

CS403 FINAL TERM CURRENT PAPER FALL 2021

1) Describe insertion anomaly

Suppose we want to insert a course in the table, but this course has not been registered to any student. But we cannot enter the student ID, because no student has registered this course yet. So we can also not insert this course. This is called as insertion anomaly which is wrong state of database.

2) What is Clustered Indexes and non-Clustered Indexes?

A Clustered index is a type of index in which table records are physically reordered to match the index. Example: If you apply primary key to any column, then automatically it will become clustered index. In clustered index, index contains pointer to block but not direct data.

A Non-Clustered index is a special type of index in which logical order of index does not match physical stored order of the rows on disk Example: If we want to apply non-clustered index in NAME column (in ascending order), then the new table will be created for that column. In non-clustered index, index contains the pointer to data.

3) What is dynamic view?

Dynamic views are those types of views for which data is not stored and the expressions used to build the view are used to collect the data dynamically. Dynamic views are not executed only once, rather they are created and updated every time An example of a dynamic view creation is given below:

```
CREATE VIEW st_view1 AS (select stName, stFname, prName
FROM student
WHERE prName = 'MCS')
```

4) What is view its types and syntax

Views Views are generally used to focus, simplify, and customize the perception each user has of the database. Types of Views: • Materialized View • Simple Views • Complex View • Dynamic Views.

Syntax

```
CREATE VIEW view_name AS
SELECT column1, column2, ...
FROM table_name
WHERE condition;
```

5) Horizontal partitioning m sy ek question tha advantages btany thy es k

Horizontal Partitioning: Table is split on the basis of rows, which means a larger table is split into smaller tables. Now the advantage of this is that time in accessing the records of a larger table is much more than a smaller table. It also helps in the maintenance of tables, security, authorization and backup.

Vertical partitioning is done on the basis of attributes. Same table is split into different physical records depending on the nature of accesses. Primary key is repeated in all vertical partitions of a table to get the original table.

6) Simple and complex view ko explain krna tha

Simple Views: simple views are created from tables and are used for creating secure manipulation over the tables or structures of the database.

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Complex Views: Complex views are by definition views of type which may comprise of many of elements, such as tables, views sequences and other similar objects of the database.

6) Transaction k advantages

1) Performance. 2) Continuous availability. 3) Data integrity. 4) Ease of use. 5) Modular growth. 6) Improved security.

7) Count* ko hm kis liey use krty

COUNT (*) Counts all rows in the specified table or view

8) question tha k " usually we prefer direct access over sequential access of files " is statmnt k tha k correct the ya in correct justify krna tha

Direct access is faster than sequential access. When you plug in your flash drive, you can quickly access files and data without having to cycle through the entire drive.

10) Difference between SQL and SQL server

SQL is a query language. It is used to write queries to retrieve or manipulate the relational database data. On the other hand, SQL Server is proprietary software or an RDBMS tool that executes the SQL statements.

11) Two commands to end transaction

A transaction ends when it is committed or rolled back, either explicitly with a COMMIT or ROLLBACK statement or implicitly when a DDL statement is issued.

12) Importance of input form

An input form is an easy, effective, efficient way to enter data into a table. Input forms are especially useful when the person entering the data is not familiar with the inner workings of Microsoft Access and needs to have a guide in order to input data accurately into the appropriate fields.

13) Deadlock how to detect and works

A deadlock exists in the system if and only if there is a cycle in the wait-for graph. In order to detect the deadlock, the system needs to maintain the wait-for graph and periodically system invokes an algorithm that searches for the cycle in the wait-for graph.

14) Create simple index in the given field

Basic Syntax of INDEX.

CREATE INDEX

index_name ON table_name

(column_name)

15) Create unique index in the given field

CREATE UNIQUE INDEX

St_Name ON

Student(stName ASC, stFName DESC)

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16) Partitions define krna the Partitioning

De-normalization leads to merging different relations, whereas partitioning splits same relation into two. The general aims of data partitioning and placement in database are to

1. Reduce workload 2. Balance workload 3. Speed up the rate of useful work

There are two types of partitioning:- 1) Horizontal Partitioning 2) Vertical Partitioning

17) Simple select ki command likhni thi

Select Statement Select statement is the most widely used SQL Command in Data Manipulation Language. It is not only used to select rows but also the columns.

