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Code No. : 14665 N

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (I.T.) IV-Semester Main Examinations, July-2023

Database Management Systems

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	List any four advantages between a file-processing system and DBMS.	2	1	1	1
2.	What is physical and logical data independence?	2	1	1	1
3.	Construct the relational model for the given ER model with appropriate keys.	2	4	2	2
<pre> erDiagram STUDENT --o{ COLLEGE : StudyIn STUDENT { string Stu_Name int Stu_Id string Stu_Addr } COLLEGE { int Col_ID string Col_Name } </pre>					
4.	Consider a relation schema named: Books (Book_name, Publisher, Price) Write a simple query in the relation algebra to Project all the names of a books whose price is below Rs.1000/-.	2	3	2	2
5.	Write a trigger that ignores deletion on sailors table where rating>10.	2	3	3	2
6.	Given FD's are A→B and B→CD applying which Armstrong axiom rules we can generate new FD's.	2	4	3	2
7.	Assume that transaction T1 want to acquire lock(s) on data item A, holding a lock(x) on data item B while another transaction T2 want to acquire lock(s) on data item B as well it is holding a lock(x) on data item A, check whether the request lead to deadlock or not. If so, how do you resolve it?	2	3	4	2
8.	Discuss how you assign the read-timestamp and write timestamp for a data item?	2	1	4	1
9.	Compare RDBMS and NoSQL.	2	2	5	1
10.	Outline the importance of HBASE.	2	1	5	1
Part-B (5 × 8 = 40 Marks)					
11. a)	Explain the different levels of abstraction.	4	2	1	1
b)	List the responsibilities of Storage manager, Transaction Manager and Query Processor.	4	1	1	1

12. a) Consider the following relational schema:

Employee (person_name, street, city)

Works (person_name, company_name, salary)

Company (company_name, city)

Manages (person_name, manager_name)

Write the following queries in relational algebra:

- Find the names of all employees who work for First Bank Corporation.
- Find the names and cities of residence of all employees who work for First Bank Corporation.
- Find the names, street address, and cities of residence of all employees who work for First Bank Corporation and earn more than \$10,000 per annum.

b) Discuss the types of joins and explain full outer join, left outer join and right outer join between the Mentor and Mentee tables in SQL.

Mentor:

Mentor Id	Mentor Name	Mentee Id
1020	Prabhu	1
2010	Sharan	2
2050	Keerthi	3
4010	Ganesh	1

Mentee:

Mentee Id	Mentee Name
1	Anna
2	Shree
3	Shashank

13. a) Explain the importance of referential integrity constraints on relations in SQL with an appropriate examples.

b) Convert the following schema to BCNF, showing all intermediate stages, that is, 1NF, 2NF and 3NF Schema:

R (Faculty, Dean, Department, Chairperson, Professor, Rank, Student)

The set of FDs satisfied by R:

Faculty \rightarrow Dean

Dean \rightarrow Faculty

Department \rightarrow Chairperson

Professor \rightarrow Rank, Chairperson

Department \rightarrow Faculty

Student \rightarrow Department, Faculty, Dean

(Professor, Rank) \rightarrow Department, Faculty

4 4 2 2

4 3 2 2

4 2 3 1

4 3 3 2

14. a)	Explain the deferred and immediate modification versions of log-based recovery Schemes.	4	2	4	1
b)	What are the two strategies for deadlock prevention in a concurrency control scheme of a database, briefly explain.	4	2	4	1
15. a)	Explain CAP theorem, BASE theorem, and state which theorem is implemented in NoSQL.	4	3	5	2
b)	Briefly discuss how HBASE implements column-oriented database with an example.	4	1	5	1
16. a)	Design an E-R diagram for keeping track of the exploits of your favorite sports team. You should store the matches played, the scores in each match, the players in each match and individual player statistics for each match. Summary of the statistics should be modeled as derived attributes. (Hint: Entities-Match, Played, Player)	4	3	1	2
b)	Explain about different set operations performed in SQL with an example for each operation.	4	2	2	1
17.	Answer any <i>two</i> of the following:				
a)	Differentiate between stored procedures and stored functions in PLSQL. Write a PLSQL stored procedure which takes Roll_no of a Student as a parameter and displays the details of that Student. Handle all possible exceptions.	4	3	3	2
b)	Explain in detail the phases involved in ARIES algorithm with suitable example?	4	2	4	1
c)	Write any five significant differences between Firebase and MongoDB.	4	2	5	1

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	37.5%
iii)	Blooms Taxonomy Level – 3 & 4	42.5%
