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<u>**Important Instructions to examiners:**</u>

1) The answers should be examined by key words and not as word-to-word as given in themodel answer scheme.

2) The model answer and the answer written by candidate may vary but the examiner may tryto assess the understanding level of the candidate.

3) The language errors such as grammatical, spelling errors should not be given moreImportance (Not applicable for subject English and Communication Skills).

4) While assessing figures, examiner may give credit for principal components indicated in thefigure. The figures drawn by candidate and model answer may vary. The examiner may give credit for anyequivalent figure drawn.

5) Credits may be given step wise for numerical problems. In some cases, the assumed constantvalues may vary and there may be some difference in the candidate's answers and model answer.

6) In case of some questions credit may be given by judgment on part of examiner of relevant answer based on candidate's understanding.

7) For programming language papers, credit may be given to any other program based on equivalentconcept.

1. **a) Attempt any <u>SIX</u> of the following:**   **Marks 12**

   (i) List first four codd rules.

   (For each rule - ½ Mark)

Ans: Codd rules:

- **Rule 1 : The information rule**

  According to E.F. codd's first rule, the whole data has to be presented to the user should be in the form of table.

- **Rule 2 : Guaranteed Access Rule**

  According to second rule stated by E.F. codd, whole data should be available or accessible to the user without any ambiguity. The ambiguity can be avoided only through the perfect combination of the table name, primary key, and column name.

- **Rule 3: Systematic treatment of null values**

  Third law states that the null values i.e. absence of the values in the table should be treated properly. The table should allow a field to remain empty. This is not applicable to primary keys. Key columns cannot have null values.
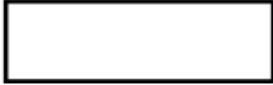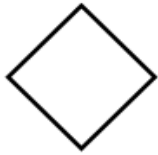
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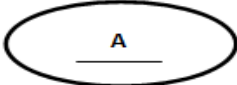
- **Rule 4 : Dynamic on-line catalog based on the relational model**

  Fourth rule specifies need of dynamic on-line catalog based on the relational model. There are certain system tables that stores the database definition should be present. The data accessing tools should be used to access the database structure information.

(ii) List four symbols used in E-R diagram.

(For each symbol - ½ Mark (Any four symbols can be considered))

Ans: The symbols used in E-R diagram are:

	Rectangle Represent entities sets
	Diamonds represent relationship sets
	Lines link attribute to entity set and entity sets to relationship sets
	Represent attributes(Ellipses)
	Represent multi value attribute (Double Ellipses)
	Represent derived attribute (Dashed Ellipses)
	Indicates primary key attributes (Underline)

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(iii) How to apply NOT NULL constraint at the time of table creation? Give syntax.

(For correct syntax - 2 Marks)

Ans: **syntax:**

create   table<table   name>(column_name1   datatype(size),column_name2   datatype(size)   not

null,……………….,column_namen datatype(size));

Example:

create table emp (eno number(10),ename varchar2(20) not null);

(iv) List four DML commands.

(For each command - ½Mark)

Ans: List of DML commands:

1.   Select

2.   Insert

3.   Update

4.   Delete

(v) State use of '%' character in string operations.

(Explanation - 2 Marks)

Ans: '%' is used in select command with 'like'operator . '%' matches all characters.

e.g.   Select ename from emp where ename like 'A%';

In this it will give all enames having first character as 'A'.

(vi) What is index? List its types.

(Definition - 1 Mark,Types - 1 Mark)

Ans: Index: An index can be created on a table to find data more quickly and efficiently.

The users cannot see the index.Indexes are used to speed up searches/queries.

Types of Index: **1. Unique index**

2. Simple index

3. Composite index

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(vii) What is trigger? List its types.

(Definition - 1 Mark, Types -1Mark)

Ans: Trigger: A trigger is a PL/SQL block structure which is fired when a DML statements like Insert, Delete, Update is executed on a database table. A trigger is triggered automatically when an associated DML statement is executed.

Types of Triggers:

1. Statement-level trigger
2. Row-level trigger
3. Before-trigger
4. After-trigger

(viii) What is Sigma(σ) operator in Relational Algebra?

Give Example.

(Explanation -1 Mark, Example-1 Mark)

Ans: sigma operator(σ):Select(σ)is used to obtain a subset of the tuples of a relation that satisfy a select condition.

<div align="center">

OR

</div>

The select operation selects tuples that satisfy a given predicate.