SELECT {*|col_name[,....n]} FROM table_name

18) Hash function likhna tha

A good hash function gives an average-case lookup that is a small constant, independent of the number of search keys. We hope records are distributed uniformly among the buckets.

19) Disk name likhne they

Floppy Disk, Hard Disk, CD-ROM, WORM & Erasable optical

20) Lock protocol

The most widely used locking protocol, called Strict Two-Phase Locking, or Strict 2PL

21) Advantages and dis advantages of re hashing and chaining

1) Re-hashing

Advantages: i) Fast re-hashing. ii) Fast access through use of main table space

Disadvantages: i) Maximum number of elements must be known ii) Multiple collisions may become probable

2) Chaining

Advantages: i) Unlimited number of elements ii) Unlimited number of collisions

Disadvantages: Overhead of multiple linked lists

22) Primary index is related to clustered index. How?

A primary index is an index on a set of fields that includes the unique primary key for the field and is guaranteed not to contain duplicates. Primary key is not necessarily clustered index (although probably in 95% of scenarios it is), while Clustered index is not necessarily is primary key.

23) Define RAID Level 1

RAID-1 RAID Level 1 provides redundancy by writing all data to two or more drives. The performance of a level 1 array tends to be faster on reads and slower on writes compared to a single drive, but if either drive fails, no data is lost.

23) D/f serial and interleaved schedule.

The serial schedule is a type of schedule where one transaction is executed completely before starting another transaction. In the serial schedule, when the first transaction completes its cycle, then the next transaction is executed.

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An interleaved schedule is a schedule in which the operations of an individual transaction are executed in order with respect to the same transaction, but without the restriction that the transactions be scheduled as a whole

24) Three points of materialized views.

- 1) A materialized view is a replica of a target master from a single point in time.
- 2) In data warehouses, materialized views are used to compute and store aggregated data such as sums and averages.
- 3) In distributed environments, materialized views are used to replicate data at distributed sites
- 4) In mobile computing environments, materialized views are used to download a subset of data from central servers to mobile clients

25) Locking ma concurrency ko define karna tha

Lock-Based Concurrency Control: A DBMS must be able to ensure that only serializable, recoverable schedules are allowed, and that no actions of committed transactions are lost while undoing aborted transactions. A DBMS typically uses a locking protocol to achieve this. A locking protocol is a set of rules to be followed by each transaction (and enforced by the DBMS), in order to ensure that even though actions of several transactions might be interleaved, the net effect is identical to executing all transactions in some serial order.

26) List partitioning

In this type of partitioning the values are specified for every partition. So there is a specified list for all the partitions. So there is no range involved in this rather there is a list of values.

27) write 3 SQL commands

The standard SQL commands such as "Select", "Insert", "Update", "Delete", "Create", and "Drop" can be used to accomplish almost everything that one needs to do with a database. OR
CREATE TABLE Employees
SELECT * FROM Students
DROP TABLE Products

28) Partitioning aims and objectives

The main goal of partitioning is to aid in maintenance of large tables and to reduce the overall response time to read and load data for particular SQL operations.

29) Locking and its types

The basic idea of locking is that an object is locked prior to performing any operation. Locking is based on two types of locks; shared and exclusive.

30) Delete and truncate

The TRUNCATE is used to delete all the rows of any table but rows would exist. The DELETE is used to delete one or many records. If we want to remove all records we must use truncate

31) Update ki commands

An SQL UPDATE statement changes the data of one or more records in a table. Either all the rows can be updated, or a subset may be chosen using a condition.

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The UPDATE statement has the following form:[1]

UPDATE table_name SET column_name = value [, column_name = value ...]

