**Institute of Information Technology & Management**

**Lesson Plan for Data Base Management System Lab**

**Programme: BCA Semester: II Paper Code: BCA 176 Academic Year: 2021-2022**

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| **CO#** | **Detailed Statement of the CO** | **BT Level** | **Mapping to PO** # |
| COJ | Understand the structure and design of relational databases. | BT2 | PO3 |
| CO2 | Write DDL statements in SQL to create, Modify and remove database objects | BTLl,BTL3, BTL4 | P03 , PO5 |
| C03 | Use constraints for the database | BTLl,BTL2, BTL3 | PO3,PO5 |
| CO4 | Write DML statements in SQL to inse1t , Modify and remove data from database | BTL4 | PO3,PO5 |
| CO5 | Write SQL statements to retrieve data based on the conditions provided by the user | BTLI , BTL2, BTL3 | PO3,PO5 |
| CO6 | Use index and Views in database | BTL2 | PO3,PO5 |
| CO7 | Use structured query language (SQL) to an intermediate /advanced level | BTL5, BTL6 | PO4 |

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| **Practical No** | **Application Area/Functionality/ Concept Details** | **Problem Statement** | **No of Hrs. All’ted (Per Grp)** | **Date Of Completion** |
| **1** | Introduction To Oracle | 1.1 Introduction To Oracle:  1.2 Oracle Versions:  1.3 Current Version:-  1.4 Login Procedure:- | **1** |  |
| **2** | SQL Introduction | 2.1 **History of SQL and component languages:**  1. Data Definition Language (DDL)  2.Data Manipulation Language (DML)  3. Data Control Language (DCL  2.2 **SQL Datatypes** | **1** |  |
| **3** | **DDL Commands Syntax**   * CREATE with constraints   -PRIMARY KEY  -UNIQUE  -NOT NULL  -CHECK   * ALTER * MODIFY * DROP * TRUNCATE | **3.1 SQL DDL COMMANDS SYNATX**  **1. CREATE command syntax with column level constraints**  **2. CREATE command syntax with table level constraints**  **3. ALTER to add column, remove column, add constraint and remove constraint**  **4. MODIFY**  **5. DROP**   1. **TRUNCATE** 2. **RENAME (Column and Table)** | **2** |  |
| **4** | **DML Commands**  INSERT  SELECT  DELETE | **3.2 SQL DDL EXERCISE1**   1. **Create a table student containing a unique roll no., address, date of birth where year should be greater than 1992, phone no., course which should only be either MCA or MBA.** 2. **Create a table marks containing roll no. as foreign key from student table, exam date, exam name and marks of 3 subjects.** 3. **Insert atleast 10 records in above tables** 4. **Alter student table to add two new column city& hobby with city name from four fixed.** 5. **Alter marks database table to add new percent column.** 6. **Drop column hobby from student table.** 7. **Rename student table to stud table.** | **2** |  |
| **5** | To understand Create, Insert and Select command | create table client with following columns  Client\_id varchar(6),  name varchar(25),  city varchar(20),  pincode int(8),  state varchar(5),  balance int(10,2)  Describe the structure of above table client?  Insert 10 rows into given tables?  Write a command show all tables?  List all the clients from table client?  List clients located in mumbai for table client?  Find the names of client whose balance is 30,000 in client table | **2** |  |
| **6** | **SQL DML COMMANDS SYNTAX** | **4.1 Write down general syntax of following commands and explain with example**   1. INSERT 2. INSERT with & 3. INSERT with NULL values 4. UPDATE 5. DELETE 6. SELECT & SELECT WITH WHERE 7. SELECT USING OPERATORS (=, <,>,<>, <=, >=, AND , OR , NOT , BETWEEN, IN ,LIKE) | **2** |  |
| **7** |  | **4.2 SQL DML EXERCISE**  1. Find details of all students of 'MCA'  2. Find details of all students between 1990 to 2014  3. Find name and roll no of all students with middle name 'Singh'  4. Find student scoring marks below 70 in any one subject.  5. Find details of student have name starting with 'S'.  6. Find details of students having all subject marks between 75 and 90.  7. Find details of students having marks above 60 in all subjects.  8. Find the name, dob, age of all students having age>=20.  9. Delete all students record without dob.  10. Update City value in student table.  11. Find the name of the students living outside Delhi.  12. Update percentage in marks table (as (s1+s2+s3)/3). | **2** |  |