Example:

To find all employees having salary more than 10000 from employee table.

$$\sigma_{Salary>10000}\text{(employee)}$$

b) Attempt any <u>TWO</u> of the following: **Marks 08**

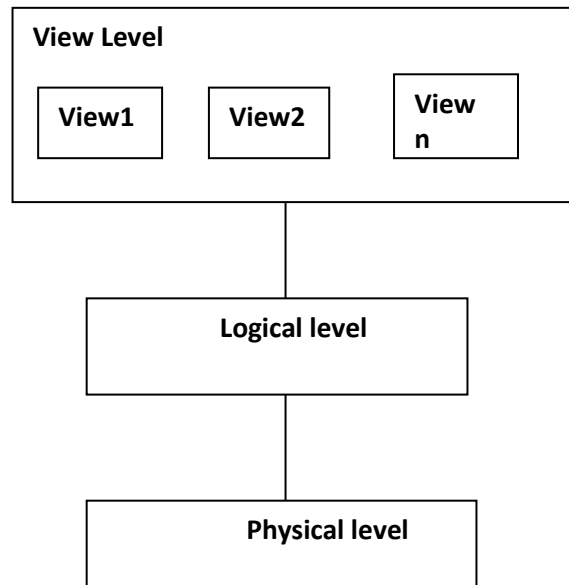**(i) Describe data abstraction with neat diagram.**

(Diagram- 1 Mark, Description of each level-1 Mark)

Ans: Three levels of abstraction are as follows:

1) Physical level

2) Logical level

3) View level

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Diagram:

Three levels of data abstraction

Explanation:

1) **Physical Level:**

   - It is lowest level of abstraction.
   - This level defines lowest complicated data structure of database system.
   - This level hidden from user.
   - It defines how the data are stored.

2) **Logical Level:**

   - The level next to physical level is called logical level.
   - This level defines what data stored in the database and what the relationships among these data are.
   - Fully decides the structure of the entire database**.**

3) **View Level:**

   - This level is used to show the part of database to user.
   - There is more complexity in physical as well as logical level so user should not interact with complicated database.
   - So different view of database can be created for user to interact with database easily.

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(ii) Explain group by clause with suitable example.

(Explanation - 2 Marks,Any Correct Example - 2 Marks)

Ans: **Group by clause:**

This clause allows multiple columns to be grouped so aggregate functions may be performed on multiple columns with one command. It is used to divide the rows in a table into groups. It can also be used to return summary information for each group.

Example: select dept, avg(salary) from emp group by dept;

(iii) Write step by step syntax to create, open and close cursor in PL/SQL block.

(Create - 1 Mark, Open - 1 Mark, Close - 1 Mark, Syntax - 1 Mark)

Ans: Steps in Cursor:

    DECLARE

      CURSOR cursor_name ISselect_statement;

   OPEN cursor_name;

    FETCH cursor_name into record_name;

  PL/SQL block;

  CLOSE cursor_name;

2.   **Attempt any <u>FOUR</u> of the following:**   **Marks 16**

  a) Describe strong and weak entity set.

    (Strong entity set - 2 Marks, Weak entity set - 2 Marks)

Ans: <u>**Strong Entity Set:**</u> An entity set that have sufficient attributes to form a primary key is called as strong entity set.
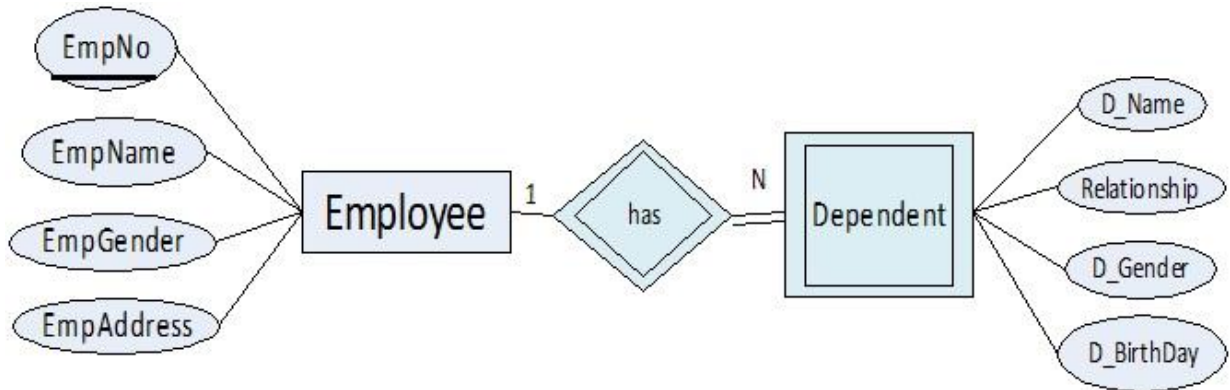
  OR

An entity set that have a primary key of its own is referred as Strong entity set.

<u>**Weak Entity:**</u>A Entity set that does not have a Primary key of its own is referred as a weak entity set.

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OR

An entity set that does not have sufficient attribute to form a primary key is called as Weak Entity Set.

In the above diagram Employee is a Strong Entity and Dependent is Weak Entity as it depends on Employee.

b) **State and explain INF and 2NF with example.**

(For 1NF - 2 Marks, For 2NF -2 Marks)

Ans: **First Normal Form (1NF):** A relation R is said to be in first normal form (1NF) if the domain of all attributes of R are atomic.

