JHARKHAND Rai University RANCHI

PRACTICE SET

End Semester Examination, Dec- 2025

Program: MCA
Semester: I
Subject: Advance Database Management System
Subject Code: 3CIT101

Course Outcomes	Description
CO1	Identify advance database concepts and database models.
CO2	Apply and analyze various terms related to transaction management in centralized and distributed database.
CO3	Produce data modelling and database development process for object –oriented DBMS.
CO4	Analyze and Implement the concept of object- relational database in development of the various real time software. Examine the issues related to multimedia and mobile database performance.

SECTION A

(EACH QUESTION CARRIES 5 MARKS)

1. What is the purpose of Database System? **[CO1][UNIT 1][REMEMBER,LOT]**

2. Define Aggregation along with an example. **[CO1] [UNIT 1][[REMEMBER,LOT]**

3. Explain Database Architecture. **[CO1] [UNIT 1][[UNDERSTAND,LOT]**

4. Compare between Degree and Cardinality. **[CO1] [UNIT 1][[ANALYSE,LOT]**

5. Differentiate between Multi-valued attribute and Derived attribute along with an example of each. **[CO1] [UNIT 1][[ANALYSE,LOT]**

6. Differentiate between Relational Algebra and Relational Calculus. **[CO1] [UNIT 2] [ANALYSE,LOT]**

7. Differentiate between Universal Quantifier and Existential Quantifier. **[CO2] [UNIT 2] [ANALYSE,LOT]**

8. Explain functional dependency concepts. **[CO2] [UNIT 2] [UNDERSTAND,LOT]**

9. Define BCNF .How does it differ from 3NF. **[CO2] [UNIT 2] [REMEMBER,LOT]**

10. What are the pitfalls in relational database design? **[CO3][UNIT 3] [REMEMBER,LOT]**

11. Define the term "functional dependency" and provide an example. **[CO3] [UNIT 3] [REMEMBER,LOT]**

12. What is the primary objective of decomposition in DBMS? **[CO3] [UNIT 3] [REMEMBER,LOT]**

13. Illustrate the state of Transaction. **[CO4][UNIT 4] [APPLY,HOT]**

14. Define Active state, partially committed state and failed state of a transaction. **[CO4] [UNIT 4][REMEMBER,LOT]**

15. Define Transaction, Advantages of a transaction and some real world examples of a transaction. **[CO4] [UNIT 4] [REMEMBER,LOT]**

16. Describe Consistency property of a transaction along with an example. **[CO4] [UNIT 4] [REMEMBER,LOT]**

17. Describe Equi-join operation in SQL along with an example. **[CO4] [UNIT 5] [REMEMBER,LOT]**

18. Explain Distributed database and its two types. **[CO4] [UNIT 5] [UNDERSTAND,LOT]**

SECTION B

(EACH QUESTION CARRIES 10 MARKS)

19. List the Role and Duties of DBA. **[CO1] [UNIT 1] [REMEMBER,LOT]**

20. Describe the types of Relationship exist in ER Model along with suitable diagrams. **[CO1] [UNIT 1][REMEMBER,LOT]**

21. Classify the Data Models. **[CO1] [UNIT 1] [ANALYSE,HOT]**

22. Write a note on the Conceptual database design using Relational model. **[CO1] [UNIT 1] [REMEMBER,LOT]**

23. Illustrate about integrity and key constraints with suitable examples? Describe Attribute and its types. **[CO2] [UNIT 1] [APPLY,HOT]**

24. Explain 1NF, 2NF and 3NF and BCNF with suitable example. **[CO1] [UNIT 1] [UNDERSTAND,LOT]**

25. Let R = (A, B, C, D, E, F) be a relation scheme with the following dependencies- {C → F, E → A, EC → D, A → B} Determine the total number of candidate keys. **[CO4] [UNIT 1] [EVALUATE,HOT]**

26. Define the projection operation in relational algebra and provide an example. **[CO1] [UNIT 1] [REMEMBER,LOT]**

27. Explain all the advance operation in relational algebra with the help of example. **[CO2] [UNIT 2] [UNDERSTAND,LOT]**

28. Given a Student Schema (Roll_no, Name, Marks). Find the names of all students whose marks are greater than 70.(using Relational Algebra) **[CO4] [UNIT 2] [EVALUATE,HOT]**

29. Describe the term Domain Relational Calculus and Tuple Relational Calculus. **[CO2] [UNIT 2] [REMEMBER,LOT]**

30. Write a short note on the Relational Algebra along with an example. **[CO2] [UNIT 2] [REMEMBER,LOT]**

31. Differentiate between lossless and lossy decomposition. Provide examples for each. **[CO2] [UNIT 3] [ANALYSE,LOT]**

32. Write a short note on 4NF and 5NF along with an example. **[CO2] [UNIT 3] [REMEMBER,LOT]**

33. Given a Relation R(A,B,C,D) **[CO4] [UNIT 3] [EVALUATE,HOT]**

FD= { A-> B ,B->C , C->D } .

Find all possible Candidate keys ?