| **8** | To understand Alter, Drop command | Create a table Supplier with the following structure.  suplierid int(5);  name varchar(10);  S\_code int(5);  Deposit int(7);  Describe the above table after inserting 10 rows in the table supplier.  Add new columns pin code, city to the table supplier.  Change the size of pin code or the width of pincode to 6.  Add a primary key after table creation.  Add a not null constraint.  Drop a not null constraint.  To add a primary key constraint to the table supplier | **2** |  |
| 9 | **Operators**  **Relational Operators** (<,>,=,<=,>=,<>)  **Logical Operators** (AND, OR, NOT)  **Set Comparison Operators**  IN / NOT IN  IS NULL / IS NOT NULL / BETWEEN /  LIKE | Create the following tables populate the tables and answer the queries given below: (Apply all integrity constraints applicable).  **Sailors** (Sid: integer, Sname:string, Rating:integer, Age:integer, Income:real)  **Boats** (Bid: integer, Bname:string, Color:string)  **Reserves** (Sid:integer,Bid:integer,dob:date, dot:date) | 2 |  |
| 10 |  | **Execute the following DDL commands:**  1. Create table Sailors & Boats.  2. Alter table sailors.  3. Add check constraints.  4. Insert data into table Sailors & Boats.  5. Create duplicate table for Sailor.  6. Use of Drop table command.  7. Create table Reserves with foreign key constraint.  8. Alter table Reserve - add composite primary key.  9. Insert data into Reserve tables.  10. Delete data from sailor or boat table. | 2 |  |
| 11 | SELECT with **ORDER BY** | **Solve the following queries:**  1. Find the names of all sailors with a rating above 8.  2. Find the Id of sailors who have reserved boat number 104.  3. Find the names of all sailors with income above 5000.  4. Find the names of all sailors with income between 5000 to10000.  5. Find the names of all ‘brown’ color boats.  6. Find the names of all sailors having either rating above 7 or income above 6000.  7. Find the details of all boats reserved from 1st Jan 2011 to 10th Jan 2011.  8. Find the names of sailors who have reserved a ‘black’ or ‘brown’ boat.  9. Find the details of sailors having names starting from ‘R’.  10. Find the details of sailors having names middle name as ‘Kr’ and rating between 5-6  11. Find the names of sailors whose names begins and ends with ‘S’ and has atleast three characters.  12. Find the ids of all ‘brown’ color boats in ascending order. | 2 |  |
| 12 | To understand  Advanced DML Commands and Logical Operators in SQL. | Create table customer with the fields;  customer id,  firstname,  lastname,  city,  state,  pincode;  Insert 10 rows into the table customer.  Display the content of customer table.  Display customer id and first name of customers.  Display first name, last name and state of all the customers.  Display all records from the customer table where the state is Delhi.  Display first names, last name of customers concatenated with state and name it as customer and their location.  Display the records of those customers who pin-code is not entered.  Display the states to which all the customers belong.  Select records of customers from Delhi having name rajeev.  Display records of customers of state Delhi or Mumbai;  Display the names of customer where customer id is 5.  Display details of customer expect the customer with customer id=5.  Retrieve all rows where customer\_id is between 10 and 50.  Display those rows where name begins with letter t.  Display all rows where first\_name contains the letter raj. | 2 |  |
| 13 | **Functions Introduction**  **String:** Lower, Upper, Initcap, Concat, Substr, Length, Instr, Lpad, Rpad, Trim, Replace | **Queries on string and math functions**  1. Show the details of sailors in Lower order  2. Show the details of boats in Upper order  3. Show the details of boats in initcap order.  4. Find concatenation between two words using ||  5. Find concatenation between two words using concat  6. Find the position of letters in a word.  7 Find first five letters in a word  8. Perform ltrim and rtrim on a string  9. Find ASCII code in a word  10. Find length of any string.   1. Perform lpad & rpad on a string | 2 |  |