OR

A table is in the first normal form if it contains no repeating elements groups.

Example: Supplier(sno,sname,location,pno,qty)

SNO	SNAME	LOCATION	PNO	QTY
S1	Abc	Mumbai	P1	200
S2	Pqr	Pune	P2	300
S3	Lmn	Delhi	P1	400

The above relation is in 1NF as all the domains are having atomic value. But it is not in 2NF.

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Second Normal Form (2NF): A relation is said to be in the second normal form if it is in first normal form and all the non key attributes are fully functionally dependent on the primary key.

Example: In the above relation NAME, LOCATION depends on SNO and QTY on (SNO, PNO) so the table can be split up into two tables as Supplier(SNO,SNAME,LOCATION) and SP(SNO,PNO,QTY) and now both the tables are in second normal form.

Supplier   SP

SNO	SNAME	LOCATION
S1	Abc	Mumbai
S2	Pqr	Pune
S3	Lmn	Delhi

SNO	PNO	QTY
S1	P1	200
S2	P2	300
S3	P1	400

c) **Consider following database and solve queries**

   emp (empno, ename, ph, sal, dept_no, comm)

   (i) Change employee name 'Rahul' to 'Ramesh'.

   (ii) Give increment of 20% in salary to all employees.

   (For each command - 2 Marks)

Ans:

   (i) Update emp set ename= 'Ramesh' where ename= 'Rahul';

   (ii) Updateemp set salary=salary+(salary*20)/100;

d) **Consider following schema:**

   Depositor (Acc_no, Name, PAN, Balance)

   Create a view on depositor having attributes (Acc_no, PAN)

   where balance is greater than 100000.

   (For command – 4 Marks)

Ans: Create view v1 as select Acc_no,PAN from depositor where balance>100000;

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e) List two advantages of each the following:

(i)   functions

(ii) procedures.

(Forany two advantages of functions - 2 Marks, for any two advantages of procedures - 2 Marks)

Ans: Advantages of Function:

1. Code reusability feature can be used.

2. It saves time and cost.

3. Increases flexibility of the program.

4. Memory space required is less.

5. It can return value to the calling program.

Advantages of Procedure:

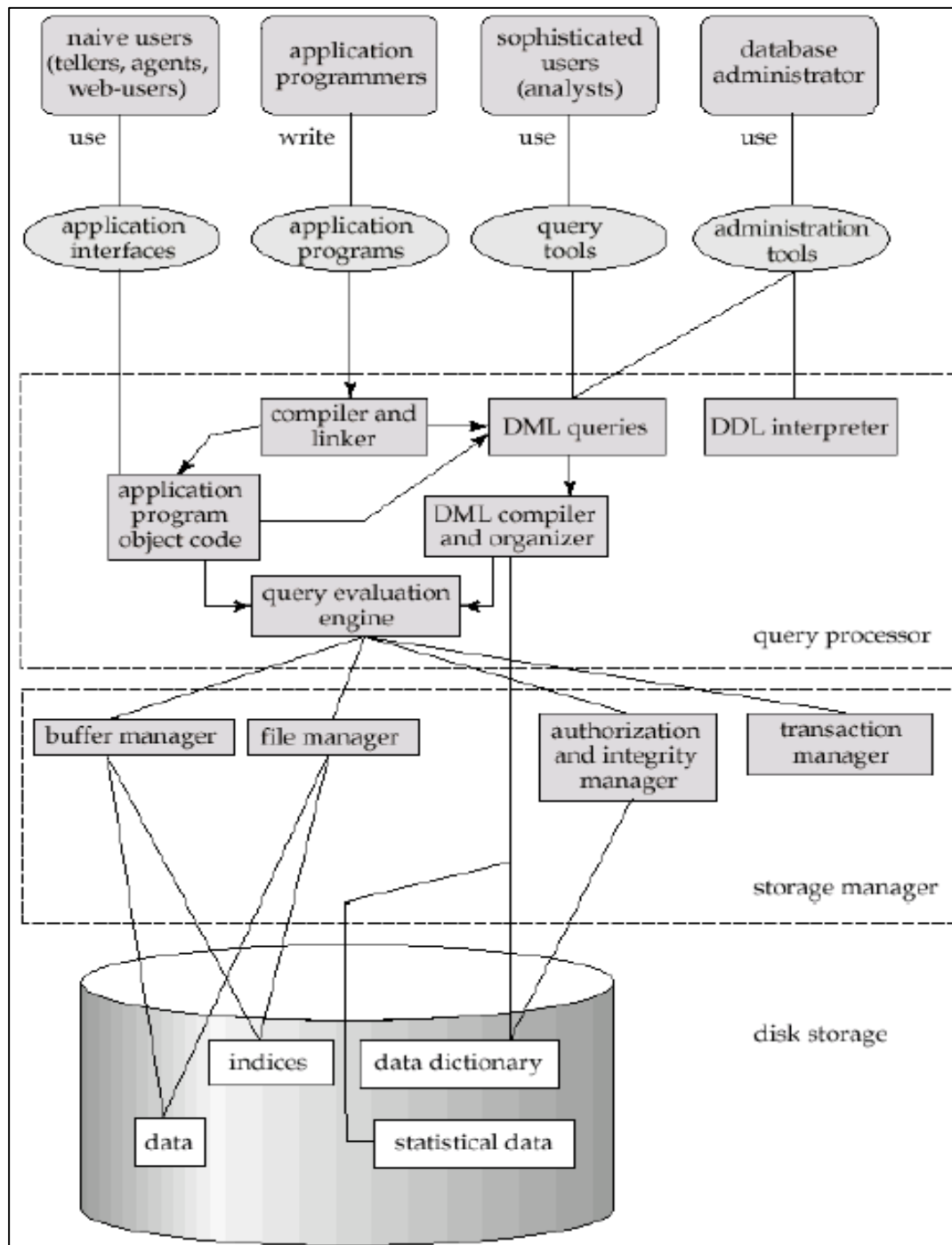1. Security: Procedures offer more security.