30) Write the steps to create "command button" in MS Access

- 1) Open the form in Design View and ensure that the Control Wizard button on the toolbox is pressed in.
- 2) Click the command button icon on the toolbox and draw the button on the form. The Command Button Wizard will then appear.
- 3) On the first dialog window, action categories are displayed in the left list while the right list displays the actions in each category. Select an action for the command button and click Next .
- 4) The next few pages of options will vary based on the action you selected. Continue selecting options for the command button.
- 5) Choose the appearance of the button by entering caption text or selecting a picture. Check the Show All Pictures box to view the full list of available images. Click Next
- 6) Enter a name for the command button and click Finish to create the button.

31) Hash partitioning or uske types

Hash Partitioning: It is a type of horizontal partitioning. In this type particular algorithm is applied and DBMS knows that algorithm. So hash partitioning reduces the chances of unbalanced partitions to a large extent.

32) ORDER BY k baray main batana tha

The ORDER BY clause allows you to sort the records in your result set. The ORDER BY clause can only be used in SELECT statements. The ORDER BY clause sorts the result set based on the columns specified.

The syntax for the ORDER BY clause is:

SELECT columns

FROM tables

WHERE predicates

ORDER BY column ASC/DESC;

33) Cluster aur replicating tha shayd deference

Replication The process of copying a portion of the database from one environment to another and keeping subsequent copies of the data in synchronization with the original source Changes made to the original source are propagated to the copies of the data in other environments.

Clustering is a process, which means to place records from different tables to place in adjacent physical locations, called clusters. It increases the efficiency since related records are placed close to each other.

34) Timestamping k rules and how to implement them.

- If T attempts to read a data item which has already been written to by a younger transaction then ABORT T.
- If T attempts to write a data item which has been seen or written to by a younger transaction then ABORT T.

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35) How we access disk caching environment. Explain its working.

Disk caching works under the same principle as memory caching, but instead of using high-speed SRAM, a disk cache uses conventional main memory.

36) Differentiate between RAID 2 and RAID 3. (5)

RAID-2 RAID Level 2, which uses Hamming error correction codes, is intended for use with drives which do not have built-in error detection.

RAID-3 RAID Level 3 stripes data at a byte level across several drives, with parity stored on one drive. It is otherwise similar to level 4.

37) Why hash function h compute for key K

To perform a lookup on a search key value k_i , we compute $h(k_i)$, and search the bucket with that address. A hash function h is a function from the set of all search key values K to the set of all bucket addresses B .

38) Characteristics of hash function

- No indexes to search or maintain
- Very fast direct access
- Inefficient sequential access
- Use when direct access is needed, but sequential access is not.

39) Insert into command (table given)

The INSERT statement allows you to insert a single record or multiple records into a table. It has two formats: INSERT INTO table-1 [(column-list)] VALUES (value-list) And, INSERT INTO table-1 [(column-list)] (query-specification)

40) SQL delete statement

DELETE FROM table_name WHERE condition.

41) SQL insert into statement

INSERT INTO table_name (column1, column2, column3,...)
VALUES (value1, value2, value3,...);

42) SQL create table statement

CREATE TABLE table_name (column1 datatype, column2 datatype, column3 datatype,...);

43) SQL update statement

UPDATE table_name
SET column1 = value1, column2 = value2, ...
WHERE condition

44) Difference b/w TRUNCATE and DROP

DROP table command, which is used to drop the complete table from the database. The TRUNCATE is used to delete all the rows of any table but rows would exist.

45) List partition (table given)

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List Partitioning: In this type of partitioning the values are specified for every partition. So there is a specified list for all the partitions. So there is no range involved in this rather there is a list of values.

46) Range partition (table given)

Range Partitioning: In this type of partitioning range is imposed on any particular attribute. For Example for those students whose ID is from 1-1000 are in partition 1 and so on. This will improve the overall efficiency of the database.

47) RAID 0 to 5 batana thy

RAID Level 0 is not redundant, hence does not truly fit the "RAID" acronym.

RAID Level 1 provides redundancy by writing all data to two or more drives.