| 14 | **Numeric:** Round, Trunc, Mod,Arithmetic Operators, | 1. Perform round, truncate of 50.789. 2. Perform ceil of 50.789. 3. Perform abs of 50.789, 50.90000000. 4. Perform power function. 5. Find square root of 36. 6. Find 50 mod 100. | 2 |  |
| 15 | **Date:** Months\_between, Add\_months, Last\_day, Round, Trunc  **Conversion:**To\_char, To\_date, To\_number | 1. Find the date 3 months from the today 2. Find last day of month. 3. Find next day of month. 4. Find the month between of year. 5. Find the date 15 days from the current date. 6. Convert the date in character to date format. 7. Print the date in dd-mm-yy format. | 2 |  |
| 16 | Introduction To Joins,  **Various Joins**  **-**INNER JOIN / EQUI JOIN  -OUTER JOIN  Right Outer Join  Left Outer Join  Full Outer Join  -CROSS JOIN  -SELF JOIN | **7.1 General syntax and notes on types of Join**  1     Equi join  2     Non-equi join  3     Self join  4     Natural join  5     Cross join  6     Outer join | 2 |  |
| 17 | **Aggregate Operators**  -MIN, MAX, SUM, COUNT, AVG | **7.2 Queries on JOINS**  1.Perform the equijoin on sailor and reserve table  2.Perform the inner join on boat and reserve table  3.Perform the outer join on sailor and reserve table  4. Perform the equijoin on sailor, boat and reserve table  5. Find the details of sailors who have reserved boat number not as 104.  6. Find the names of sailors who have reserved a ‘black’ or ‘brown’ boat.  7. Find the color of boats reserved by ‘Sam’.  8. Find the names of sailors who have reserved atleast one boat.  9. Find the sids of sailors who have a rating 5 or have reserved boat number 101.  10. Find the names of sailors who have not reserved a black boat.  11. Find the names and sids of sailors whose rating is better than some sailor called Lobo.  12. Find the sailors with highest rating.  13. Find the names and sids of sailors who have reserved all boats. | 2 |  |
| 18 | **Group By and Having Clause**  **Set Operators**  ­­-UNION  -INTERSECT  -MINUS  **Complex Queries**  -Nested Queries & Correlated Nested Queries | **7.3 Group by, having clause, group value functions**  14. Find the average age of all the sailors.  15. Find the average age of sailors with a rating of 10.  16. Find the name and age of the oldest sailor.  17. Count the number of sailors.  18. Find the names of sailors who are younger than the oldest sailor with a rating of 10.  19. Count the number of different sailor names.  20. Find the age of youngest sailor for each rating level.  21. Find the age of youngest sailor who is eligible to vote for each rating level with atleast two such sailors.  22. Find the average age of sailors for each rating level that has atleast two sailors.  23. Find those ratings for which the average age of sailors is the minimum of overall ratings.  24. Find the names of sailors who have reserved a ‘black’ or ‘brown’ boat. | 2 |  |
| 19 | To understand Aggregate/Grouping Functions | Create table employee with following attributes  Emp\_no, emp\_name(notnull),salary(not null),phone\_number,designation,department no.  Insert 8 rows tuples in employee table.  Find average and total salary of all employees?  Find min salary of manager?  Find max salary of the manager?  How many employees are managers find out?  Add 50 % salary to the salary column and name it as HRA?  Count the total no of employees.  Count the no departments available.  Count the no of employees in each department.  Update the commission to 10% of salary for all the employees having salary greater than 50,000?  Find the salary of lowest paid employees for each department?  Update the salary of all employees in department no 5 by hiking it by 15%.  Find out the different between highest and lowest salary of each department.  List average salary of all the departments which have more than 2 employees.  List type of designation off all the employees’ fair maximum salary is greater than equal to 40,000.  List average salary of each employee excluding manager. | 2 |  |