2. Productivity: Avoids redundant code for common procedures in multiple applications.

3. Memory savings: Requires only one copy of the code for multiple users.

4. Performance: Precompiled code hence no compilation is required to execute a code.

5. Integrity and accuracy: As procedure is needed to be tested only once hence guarantee of accurate   result.

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f) Draw a neat labeled diagram of overall DBMS structure.

(For diagram - 4 Marks)

Ans:

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3. **Attempt any __FOUR__ of the following:**   **Marks 16**

a) **Consider following schema:**

Employee (emp_no, emp_name, dept, designation, salary, Dept_location)

Solve following queries:

(i) **List all Managers in Mumbai location.**

(ii) **Set salary of all 'project leaders' to 70000/-.**

(iii) **List employees with having alphabet 'A' as second letter in their name.**

(iv) **Display details of those employees who work in Mumbai or Chennai.**

(For each query - 1 Mark)

Ans:

i)   Select * from Employee where designation= 'Manager' and Dept_location= 'Mumbai';

ii) Update Employee set salary=70000   where designation= 'project leader';

iii) Select * from Employee where emp_name like '_A%';

iv) Select * from Employee where Dept_location= 'Mumbai' or Dept_location= 'Chennai';

b) **State two advantages of PL/SQL and give its block structure.**

(Any two advantages - 2 Marks, Block structure - 2 Marks)

Ans: **Advantages of PL/SQL:**
1. PL/SQL is portable and high transaction processing language.

2. PL/SQL is in fact procedural language but it also supports object oriented programming.

3. It allows user to write as well as access the functions and procedures from outside the programs.

4. It has got built in libraries of packages.

5. PL/SQL is highly productive as it works with the oracle forms to develop the application software i.e. it works with the front ends to develop the complete commercial applications.

6. The performance of PL/SQL is better, as in single line query entire block of statements can be processed.

7. Some special features of PL/SQL includes the different data types that are capable of handling different types of data required in real life applications.

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8. The most important features like triggers, cursors, locks etc have made PL/SQL a very versatile language.

9. Security can be ensured with the help of PL/SQL, while developing a commercial database system.

10. PL/SQL is a user friendly language and very simple to use.

Block Structure of PL/SQL

- The Parts of PL/SQL block structure are as follows :

    1. Declaration

    2. Execution

    3. Exception

Declare

    Declarations of memory variables.

BEGIN

    SQL executable statements;

[Exceptions

    Handling errors]

END;

c) **Explain need of normalization and state 3NF.**

   (Need - 3 Marks, 3NF - 1 Mark)

Ans:

- **Normalization** can be defined as process of decomposition of database tables to avoid the data redundancy.

- The normalization is an important process that removes the repeating data from database and also used to remove the inconsistency. How to avoid the data redundancy and update anomalies.

- **Insertanomaly** due to lack of that is all the data available for insertion such that null values in keys should be avoided. This kind anomaly and seriouslydamage a database.

- **Update anomaly**due to data redundancy that is multiple occurrences of same values in column.

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- **Deletion anomaly** it leads to loss of data for rows that are not stored else square it could result in loss of vital data.

Definition of 3NF:

A relational table is present in the third normal form (3NF) if it is in 2NF and every non-key attribute is non-transitively dependent upon its primary key.

d) **What are synonyms? How to create and drop synonym?**

(Definition - 1 Mark, Syntax / Example - 1 ½ Marks)

Ans: **Synonyms:**

- Synonym is another name given to the table, view, sequence, stored procedure, function or packages for the user's convenience to use it.