RAID Level 2, which uses Hamming error correction codes, is intended for use with drives which do not have built-in error detection.

RAID Level 3 stripes data at a byte level across several drives, with parity stored on one drive.

RAID Level 4 stripes data at a block level across several drives, with parity stored on one drive.

RAID-5 RAID Level 5 is similar to level 4, but distributes parity among the drives.

48) Windows control ki 2 example

Windows Controls There are number of controls which are used to take input and display output like buttons, checkboxes etc. Following are the examples: Numbers, Dates and Text

49) Beginner and intermediate user tha

Beginners need to know what your system does before they start to learn how to use it. The best way to present this information is outside the main system itself.

Intermediate For most systems, the majority of users fall into the intermediate category.

Intermediate users know what the system does, but they often forget the details of how.

50) Differentiate between dense index and sparse index

Dense Index: An index record appears for every search key value in file. This record contains search key value and a pointer to the actual record.

Sparse Index: Index records are created only for some of the records. To locate a record, we find the index record with the largest search key value less than or equal to the search key value we are looking for. OR

Dense indices are faster in general, but sparse indices require less space and impose less maintenance for insertions and deletions.

51) TransactionID,name, price,date, iski datatypes batani thi

Transaction ID = int

Name = varchar

Date = date

Price = float or real

52) Sorting kis clause se hoti

Order by clause

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53) Select all field from yhe table EMP

SELECT * FROM EMP

54) Create view STU_LIST of table STUDENT in which display STU_ID and STU_NAME

who arrbin city Lahore or katachi in descending order

CREATE VIEW STU_LIST AS STU_ID, STU_NAME FROM STUDENT WHERE City IN (Lahore, karachi) ORDER BY DESC

55) Display em_id and emp_name in EMPLOYEE table where designation is Admin

SELECT emp_id, emp_name FROM EMPLOYEE where designated ='Admin';

56) Types of joins

Inner Join: Only those rows from two tables are joined that have same value in the common attribute.

Outer Join: SQL supports some interesting variants of the join operation that rely on null values, called outer joins.

Semi Join: Another form of join that involves two operations.

Self-Join: In self join a table is joined with itself.

57) Problems occur in transaction

• Lost Update Problem • Uncommitted Update Problem • Inconsistent Analysis Problem

58) Access control k purpose related tha

ACCESS CONTROL SQL-92 supports access control through the GRANT and REVOKE commands.

The syntax of this command is as follows:

GRANT privileges ON object TO users [WITH GRANT OPTION]

The syntax of the REVOKE command is as follows:

REVOKE [GRANT OPTION FOR] privileges ON object FROM users {RESTRICT | CASCADE}

59) 5. Incremental log with immediate update k topic ma sa tha asky five step btany thy

The sequence of steps on write statement is:

- A log record of the form <T, X, old val, new val> is written in the log file
- Database buffers are updated
- Log record is moved from buffer to the file
- Database is updated when convenient
- On commit a log file entry is made in the log file as <T, commit>

60) Sequence and group k bare main banana tha.

Sequences are a feature that some DBMS products implement to provide users with a mechanism to generate unique values

The GROUP BY statement groups rows that have the same values into summary rows, like "find the number of customers in each country".

61) Advantages of clustering index

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A clustered index is useful for range queries because the data is logically sorted on the key. You can move a table to another filegroup by recreating the clustered index on a different filegroup. You do not have to drop the table as you would to move a heap. A clustering key is a part of all nonclustered indexes.

62) Three ways to judge the effectiveness of Cache Memory.

When data is found in the cache, it is called a cache hit, and the effectiveness of a cache is judged by its hit rate. Many cache systems use a technique known as smart caching, in which the system can recognize certain types of frequently used data.