| 20 | To understand Sub queries | Create table employee with fields empno(primary key), salary, dno(not null), dname, ename.  Insert 8 tuples in table employ.  Find the details of those employs whose salary is equal to MAX salary in the organization.  Find the details of those employs who earn less than AVG salary in organization.  Find department name where SCOTT works.  Find detail of those employs that drew more than avg salary in organization.  Find the details of those employs that drew the highest salary.  Find the details of the employ provided at least 2 people work in the department 30. | 2 |  |
| 21 | To understand  Views | Create a table employee with the following attributes e.no(Primary key),ename,ecity,salary,dept\_no?  Insert 8 rows into the table employee?  Create a view having ename and city?  In the above view update the ecity to delhi where the ename is JOHN?  Create a view containg ename, city, deptno, salary?  Update the view by increasing the salary of all employees of dept no 10 by rs 5000?  Create view having details of employee working in dept no 10.  Create a view having grouping function max (salary), min (salary).  Update the above view set the max salary to 9000 and observes the result.  Drop the view. | 2 |  |
| 22 | **PL/SQL Programming**  **CONDITIONAL CONTROLS** | 1. Write a simple PL/SQL block to show the use of begin and end section.  2. Write a simple PL/SQL block of code to demonstrate the use of declare section.  3. Write a program to demonstrate the use of if-end if control  4. Write a PL/SQL block of code to demonstrate use of IF-THEN-ELSE-ENDIF control.  5. Write a PL/SQL block of code to demonstrate use of IF-THEN-ELSEIF-ELSE-ENDIF control. | 2 |  |
| 23 | **ITERATIVE CONTROLS** | 6. Create a simple loop which displays the calculated values in a table format.  7. Write PL/SQL code to print the table of a number.  8.Write a PL/SQL block of code for inverting a given number using for loop. | 2 |  |
| 24 |  | 9. Write a PL/SQL block of code to check whether a number entered by the user is Armstrong or not.  10. Write PL/SQL code to print the factorial of a number. | 2 |  |
| 25 |  | .11. Write PL/SQL code to print the pattern  \* \* \* \* \*  \* \* \* \*  \* \* \*  \* \*  \* | 2 |  |
| 26 | **CURSORS** | 12. Write a PL/SQL block of code for demonstrating the use of implicit cursors.  13. Write a PL/SQL block of code for demonstrating the use of explicit cursors.  14. Write a PL/SQL block of code for demonstrating the use of cursors using while loop.  15. Write a PL/SQL block of code to retrieve all employee names and their salary from the table emp\_rec using cursor for loop. | 2 |  |
| 27 | **EXCEPTION HANDLING** | 16. Write a PL/SQL block of code to raise an exception for divide by zero.  17. Write a PL/SQL block of code for demonstrating the use of NO\_DATA\_FOUND exception handler | 2 |  |
| 28 |  | 18. Write a PL/SQL block of code for demonstrating the use of DUP\_VAL\_ON\_INDEX exception handler  19.Write a PL/SQL block of code to raise an application error using numbered exception  20. Write a PL/SQL block of code to reraise an exception from different blocks. | 2 |  |
| 29 | **PROCEDURES, FUNCTIONS AND** | 21. Write a PL/SQL block of code demonstrating the use of procedures  22. Write a PL/SQL block of code demonstrating the use of functions | 2 |  |
| 30 | **TRIGGERS** | 23. Write a PL/SQL block of code demonstrating the use of triggers(after)  24. Write a PL/SQL block of code demonstrating the use of triggers(before) | 2 |  |

**Text Books:**

1. Jason Price, “Oracle Database 10g SQL”, McGarwHill,2004
2. [Scott Urman](http://www.mhprofessional.com/contributor.php?id=17258), [R.Hardman](http://www.mhprofessional.com/contributor.php?id=50745)&[M.McLaughlin](http://www.mhprofessional.com/contributor.php?id=49822), “Oracle Database 10g PL/SQL Programming”, McGarwHill,2004.
3. Ivan Bayross, “SQL, PL/SQL: The Programming Language Of Oracle”, 4th Ed., BpB Pub.,2010.
4. Sham Tickoo and Sunil Raina, “Oracle 11g with PL/SQL Approach”, Pearson, 2010.

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