Creating Synonyms:

Create synonym <synonym name> for <object name>;

Create synonym employee1 for employee;

Dropping Synonyms:

Drop synonym <synonym name>;

Drop synonym employee1;

e) **Define lock? Explain shared and exclusive locks.**

(Definition - 1 Mark, Explanation of each lock -1 ½ Marks)

Ans: **Lock** can be defined as the mechanism that avoids the destructive interaction between two concurrent transactions or sessions that are attempting to access the same database object.

Types of Locks-shared &Exclusive:

- Exclusive locks avoid the resource from being shared. Exclusive lock mode is used to modify the data. Using exclusive lock single transaction can perform both read and write operation at a time.

- Shared lock allows the resource to be shared. This sharing of resource depends on the operations that are involved. Many users at a time can read the data. Share locks are used to avoid concurrent access to the writers.

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f)   Explain data mining. List four features of data mining.

(Explanation - 2 Marks, for each relevant correct features - ½ Mark)

Ans:

- **Data mining** is the exploration and analysis of large quantities of data in order to discover valid, novel, potentially useful and ultimately understandable patterns in data.

- **It is** known as "Knowledge Discovery in Databases". When the data is stored in large quantities in data warehouse, it is necessary to dig the data from the ware house that is useful and required for further use.

- For data mining, different software tools are used to analyze, filter and transfer the data from the data warehouses.

Feature of data mining:

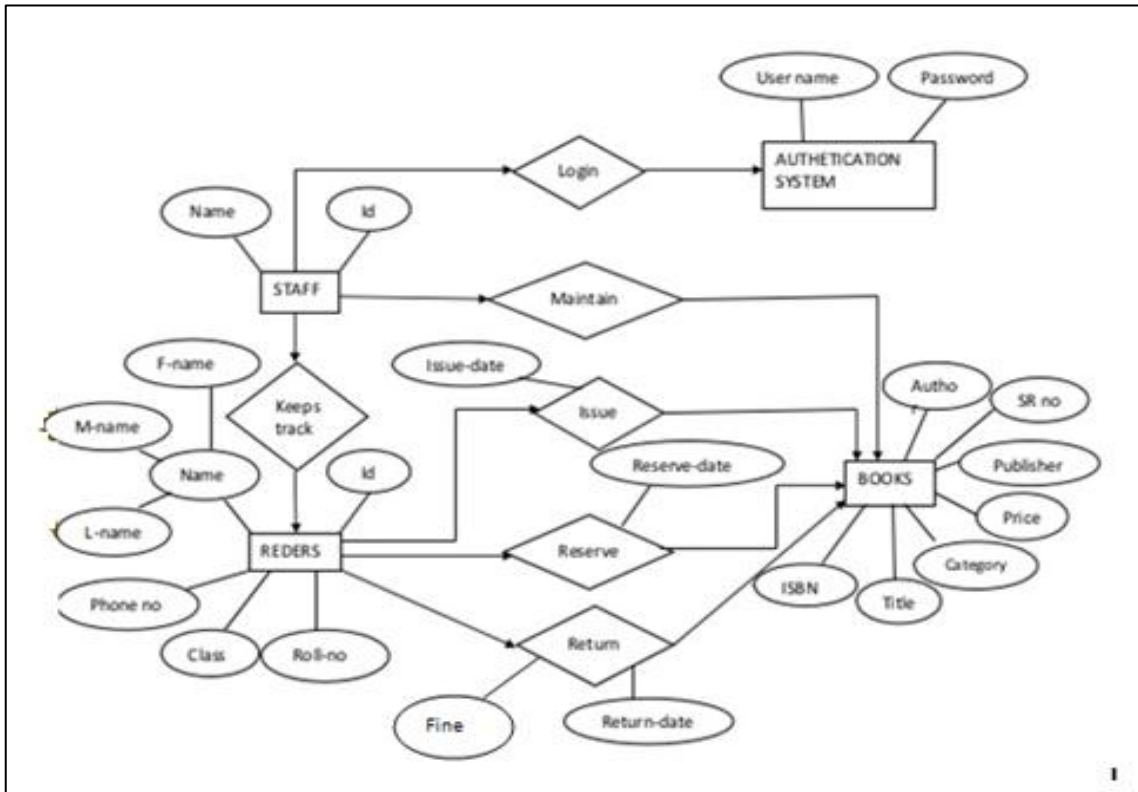1) prediction
2) identification
3) classification
4) optimization

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4.   Attempt any <u>FOUR</u> of the following :   **Marks 16**

a) Draw an E-R diagram of library management system considering issue and return, fine calculation facility.

(Any relevant diagram - 4 Marks)

Ans: E-R Diagram for library management

b) Write PL/SQL program to display square of any number.

(For correct program - 4 Marks)

Ans: declare

no number:=&no;

sqr number:=1;

begin

sqr:=no*no;

dbms_output.put_line('Square of a number ' ||no||'is'||sqr);

end;

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c) Explain Alter command. Give syntax of add and modify option.

