,D,E,F,G,H,I,J} and the set of functional dependencies are as given below: 6 CO3

F = {AB→C, A→DE, B→ F, F→GH, D→IJ}

Decompose R into 3NF.

9. (a) You are given the following table: 6 CO3

Vehicle(reg_No, make, colour)
Person(eno, name,address)
Owner(eno, reg_no)
Consider the following query:
SELECT eno, name, reg_no FROM Person,Owner WHERE Person.eno=Owner.eno and Person.name= 'RIA'
Draw the Query tree.

Optimize the query and draw the optimized query tree.

(b) Draw ER diagram with cardinality: 7 CO2

i. A bill may send to a customer. A customer may receive many bills.
ii. A clerk works in a bank. A bank has many clerks.
iii. Students appear for seats in a college. Each student can get one seat.
iv. A college has many seats in different departments.

A student can apply in more than one department.

(c) Consider the following: 2 CO2

T1	T2
Read(x)	
Write(x)	
	Read(x)
Read(y)	
	Write(x)
Write(y)	
commit;	
	Commit;

Schedule 1

T1	T2
Read(x)	
Write(x)	
	Read(x)
Read(y)	
	Write(x)
	commit;
abort;	

Schedule2

a) S1 Recoverable ,S2 Non- Recoverable
b) S1 Non-Recoverable ,S2 Recoverable
c) Both are Recoverable
d) Both are Non- Recoverable

10.	(a)	Explain the Deadlock Prevention Technique with proper example. What is Rolback?	5	CO3
	(b)	Consider the relation schema EMP-DEPT{ ENO, ENAME, DOB, ADDRESS, DNO, DNAME, DMGRNO}. With the following set G of functional dependencies on EMP-DEPT: G={ENO->{ENAME,DOB,ADDRESS,DNO},DNO->{DNAME,DMGRNO}}. Calculate the closure {ENO}+.	4	CO2
	(c)	What do you mean by serializability? Consider two transactions T1 & T2 such that T1: R1(A)W1(A)R1(B)W1(B) T2: R2(A)W2(A)R2(C)W2(C) Let schedule S: R1(A)W1(A)R2(A)W2(A)R1(B)WI(B)R2(C)W2(C). Find out whether the given schedule s is conflict serializable or not.	6	CO3
11.		Write short Notes on any three of the following:	3x5=15	
	(a)	Wait-for graph.	5	CO4
	(b)	Database user and DBA	5	CO1
	(c)	Extended E-R features	5	CO2
	(d)	Conflict serializable schedule	5	CO2
	(e)	B+ tree Index.	5	CO3