IST(HONOURS)

SEMESTER- IV

Core Course

C410 - Database Management Systems(6 Credits)

Full Marks 100 (Mid Sem 20 + End Sem 80)

THEORY – 70 (Mid Sem 20 + End Sem 50)

Unit - I

Introduction: Characteristics of Database Approach, Advantages of using DBMS, Data Models Schemas and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces.

Entity Relationship(ER) Modeling: Entity Types, Relationships, Constraints, ER Diagram

Unit- II

Relational Model: Relational Model Concepts, Relational Constraints, Relational Algebra – Unary Operations and Operations from Set Theory, SQL and Basic SQL Queries, Examples of Queries in Relational Algebra, Relational Calculus

Unit- III

Database Design: Relational Database Design using ER-To-Relational Mapping, Design Guidelines, Functional Dependencies, Lossless Decomposition, Normal Forms (1NF, 2NF, 3NF and BCNF).

Unit - IV

Transaction Processing: ACID Properties, Recoverability and Serializability, Concurrency Control – Two Phase Locking, Timestamp, Multiversion and Validation, Recovery – Deferred Update and Immediate Update, Shadow Paging

Unit- V

File Structure and Indexing: Secondary Storage and Files, Operations on Files, Files of Unordered and Ordered Records, Overview of File Organizations, Indexing Structures for Files (Primary Index, Secondary Index, and Clustering Index), Multilevel Indexing using B Trees and B+ Trees.

Reference Books:

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
3. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.

PRACTICALS – 30(End Semester Evaluation)

Create and use the following database schema to answer the given queries.

EMPLOYEE Schema

Field	Type	NULL	KEY	DEFAULT
Eno	Char(3)	NO	PRI	NIL
Ename	Varchar(50)	NO	NIL	Job_type
	Varchar(50)	NO	NIL	Manager
	Char(3)	Yes	FK	NIL

Hire_date	Date	NO	NIL	Dno
	Integer	YES	FK	NIL
Commission	Decimal(10,2)	YES	NIL	Salary
	Decimal(7,2)	NO	NIL	

DEPARTMENT Schema

Field	**Type**	**NULL**	**KEY**	**DEFAULT**
Dno	Integer	No	PRI	NULL
Dname	Varchar(50)	Yes		NULL
Location	Varchar(50)	Yes		New Delhi

Query List :

1. Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.
2. Query to display unique Jobs from the Employee Table.
3. Query to display the Employee Name concatenated by a Job separated by a comma.
4. Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.
5. Query to display the Employee Name and Salary of all the employees earning more than $2850.
6. Query to display Employee Name and Department Number for the Employee No= 7900.
7. Query to display Employee Name and Salary for all employees whose salary is not in the range of $1500 and $2850.
8. Query to display Employee Name and Department No. of all the employees in Dept 10 and Dept 30 in the alphabetical order by name.
9. Query to display Name and Hire Date of every Employee who was hired in 1981.
10. Query to display Name and Job of all employees who don't have a current Manager.
11. Query to display the Name, Salary and Commission for all the employees who earn commission.
12. Sort the data in descending order of Salary and Commission.
13. Query to display Name of all the employees where the third letter of their name is _A'.
14. Query to display Name of all employees either have two _R's or have two _A's in their name and are either in Dept No = 30 or their Manger's Employee No = 7788.
15. Query to display Name, Salary and Commission for all employees whose Commission Amount is 14 greater than their Salary increased by 5%.
16. Query to display the Current Date.

17. Query to display Name, Hire Date and Salary Review Date which is the 1st Monday after six months of employment.

18. Query to display Name and calculate the number of months between today and the date each employee was hired.

19. Query to display the following for each employee <E-Name> earns < Salary> monthly but wants < 3 * Current Salary >. Label the Column as Dream Salary.

20. Query to display Name with the 1st letter capitalized and all other letter lower case and length of their name of all the employees whose name starts with _J', 'A' and _M'.

21. Query to display Name, Hire Date and Day of the week on which the employee started.

22. Query to display Name, Department Name and Department No for all the employees.

23. Query to display Unique Listing of all Jobs that are in Department # 30.

24. Query to display Name, Dept Name of all employees who have an _A' in their name.

25. Query to display Name, Job, Department No. and Department Name for all the employees working at the Dallas location.

26. Query to display Name and Employee no. Along with their Manger's Name and the Manager's employee no; along with the Employees' Name who do not have a Manager.

27. Query to display Name, Dept No. And Salary of any employee whose department No. and salary matches both the department no.And the salary of any employee who earns a commission.

28. Query to display Name and Salaries represented by asterisks, where each asterisk (*) signifies $100.

29. Query to display the Highest, Lowest, Sum and Average Salaries of all the employees

30. Query to display the number of employees performing the same Job type functions.

31. Query to display the no. of managers without listing their names.

32. Query to display the Department Name, Location Name, No. of Employees and the average salary for all employees in that department.

33. Query to display Name and Hire Date for all employees in the same dept. as Blake.

34. Query to display the Employee No. And Name for all employees who earn more than the average salary.

35. Query to display Employee Number and Name for all employees who work in a department with any employee whose name contains a _T'.

36. Query to display the names and salaries of all employees who report to king.

37. Query to display the department no, name and job for all employees in the Sales department.

[SQL COMMANDS]

1. SQL* formatting commands
2. To create a table, alter and drop table.

3. To perform update, insert and delete operation in a table.
4. To perform different type of query using select in a table.
5. To make use of different clauses viz where, group by, having, order by.
6. To make use of special operator - in, any, all, between, exists, like etc.
7. To study different constraints.

[SQL FUNCTION]

8. To use oracle function -aggregate, numeric, conversion.
9. To use oracle function -string function, date/time functions
10. To understand use and working with joins.
11. To make use of transaction control statement viz rollback, commit and save point.
12. To make views of a table.
13. To make indexes of a table.
14. To make use synonyms on database object.

[PL/SQL]

15. To understand working with PL/SQL
16. To make use basic and composite data types.
17. To make use variable and constants in PL/SQL.
18. To implement PL/SQL conditional statements.
19. To implement PL/SQL Iterative statements.
20. To implement Cursor on a table.