63) Rolling back definitions

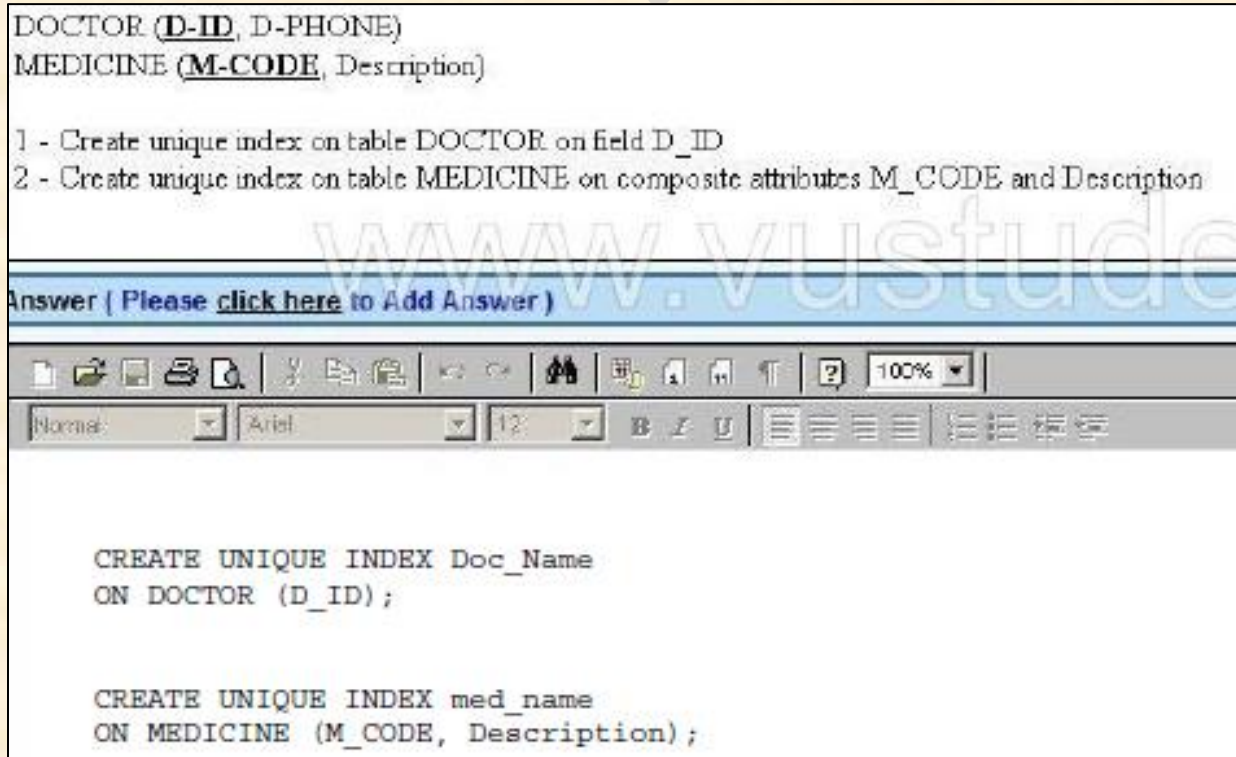
In SQL, ROLLBACK is a command that causes all data changes since the last BEGIN WORK , or START TRANSACTION to be discarded by the relational database management systems (RDBMS), so that the state of the data is "rolled back" to the way it was before those changes were made.

64) Difference primary index or secondary

The main difference between primary and secondary index is that the primary index is an index on a set of fields that includes the primary key and does not contain duplicates, while the secondary index is an index that is not a primary index and can contain duplicates.

65) Base table and view ko control kis commands se milta

GRANT and REVOKE commands.



DOCTOR (D-ID, D-PHONE)
MEDICINE (M-CODE, Description)

1 - Create unique index on table DOCTOR on field D_ID
2 - Create unique index on table MEDICINE on composite attributes M_CODE and Description

Answer (Please [click here](#) to Add Answer)

CREATE UNIQUE INDEX Doc_Name
ON DOCTOR (D_ID);

CREATE UNIQUE INDEX med_name
ON MEDICINE (M_CODE, Description);

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Create a view named 'Student-List' on STUDENT table which will show STU_ID and STU_NAME of those students, who belongs to Lahore.