34. Write a short note on States of a transaction along with a suitable diagram.

[CO1] [UNIT 4] [REMEMBER,LOT]

35. Differentiate between "conflict serializable" and "view serializable" schedules.

[CO2] [UNIT 4] [ANALYSE,HOT]

36. Explain the concept of a "precedence graph" in determining serializability.

[CO3] [UNIT 4] [UNDERSTAND,LOT]

37. Write the comparison of concurrency control protocols.

[CO1] [UNIT 4] [ANALYSE,LOT]

38. In a client-server architecture, what is the role of the client?

[CO3] [UNIT 5][UNDERSTAND,LOT]

39. Write a short note on 3-Tier Client Server Architecture.

[CO1] [UNIT 5] [REMEMBER,LOT]

40. Explain the concept of data replication in distributed databases. What are its advantages and challenges? **[CO2] [UNIT 5] [UNDERSTAND,LOT]**

41. Discuss the concurrency control and recovery in distributed databases.

[CO2] [UNIT 5] [UNDERSTAND,LOT]

SECTION C

(EACH QUESTION CARRIES 20 MARKS)

42. Illustrate the difference between the natural join and the cross join in relational algebra with the help of example. **[CO3] [UNIT 1] [APPLY,HOT]**

43. **[CO4][UNIT 1][EVALUATE,HOT]**

a. Consider the universal relation R= {A, B, C, D, E, F, G, H, I, J} and the set of functional dependencies f = {AB → C, A → D, B → F, F → GH, D → IJ}.What is the key for R? Find the Highest NF, justify your answer.

b. Describe the Cardinality Ratios with suitable diagrams.

44. The following relation are given: **[CO4][UNIT 1] [EVALUATE,HOT]**

a. Calculate the natural join operation on R1 and S1 relation.

sid	bid	day
22	101	10/10/96
58	103	11/12/96

R1

sid	sname	rating	age
22	dustin	7	45.0
31	lubber	8	55.5
58	rusty	10	35.0

S1

b. Calculate the left outer join, right outer join, full outer join on relation PEOPLE and MENU.

PEOPLE:

Name	Age	Food
Alice	21	Hamburger
Bill	24	Pizza
Carl	23	Beer
Dina	19	Shrimp

MENU:

Food	Day
Pizza	Monday
Hamburger	Tuesday
Chicken	Wednesday
Pasta	Thursday
Tacos	Friday

45. Create the tables given below: **[CO4] [UNIT 2] [EVALUATE,HOT]**

emp(empno, ename, job, mgr, sal, comm, deptno, gender). Find the SQL Query for the following:-

(a) List all department numbers, employee numbers and their managers numbers in descending order of deptno from emp table.

(b) List the employee names, who are not eligible for commission.(salary having >15,000 eligible for commission)

46. **[CO3][UNIT 2] [APPLY,HOT]**

a).Illustrate the usage of SQL GROUP BY, ORDER BY and HAVING clauses with example.

b). The SQL SUM function is used to select the sum of values from numeric column.

i. The SQL AVG function retrieves the average value for a numeric column.
ii. The SQL MIN function selects the smallest number from a numeric column.
iii. The SQL MAX function retrieves the maximum numeric value from a numeric column.

Table Name: A

Name	Salary
Emil	5000
Chang	5000
Emily	4500
Nick	4000

c). with a suitable example, explain the role of functional dependency in the process of normalization.

47. Describe Functional Dependency (FD) and its 5 types (Trivial FD, Non-trivial FD, Multi-Valued FD, and Transitive FD) along with an example for each.

[CO2] [UNIT 3] [UNDERSTAND,LOT]

48. Describe ACID properties of a transaction along with examples

[CO1] [UNIT 4] [REMEMBER,LOT]

49. **[CO4] [UNIT 4][ANALYSE,HOT]**

a. What is a "cycle" in the context of serializability?

b. Which of the following is a conflict serializable schedule?

a. S1: T1 reads X, T2 writes X, T1 writes Y, T2 reads Y
b. S2: T1 writes X, T2 reads X, T1 reads Y, T2 writes Y
c. S3: T1 reads X, T2 reads X, T1 writes Y, T2 writes Y
d. S4: T1 writes X, T2 writes X, T1 writes Y, T2 writes Y

50. **[CO3][UNIT 5] [UNDERSTAND,LOT]**

a. Describe Query Processing in Distributed DBMS along with an example.

b. Explain the impact of data distribution strategies on the performance of distributed query processing.

Summary Sheet:

CO Wise

CO	Q. No	Marks
CO1	1,2,3,4,5,6,,19,20,21,22, 24,25,26,34,37,39,48	
CO2	7,8,9,23,27,29,30,31, 32,35,40,41,47	
CO3	10,11,12,36,38,42,46,50	
CO4	13,14,15,16,17,18, 28,33,43,44,45,49	
Total		

Unit Wise

Unit	Q. No	Marks
Unit 1	1,2,3,4,5,19,20,21,22,23,24,25,26,42,43,44	
Unit 2	6,7,8,9,27,28,29,30,45,46	
Unit 3	10,11,12,31,32,33,47	
Unit 4	13,14,15,16,34,35,36,37,48,49	
Unit 5	17,18,38,39,40,41,50	
Total		

Blooms Taxonomy Level (BTL) Wise

BTL	Q. No	Marks
LOT	1,2,3,4,5,6,7,8,9,10,11,12,14, 15,16,17,18,19,20,22,24,26,27, 29,30,31,32,34,36,37,38,39,40,41,47,48,50	200
HOT	13,21,23,25,28,33,35,42,43,44,45,46,49	220
Total		

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Disclaimer: - This is a Practice Set. The Question in End term examination will differ from the Practice set. This Practice set is meant for practice only.