(Explanation - 2 Marks, for each syntax - 1 Mark)

Ans: Alter table command is used to make the changes or modification in the table structure.

Syntax for add option:

alter table<table name> add(<columnName1><data type>

(<size>), <columnName2><data type> (<size>)....);

Example:

Alter table emp add(sal number(8,2));

Syntax for modify option:

alter table<table name> modify <columnName1><data type>(<size>);

Example:

alter table emp modify sal number(10,2);

d) State and Explain ACID properties.

(For each property - 1 Mark)

Ans: ACID properties

1. **Atomicity:** When one transaction takes place, many operations occur under one transaction. Atomicity means either all operations will take place property and reflect in the database or none of them will be reflected.

2. **Consistency:** Consistency keeps the database consistent. Execution of a transaction needs to take place in isolation. It helps in reducing complications of executing multiple transactions at a time and preserves the consistency of the database.

3. **Isolation:** It is necessary to maintain isolation for the transactions. This means one transaction should not be aware of another transaction getting executed. Also their intermediate result should be kept hidden.

4. **Durability:** When a transaction gets completed successfully, it is important that the changes made by the transaction should be preserved in database in spite of system failures.

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e) What are sequences? Create sequence for 'student' table.

(Explanation - 2 Marks, Example- 2 Marks)

Ans: A sequence refers to a database object that is capable of generating unique and sequential integer values.

Syntax:

Create sequence <seq_name> [increment by num]

[start with num] [maxvaluenum] [minvaluenum][cycle/nocycle][cache/nocache];

- **Increment by num :**Used to specify the interval between sequence numbers.
- **Start with num :** States the first sequence numbers that needs to be generated.
- **Minvaluenum :** This is used to state the minimum value of the sequence.
- **Maxvaluenum :**It states the maximum value generated by sequence.

Cycle:

Cycle indicates that the sequence will be continued for generating the values from the starting after reaching either its maximum value or minimum value.

Cache:

The cache option is used to pre-allocates a set of sequence numbers and keep these numbers in the memory so that they can be accessed.

No Cache:

This states that there is no pre-allocation for the values of sequence.

Sequence for 'student' table

create sequence student_seq increment by 1

start with 1 maxvalue60 nocycle;

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f) State 4 (four) difference between DBMS and RDBMS.

(Any correct difference - 1 Mark each)

Ans:

Sr. No.	DBMS	RDBMS
1	Old version of software to handle the databases.	Latest version of software for handling databases.
2.	Can relate one table to another table.	RDBMS can relate one database to another database.
3.	Data security is low as compare to RDBMS.	Level of data security is very high as compare to DBMS.
4.	Data storage capacity is less as compare to RDBMS.	Data storage capacity is very high.
5.	Not easy to maintain data integrity.	Data integrity is one of the most important features of RDBMS. It can be maintained easily in RDBMS.
6.	Works better in single user or few user systems.	Works very efficiently and give good performance over the network.
7.	All Codd's 12 rules are not followed.	All Codd's 12 rules are followed.

5. Attempt any FOUR of the following: **Marks 16**

a) List four function of database administrator.

(List any four function - 1 Mark each)

Ans: Function of database administrator

1. Schema Definition: The DBA creates database schema by executing DDL statements.

2. Storage structure and access method: The storage of the data structure and how to access data from it is handled by DBA.

3. Granting of authorization for data access: The DBA will grant and restrict access to the user

4. Regular Maintenance of Database: The DBA performs some of the routine maintenance activities like periodic backups, ensuring enough disk space is available.

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5. Schema and Physical organization modification: DBA writes a set of definitions to modify the database schema or description of physical storage organization.

6. Integrity-constraint specification: Integrity constraints are written by DBA and they are stored in a special file, which is accessed by database manager, while updating the data.

7. Back-up and Recovery: DBA also takes backup of the data on a backup storage device so that if data then lost then it can be again recovered and compiled. DBA also recovers the damaged data.

b) What are snapshots? Create snapshot for employee table.

(Explanation - 2 Marks, snapshot for emp – 2 Marks)

Ans: **Snapshot:**

- It is also known as materialized view.
- It is a copy of either an entire single table or set of its rows or collection of tables,

Views or either rows using join,grouping and selection criteria.

- Useful in distributed environment

It has two types:

Simple snapshot and complex snapshot. Simple snapshot related to single table and complex snapshot related to joined tables.

Snapshot for emp table:

Create snapshot emp_data refresh with rowid as select * from emp;

c) Explain 'exception handling' in 'PL/SQL'.

(Any relevant Explanation - 4 Marks (Consider either Syntax or Example))

Ans: Exception is nothing but an error.

When the system throws a warning or has an error it can lead to an exception.

Such exception needs to be handled and can be defined internally or user defined

Exception handling is nothing but a code block in memory that will attempt to resolve current exception condition.

