

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

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

Fourth Semester

Information Technology

CS3492 - Database Management Systems

(Common to Computer Science and Engineering)

Regulations - 2021

Duration : 3 Hrs

Maximum: 100 Marks

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

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Define the data model and list the types of data model.	RE	1	2
2.	Compare the difference between primary key and foreign key.	AN	1	2
3.	Infer functional dependency.	UN	2	2
4.	Summarize the normalization.	UN	2	2
5.	Outline the properties of transaction.	AN	3	2
6.	Classify the phases of two phase locking protocol.	UN	3	2
7.	Define RIDE.	RE	4	2
8.	Examine about query evaluation plan.	AN	4	2
9.	List out the advantages of distributed databases.	RE	5	2
10.	Give the limitations of SQL authorization.	UN	5	2

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

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a i Differentiate between the physical level, conceptual level and view level of data abstraction.	AN	1	5
	ii Illustrate the basic architecture of a database management system with the help of a neat block diagram.	UN	1	8
Or				
	b i Demonstrate the select, project, Cartesian product, and join operations in relational algebra with an example.	AN	1	8
	ii Indicate the aggregate operators in SQL with examples.	UN	1	5

12.	a	i	Infer the following relationships with example: a. Many-to-Many b. One-to-One c. One-to-Many d. Many-to-Many	UN	2	8
		ii	A car rental company maintains a database for all vehicles in its current fleet. For all vehicles, it includes the vehicle identification number, license number, manufacturer, model, date of purchase and color. Special data are included for certain types of vehicles. Trucks: cargo capacity Sports car: horsepower, renter age requirement Vans: number of passengers Off-road vehicle: ground clearance, drivetrain (four or two-wheeler drive) Construct an ER model for the car rental company database.	AP	2	5
			Or			
	b		For the following relation R and set of functional dependencies F: R(A, B, C, D, E), F = {AC → E, B → D, E → A }. Show all candidate keys.	AP	2	13
13.	a		Breakdown the steps for conflict serializability and view serializability with an example.	AN	3	13
			Or			
	b	i	Examine the actions that are considered for deadlock detection and the recovery from deadlock.	AN	3	7
		ii	Illustrate deadlock prevention methods with an example.	UN	3	6
14.	a	i	Show the various levels of RAID techniques.	AP	4	5
		ii	Apply the B+ tree to insert the following key elements (order of the tree is 3) 5, 3, 4, 9, 7, 15, 14, 21, 22, 23.	AP	4	8
			Or			
	b	i	Explain query processing and optimization with a clear diagram.	UN	4	7
		ii	Summarize dynamic hashing in detail with an example.	UN	4	6
15.	a	i	Parse the architecture of a distributed database management system with an accompanying diagram.	AN	5	7
		ii	Outline the CAP theorem and its significance in the context of NoSQL databases.	AN	5	6
			Or			
	b	i	Classify the types of database security and discuss common database security issues.	UN	5	7
		ii	Show the SQL Injection Methods with example.	AP	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	Emp(ename,street,city) Works(ename,companyname, salary) Company(companyname,city) Manages (ename, managename) Give the relational algebra expression and SQL query for the following. i. Find the names of all employees who work for First Bank Corporation. ii. Find the names, street address, and cities of residence of all employees who work for first Bank Corporation and earn more than 200,000 per annum. iii. Find the names of all employees in this database who live in the same city as the companies for which they work. iv. Find the names of all employees who earn more than every employees of small bank corporation. v. Show the employee's record whose employees name ends with an alphabet 'A' Or	AP	1	15
	b	Consider the following two transactions: T1: read(A); read(B); if A = 0, then B := B + 1; write(B). T2: read(B); read(A); if B = 0, then A := A + 1; write(A). Add lock and unlock instructions to transactions T1 and T2, so that they observe the two-phase locking protocol. Can the execution of these transactions result in a deadlock? Generalize your view.	AN	3	15