**General Instructions:**

* **Follow the instructions given in each section.**
* **Make sure that you attempt the questions in order.**

**SECTION-A (10\*1 mark=10 marks)**

***(All questions are compulsory)***

1. In a DBMS, a cursor can be used to:
   1. Insert rows into a table
   2. Delete rows from a table
   3. Update rows in a table
   4. **All of the above**
2. The "CASE" statement in SQL is used to:
   1. **Perform conditional branching**
   2. Perform iterative looping
   3. Define primary key constraints
   4. Create temporary tables
3. Which control structure is used to execute a block of statements a fixed number of times?
   1. WHILE loop
   2. **FOR loop**
   3. DO-WHILE loop
   4. SWITCH statement
4. Which of the following is an advantage of using packages in DBMS?
   1. Improved security
   2. Simplified database design
   3. **Better performance**
   4. Reduced storage space
5. Which of the following is true about local variables in procedures?
   1. They can be accessed from any procedure within the package
   2. **They can only be accessed within the procedure they are declared in**
   3. They can be accessed from any trigger within the database
   4. They can only be accessed within the main program
6. Which recovery technique requires that the entire database be restored from a previous backup after a failure?
   1. Undo logging
   2. Redo logging
   3. Deferred update
   4. **Full recovery**
7. Which of the following recovery techniques is commonly used in distributed databases to ensure fault tolerance?
   1. Undo logging
   2. Redo logging
   3. Deferred update
   4. **Replication**
8. A transaction that violates the consistency property is considered to be:
   1. Serializable
   2. Dirty
   3. **Inconsistent**
   4. Isolated
9. Which isolation level allows only committed data to be read?
   1. Read Uncommitted
   2. **Read Committed**
   3. Repeatable Read
   4. Serializable
10. In timestamp ordering, which of the following determines the order of transactions?
    1. Transaction priority
    2. Transaction size
    3. **Transaction timestamp**
    4. Transaction duration

**SECTION-B (5\*2 mark=10 marks)**

***(All questions are compulsory)***

1. What is the output of the following program?

DECLARE

x NUMBER := 1;

BEGIN

WHILE x <= 5 LOOP

x := x + 2;

END LOOP;

DBMS\_OUTPUT.PUT\_LINE(x);

END;

1. 3
2. 5
3. **7**
4. 9

12) Which type of cursor is implicitly used for most SQL statements in PL/SQL?

1. **Implicit Cursor**
2. Explicit Cursor
3. Strong Cursor
4. Weak Cursor

13) DECLARE

CURSOR employee\_cur IS

SELECT emp\_name, emp\_salary FROM employees;

BEGIN

-- Cursor operations here

END;

What is the purpose of the cursor employee\_cur in the code above?

1. It defines a variable to store the employee name.
2. It defines a variable to store the employee salary.
3. It establishes a connection to the database.
4. **It defines a named query to retrieve data from the employees table.**

14) Consider the following package specification:

CREATE OR REPLACE PACKAGE my\_package AS

PROCEDURE proc1(p\_param1 NUMBER, p\_param2 VARCHAR2);

END;

/

Which of the following statements is used to call the 'proc1' procedure and pass the appropriate parameters?

1. CALL my\_package.proc1(10, 'Hello');
2. EXEC my\_package.proc1(10, 'Hello');
3. my\_package.proc1(10, 'Hello');
4. **EXECUTE my\_package.proc1(10, 'Hello');**

15) CREATE OR REPLACE TRIGGER prevent\_update\_salary

BEFORE UPDATE OF salary ON employees

FOR EACH ROW

BEGIN

IF :NEW.salary < :OLD.salary THEN

RAISE\_APPLICATION\_ERROR(-20001, 'Salary cannot be decreased.');

END IF;

END;

What will happen when an attempt is made to update the salary of an employee to a lower value?

1. The trigger will silently ignore the update.
2. **The trigger will raise a custom application error with the message "Salary cannot be decreased."**
3. The trigger will delete the employee record.
4. The trigger will update the salary without any issue.

**SECTION-C(Coding Question) (4x5 marks=20 marks)**

16**)** Write a PL/SQL program to check if a given number is even or odd.

Solution:

**DECLARE**

**num NUMBER;**

**BEGIN**

**num := &num\_input;**

**IF num MOD 2 = 0 THEN**

**DBMS\_OUTPUT.PUT\_LINE(num || ' is an even number.');**

**ELSE**

**DBMS\_OUTPUT.PUT\_LINE(num || ' is an odd number.');**

**END IF;**

**END;**

17) Create a PL/SQL procedure that finds and displays the maximum of three given numbers.

Solution:

**CREATE OR REPLACE PROCEDURE find\_maximum(a IN NUMBER, b IN NUMBER, c IN NUMBER) IS**

**max\_num NUMBER;**

**BEGIN**

**IF a >= b AND a >= c THEN**

**max\_num := a;**

**ELSIF b >= a AND b >= c THEN**

**max\_num := b;**

**ELSE**

**max\_num := c;**

**END IF;**

**DBMS\_OUTPUT.PUT\_LINE('Maximum: ' || max\_num);**

**END;**

**/**

18) Create a PL/SQL Package to Convert Temperature from Celsius to Fahrenheit.

Solution:

**CREATE OR REPLACE PACKAGE Temperature\_Converter\_Pkg AS**

**FUNCTION Celsius\_To\_Fahrenheit(celsius NUMBER) RETURN NUMBER;**

**END Temperature\_Converter\_Pkg;**

**/**

**CREATE OR REPLACE PACKAGE BODY Temperature\_Converter\_Pkg AS**

**FUNCTION Celsius\_To\_Fahrenheit(celsius NUMBER) RETURN NUMBER IS**

**fahrenheit NUMBER;**

**BEGIN**

**fahrenheit := (celsius \* 9/5) + 32;**

**RETURN fahrenheit;**

**END;**

**END Temperature\_Converter\_Pkg;**

**/**

19) Create a trigger that updates the "last\_modified" column of a record whenever the "status" column of the same record is updated in the "orders" table.

Solution:

**CREATE OR REPLACE TRIGGER tr\_update\_last\_modified**

**AFTER UPDATE OF status ON orders**

**FOR EACH ROW**

**BEGIN**

**UPDATE orders**

**SET last\_modified = SYSDATE**

**WHERE order\_id = :NEW.order\_id;**

**END;**

**/**