Syntax:

DECLARE

Declaration section

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…executable statement;

 EXCEPTION

WHEN ex_name1 THEN

-Error handling statements/user defined action to be carried out;

END;

For Example: Suppose a NO_DATA_FOUND exception is raised in a proc, we can write a code to handle the exception as given below.

BEGIN

Execution section

EXCEPTION

WHEN NO_DATA_FOUND THEN

dbms_output.put_line ('A SELECT...INTO did not return any row.');

END;

Types:

1) **Predefined Exception/system defined exception/named exception:**

Are always automatically raised whenever related error occurs.The most common errors that can occurs during the execution of PL/SQL.Not declared explicitly. i.e. cursor already open, invalid cursor, no data found, zero divide and too many rows etc.

Programs are handled by system defined Exceptions.

2) **User defined exception:**

It must be declare by the user in the declaration part of the block where the exception is used.

It is raised explicitly in sequence of statements using:

Raise_application_error(errorno,errorname);

d) **Consider following relational algebra schema.**

Student (Roll_no, Name, DOB, percentage, course)

Department (Deptno, DeptName, Head)

Write relational algebra expressions for:

(i) **Find student name and percentage from computer department.**

(ii) **Get the students name who has percentage greater than 70.**

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(Each query – 2 Marks)

Ans:

(i) $\pi_{name,percentage}(\sigma_{course=\text{'computer'}}(student))$

   OR

   $\pi_{name,percentage}(\sigma_{deptname=\text{'computer'}}(student \bowtie department))$

   (Note: natural join is considered on student.course=department.deptno)

(ii) $\pi_{name}(\sigma_{percentage>70}(student))$

e) Explain implicit and explicit locking strategies.

   (For each locking strategies - 2 Marks)

Ans: **Implicit locks** are generally placed by the DBMS automatically. Most DBMS allow the developer or the application to issue locks which are referred to as explicit locks.

   The default locking is done by the oracle server implicitly by creating deadlock situation when the transaction is done on the same database object(table) in different sessions. It is also called as implicit locking or automatic locking. This lock held till the transaction is completed.

   Explicit locking are placed by application program.

   When locking is done by the user with the help of SQL statement, it is called as explicit locking.

f) Consider following schema:

   depositor (cust_name, acc_no)

   Borrower (cust_name, loan_no)

   Solve following queries:

   (i)   Find customer name having savings account as well as loan account.

   (ii)   Find customer names having loan account but not the saving account.

   (Each query – 2 Marks)

Ans:

   (i) selectcust_name from depositor intersect select cust_name from borrower;

   (ii) Selectcust_name from borrower minus select cust_name from depositor;

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6. **Attempt any FOUR of the following:**   Marks 16

   a) **State and explain four advantages of DBMS over file processing system.**

   (Any four Advantage - 1 Mark each)

Ans:
   1. Reduction in Redundancy: Duplication of records is reduced.

   2. Avoiding Inconsistency: As the redundancy is reduced inconsistency is avoided.

   3. Maintaining Integrity: Accuracy is maintained.

   4. Sharing of data: Sharing of data is possible.

   5. Enforcement of Security: Security can be enforced.

   6. Transaction support

   b) **Explain multivalued dependencies with example.**

   (Explanation – 2 Marks, Any Relevant Example – 2 Marks)

Ans: **Multivalued dependencies** occur when the presence of one or more rows in a table implies the presence of one or more other rows in that same table.

   OR

   A multivalued dependency (**MVD**) $X \longrightarrow\!\!\!> Y$ specified on relation schema R, where X and Y are both subsets of R, specifies the following constraint on any relation state r of R: If two tuples t_1 and t_2 exist in r such that $t_1[X] = t_2[X]$, then two tuples t_3 and t_4 should also exist in r with the following properties, where we use Z to denote (R 2 ($X \upsilon Y$)):

   • $t_3[X] = t_4[X] = t_1[X] = t_2[X]$.

   • $t_3[Y] = t_1[Y]$ and $t_4[Y] = t_2[Y]$.

   • $t_3[Z] = t_2[Z]$ and $t_4[Z] = t_1[Z]$.

   Example 1: For example, imagine a car company that manufactures many models of car, but always makes both red and blue colors of each model. If you have a table that contains the model name, color and year of each car the company manufactures, there is a multivalued dependency in that table. If there is a row for a certain model name and year in blue, there must also be a similar row corresponding to the red version of that same car.

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Example 2:

Subject	Text	Teacher
MATHEMATICS	ALGEBRA	Mr. SINGH
MATHEMATICS	GEOMETRY	Mr. PATIL
MATHEMATICS	ALGEBRA	Mr. PATIL
MATHEMATICS	GEOMETRY	Mr. SINGH
COMPUTER	DATABASE MANAGEMENT	Mrs. DIXIT
COMPUTER	VB.NET	Mrs. DIXIT

In the above relation Text and Teacher are multivalued dependent on Subject. There are two multivalued dependencies in this.