STUDENT (STU_ID, STU_NAME, FATHER_NAME, ADDRESS, CITY, PHONE_NO)

Answer (Please [click here](#) to Add Answer)

```
CREATE VIEW [STUDENT-LIST] AS
SELECT STU_Name, STU_ID
FROM STUDENT
WHERE City = 'LAHORE';
```

Create a view named STUDENT-LIST on CUSTOMER table to show only CST-ID in ascending order of those customers, who belongs to GUJRANWALA city

CUSTOMER (CST-ID, CST-NAME, CITY)

Answer (Please [click here](#) to Add Answer)

```
CREATE VIEW STUDENT-LIST
AS SELECT CST-ID
FROM CUSTOMER
ORDER BY CST-ID,ASC
WHERE CITY = 'GUJRANWALA';
```

Consider a table named COMPANY with fields COMPANY_NAME,

DESCRIPTION, ORDER_NUMBER. Write an SQL statement to display company names in reverse alphabetical order.

Answer (Please [click here](#) to Add Answer)

```
SELECT COMPANY_NAME,
DESCRIPTION,
ORDER_NUMBER,
FROM COMPANY
ORDER BY COMPANY_NAME DESC;
```

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Question No : 51 of 52

Analyze the statements given below and identify each statement as correct or incorrect. Justify your answer in either case.

0. "Durability" ensures that committed changes in the database can be lost due to any failure.
1. Transaction is a dividable unit of work and execution of half transaction must be performed to preserve the data integrity.

1) Once the DBMS informs the user that a transaction has been successfully completed, its effects should persist even if the system crashes before all its changes are reflected on disk. This property is called durability

2) A transaction can be defined as an indivisible unit of work comprised of several operations, all or none of which must be performed in order to preserve data integrity. All transactions share these properties: atomicity, consistency, isolation, and durability (represented by the acronym ACID)

71) How are views valuable in the context of security?

Views are also valuable in the context of security: We can define views that give a group of user's access to just the information they are allowed to see. For example, we can define a view that allows students to see other students' name and age but not their GPA, and allow all students to access this view, but not the underlying Students table.

72) Write down output of the given query applied on the below relation:

SELECT * FROM course INNER JOIN program ON
course.prName = program.prName

	crCode	crName	crCrds	prName		prName	totSem	prCredits
1	CS-105	Intro to Programmin...	4	BCS				
2	CS-216	Data Structures	4	BCS	1	BBA	8	130
3	CS-316	Database Systems	4	BCS				
4	CS-504	Analysis of Algorit...	4	MCS	2	BCS	8	134
5	CS-511	Operating System	4	MCS				
6	CS-516	Data Structures and...	4	MCS	3	BIT	8	132
7	CS-616	Intro to Database S...	3	MCS				
8	MG-103	Intro to Management...	NULL	NULL	4	MBA	4	64
9	MG-105	Intro to Accounting...	3	BBA				
10	MG-314	Money & Capital Mar...	3	BIT	5	MCS	4	64
11	MG-505	Intro to Accounting...	3	MBA				
12	MT-305	Linear Algebra	3	MCS				

Fig. 1: COURSE and PROGRAM tables with common attribute prName

Solution:

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The output after applying inner join on tables of figure 1 will be as follows:

	crCode	crName	crCrds	prName	prName	totSem	prCredits
1	CS-105	Intro to Programming	4	BCS	BCS	8	134
2	CS-216	Data Structures	4	BCS	BCS	8	134
3	CS-316	Database Systems	4	BCS	BCS	8	134
4	CS-504	Analysis of Algorithm	4	MCS	MCS	4	64
5	CS-511	Operating System	4	MCS	MCS	4	64
6	CS-516	Data Structures and Algos	4	MCS	MCS	4	64
7	CS-616	Intro to Database Systems	3	MCS	MCS	4	64
8	MG-105	Intro to Accounting	3	BBA	BBA	8	130
9	MG-314	Money & Capital Mark	3	BIT	BIT	8	132
10	MG-505	Intro to Accounting	3	MBA	MBA	4	64
11	MT-305	Linear Algebra	3	MCS	MCS	4	64

73) List down two basic types of disks.

