

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

M.E DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

First Semester

Computer Science and Engineering

PCSB2402 - Database Practices

Regulations – 2024

Duration : 3 Hrs

Maximum : 100 Marks

PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

Q.No	Questions	BLT	CO	Marks
1.	List out the different types of data models.	UN	1	2
2.	Summarize the different fundamental operations used in relational algebra.	UN	1	2
3.	List the various protocols used to maintain the concurrency in a distributed database.	RE	2	2
4.	How will you handle deadlock in a distributed database?	UN	2	2
5.	Differentiate between structured, semi-structured, and unstructured data.	UN	3	2
6.	Examine the various SQL functions used for creating XML data.	AN	3	2
7.	What is the role of CAP theorem in NOSQL database?	RE	4	2
8.	Elucidate the storage and distributed system methods used in Hbase.	UN	4	2
9.	Distinguish between discretionary access control and mandatory access control.	UN	5	2
10.	Discuss the various challenges to maintain database security.	UN	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

Q.No	Questions	BLT	CO	Marks
11.	a i Consider the following relational database and write the SQL commands for the following: branch (<u>bname</u>, bcity, assets) Customer (<u>cname</u>, cstreet, ccity) loan (<u>loan #</u>, bname, amount) borrower (<u>cname</u>, <u>loan#</u>) account (<u>acc#</u>, bname, balance) depositor (<u>cname</u>, <u>acc#</u>) i) Insert a new customer in customer table. ii) Update any one record in depositor table. iii) Find all customers of the bank who have an account but not a loan. iv) Find all loan numbers with a loan value greater than Rs.10,000.	AP	1	8
	ii Consider the following two tables. Using SQL, write queries to demonstrate the different types of joins:	AP	1	5

Employee Table

ID	Name	Department_id
1	Alice	1
2	Bob	2
3	Charlie	Null

Departments Table

ID	Department_name
1	HR
2	IT
3	Marketing

- i. To list employees and their departments
- ii. To show all employees and their departments, including those without a department
- iii. To list all departments and their employees, including those departments with no employees
- iv. To show all employees and all departments, regardless of whether they have matches

Or

- b Draw an E-R diagram for an university enterprise. Find the primary keys, foreign keys, strong entity, weak entity and derived attributes. AP 1 13

teaches (ID, course id, sec id, semester, year)
 takes (ID, course id, sec id, semester, year, grade)
 prereq (course id, prereq id)
 advisor (s ID, i ID)
 sec course (course id, sec id, semester, year)
 sec time slot (course id, sec id, semester, year, time slot id)
 sec class (course id, sec id, semester, year, building, room number)
 inst dept (ID, dept name)
 stud dept (ID, dept name)
 course dept (course id, dept name)

12. a i Compare and contrast the different approaches used for storing a relation r in a distributed database. AN 2 6

- ii Consider the relational schema for sales and salesperson commissions. Write active rules for keeping the Sum_commissions attribute of SALES_PERSON equal to the sum of the Commission attribute in SALES for each sales person. The rules should also check if the Sum_commissions exceeds 100000; if it does, call a procedure Notify_manager(S_id). Write both statement-level rules and row-level rules and analyze the process. AN 2 7

SALES

<u>S_id</u>	<u>V_id</u>	Commission
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SALES_PERSON

<u>Salesperson_id</u>	Name	Title	Phone	Sum_commissions
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Or

- b Analyze how does two-phase commit protocol (2PC) operate during normal operation, handling failures, carries out recovery and concurrency control process in a distributed database. AN 2 13

13. a i Investigate the various methods for storing XML data, and critically evaluate their strengths and weaknesses in terms of scalability, performance, and ease of use. AN 3 7

- ii Compare and contrast the various approaches in organizing the contents of XML documents to facilitate subsequent querying and data retrieval. AN 3 6

Or

	b	Examine how can XPath path expressions and XQuery queries be utilized within a library management system, comparing their roles and effectiveness in data retrieval and manipulation.	AN	3	13
14.	a	Discuss the document-based NOSQL systems for MongoDB along with its data model, CRUD operations and its characteristics.	UN	4	13
		Or			
	b i	Write brief note on cypher query language of Neo4j.	UN	4	6
	ii	Describe how can the relational operation of join be handled using MapReduce.	UN	4	7
15.	a i	Illustrate with an example how is the granting and revoking of privileges done in a database.	UN	5	7
	ii	Paraphrase the different types of SQL injection types and their risks associated with it.	UN	5	6
		Or			
	b i	Elucidate the role of the following techniques in providing data security a) Symmetric and asymmetric key encryption b) Digital signatures	UN	5	7
	ii	How oracle label-based security architecture provides an adaptable way of controlling access to sensitive data?	UN	5	6

*PART – C (Marks 1*15 = 15)*

<i>Q.No</i>		<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16.	a	Consider the following set of functional dependencies on the relation schema r (A, B, C, D, E). $A \rightarrow BCD$ $BC \rightarrow DE$ $B \rightarrow D$ $D \rightarrow A$ 1. Find the closure of set of functional dependencies 2. Compute F^+ 3. Compute the canonical cover using the given functional dependencies	AN	1	15
		Or			
	b	Give the DTD and XML schema for an XML representation of the following nested-relational schema and discuss: Emp = (ename, ChildrenSet setof(Children), SkillsSet setof(Skills)) Children = (name, Birthday) Birthday = (day, month, year) Skills = (type, ExamsSet setof(Exams)) Exams = (year, city)	AN	4	15