{Subject} $\longrightarrow\!\!\!\gg$ {Text} and {Subject} $\longrightarrow\!\!\!\gg$ {Teacher}

c) Explain:

(i) order by clause

(ii) grant command

(iii) commit command

(iv) savepoint command.

(Each clause or command explanation - 1 Mark)

Ans:

(i) Order by clause

This clause is used for getting the result in particular order (by ascending or descending).By default the order is ascending.

Syntax:

select<attribute list> from <table name> where <condition> order by <attribute name><asc/desc>;

Example: Select * from emp order by ename;

(ii) Grant

This command is used to give permission to user to do operations on the other user's object.

Syntax:

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Grant <object privileges> on <object name> to <username>[with grant option];

Example: Grant update on emp to u1;

(iii) Commit

This command is used to end the transcation and also make its effect permanent to database. Commit deletes or removes the save points if any.

Syntax:

commit;

(iv) Savepoint:

Savepoints define breakpoints for the transaction to unable partial rollback. Savepoints are treated as marker to divide lengthy transaction to smaller one.

Syntax:

savepoint<savepoint_name>;

Example: Savepoint SV1;

d) **Describe following keys:**

   (i) Primary key.

   (ii) Foreign key.

   (Each key – 2 Marks)

Ans:

(i) **PRIMARY KEY** constraint uniquely identifies each record in a database table.

Primary keys must contain unique values.

A primary key column cannot contain NULL values.

Most tables should have a primary key, and each table can have only ONE primary key.

SQL PRIMARY KEY Constraint on CREATE TABLE

The following SQL creates a PRIMARY KEY on the "P_Id" column when the "Persons" table is created:

CREATE TABLE Persons

(

P_Idnumber(2) NOT NULL,

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LastNamevarchar2(25) NOT NULL,

FirstNamevarchar2(25),

Address varchar2(25),

City varchar2(25),

PRIMARY KET (P_Id)

);

(ii) **FOREIGN KEY** in one table points to a PRIMARY KEY in another table.

Let's illustrate the foreign key with an example. Look at the following two tables:

The "Persons" table:

P_Id	LastName	FirstName	Address	City
1	Hansen	Ola	Timoteivn 10	Sandnes
2	Svendson	Tove	Borgvn 23	Sandnes
3	Pettersen	Kari	Storgt 20	Stavanger

The "Orders" table:

O_Id	OrderNo	P_Id
1	77895	3
2	44678	3
3	22456	2
4	24562	1

Note that the "P_Id" column in the "Orders" table points to the "P_Id" column in the "Persons"
table.

The "P_Id" column in the "Persons" table is the PRIMARY KEY in the "Persons" table.

The "P_Id" column in the "Orders" table is a FOREIGN KEY in the "Orders" table.

The FOREIGN KEY constraint is used to prevent actions that would destroy links between tables.

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The FOREIGN KEY constraint also prevents invalid data from being inserted into the foreign key column, because it has to be one of the values contained in the table it points to.

SQL FOREIGN KEY Constraint on CREATE TABLE

The following SQL creates a FOREIGN KEY on the "P_Id" column when the "Orders" table is created:

CREATE TABLE Orders

(

O_Idnumber(2) NOT NULL,

OrderNonumber(5) NOT NULL,

P_Idnumber(2),

PRIMARY KEY (O_Id),

FOREIGN KEY (P_Id) REFERENCES Persons(P_Id)

);

e) **Explain word comparison operators:**

   (i) IN and NOT IN

   (ii) BETWEEN and NOT BETWEEN.

   (Each operator – 1 Mark)

Ans:

   (i) IN and NOT IN

   IN: a in(b,c)

   This operator tests that operand a matches at least one element of the list provided.

   Example: select * from emp where salin(500,600,700);

   NOT IN: a not in (b,c)

   This operator tests that operand a does not match any elements of list provided

   Example: select * from emp where sal not in (500,600,700);

   (ii) BETWEEN and NOT BETWEEN

   BETWEEN: a between b and c

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Tests that operand a is greater than or equal to operand b and less than or equal to operand c.The range which is specified will contain min value and max value. It is used numeric and date data type.

Example. Select * from emp where sal between 400 and 600;

NOT BETWEEN: a not between b and c

Testes that operand a is less than operand b or greater than operand c. It test the

Range other than b to c.

Example. Select * from emp where sal not between 400 and 600;

f) Explain while-loop in PL/SQL with example.

(Explanation - 2 Marks, Example - 2 Marks, consider any other valid example)

Ans: **While loop:**

The while loop is used to iterate the statements till a particular condition is true.

Syntax:

While<condition>

Loop

<statements>

End loop;

Example:

Declare

Num number(3):=5;

Fact number(3):=1;

Begin

While(Num!=0)

Loop

Fact:=Fact*Num;

Num:=Num-1;

End loop;

Dbms_output.put_line('Factorial of 5:'||Fact);

End;