There are two basic types of disks: magnetic disks and optical disks

74) List down any three data types, which are used to handle the textual data in sql server.

Text: It handles the textual data.

- Char: By default 30 characters, max 8000
- Varchar: Variable length text, max 8000
- Text: Variable length automatically
- nchar, nvarchar, ntext

75) Create a simple index, named “student_details”, on the CGPA field of the STUDENT table.

```
CREATE [NONCLUSTERD] INDEX studedent_details ON STUDENT (GFPA);
```

76) Analyze the statement given below and identify as correct or incorrect. Justify your answer in either case.in recovery procedure. The transactions ended before the checkpoint are redone.

Above Statement is incorrect

The correct statement is

The transactions for which the RM finds both begin and commit operations, are redone, that is, the ‘write’ entries for such transactions are executed again.

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77) Read the statement if incorrect rewrite in correct form. "Hashing provides slow, time consuming data retrieve from sequential files

Hashing provides rapid, non-sequential, direct access to records.

78) Analyze the below given statements and mark as correct and incorrect and also explain.

1. Deadlock occurs when one transaction wants to read more than on object at same time.

2. The mechanism —Wait for Graph is used to apply join on multiple.

1. Deadlock occurs when one transaction wants to read more than on object at same time. (Incorrect)

Explanation: - A deadlock occurs when the first transaction has locks on the resources that the second transaction wants to modify, and the second transaction has locks on the resources that the first transaction intends to modify.

2. The mechanism —Wait for Graph is used to apply join on multiple. (Incorrect) Explanation: - It is used for the detection of deadlock. It consists of nodes and links. The nodes represent transaction, whereas arrowhead represents that a transaction has locked a particular data item.

79) What are locking protocols

A locking protocol is a set of rules to be followed by each transaction (and enforced by the DBMS), in order to ensure that even though actions of several transactions might be interleaved, the net effect is identical to executing all transactions in some serial order.

80) Differentiate b/w Clustered Indexes and non-Clustered Indexes?

Cluster Index

1 A cluster index is a form of tables which consist of column and rows.

2 Cluster index exists on the physical level

3 It sorts the data at physical level

Non Cluster Index

1 A non-cluster index is in the form of a report about the tables.

2 They are not created on the physical level but at the logical level

3 It does not sort the data at physical level

81) Physical Record and DE normalization

DE normalization is a technique to move from higher to lower normal forms of database modeling in order to speed up database access. DE normalization process is applied for deriving a physical data model from a logical form.

82) Table given the vertical partitioning aur horizontal partitioning karni thi

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2. Vertical Partitioning

Resumes

<u>SSN</u>	Name	Address	Resume	Picture
234234	Mary	Huston	Clob1...	Blob1...
345345	Sue	Seattle	Clob2...	Blob2...
345343	Joan	Seattle	Clob3...	Blob3...
234234	Ann	Portland	Clob4...	Blob4...



T1

<u>SSN</u>	Name	Address
234234	Mary	Huston
345345	Sue	Seattle
...		

T2

<u>SSN</u>	Resume
234234	Clob1...
345345	Clob2...

T3

<u>SSN</u>	Picture
234234	Blob1...
345345	Blob2...

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2. Horizontal Partitioning

Customers

<u>SSN</u>	Name	City	Country
234234	Mary	Houston	USA
345345	Sue	Seattle	USA
345343	Joan	Seattle	USA
234234	Ann	Portland	USA
--	Frank	Calgary	Canada
--	Jean	Montreal	Canada



CustomersInHouston

<u>SSN</u>	Name	City	Country
234234	Mary	Houston	USA

CustomersInSeattle

<u>SSN</u>	Name	City	Country
345345	Sue	Seattle	USA
345343	Joan	Seattle	USA

CustomersInCanada

<u>SSN</u>	Name	City	Country
--	Frank	Calgary	Canada
--	Jean	Montreal	Canada