

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025***Third Semester**Artificial Intelligence and Data Science***AD3391- Database Design and Management***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>BTL</i>	<i>CO</i>	<i>Marks</i>
1.	Interpret the meaning of cardinality ratio in an ER model.	L2	1	2
2.	Compare requirements collection in database system development with traditional software development.	L2	1	2
3.	Relate SQL Data Definition Language and SQL Data Manipulation Language.	L1	2	2
4.	Write the SQL command to create a view.	L2	2	2
5.	Differentiate between 3NF and BCNF.	L2	3	2
6.	State Armstrong's inference rules for functional dependencies.	L2	3	2
7.	What is meant by two-phase locking (2PL)?	L1	4	2
8.	List the ACID properties of a transaction.	L1	4	2
9.	Mention two differences between document-based and column-based data models.	L1	5	2
10.	Give an example of an HBase CRUD operation.	L1	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a i Analyze the different phases of the Database System Development Lifecycle. How do they interrelate to ensure a successful database implementation?	L4	1	6
	ii Describe the architecture of a database system and explain the function of each component using a clear diagram.	L4	1	10
	Or			
	b Examine the Entity-Relationship (ER) model by illustrating its key components with neat diagrams, and explain how these components interact to represent real-world data relationships.	L4	1	16
12.	a Build the relational database, write the SQL queries for the questions given below: Emp(eid: integer, ename: string, age:integer, salary: real) Works (eid: integer, did: integer,pcttime: integer) Dept(did: integer, dname: string, budget:real, managerid: integer)	L6	2	16

- i. Write the SQL statements required to create the preceding relations, including appropriate versions of all primary and foreign key integrity constraints.
- ii. Define the Dept relation in SQL so that every department is guaranteed to have a manager.
- iii. Write an SQL statement to add John Doe as an employee with eid = 101, age = 32 and salary = 15,000.
- iv. Write an SQL statement to give every employee a 10 percent raise.
- v. Write an SQL statement to delete the Toy department.

Or

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| b | <p>Create the following relational schema of an employee management system:</p> <p>EMP (EMPID, Name, Department, Company_Name, Salary, Work_Domain, Company_ID) Company (Company_Name, Company_ID, Address, No_of_Employee) Address (EMP_ID, City, Pin_Code)</p> <ol style="list-style-type: none"> a. Create the tables for above schema and establish parent child relationship. b. Find the average salary for all the companies. c. Find the company name, whose employees are living in 642003 Pin_code. d. Delete a company name based on address | L6 | 2 | 16 |
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| 13. | <p>a Demonstrate step-by-step how an ER diagram is mapped to a relational schema. Provide an example with entities, relationships, and attributes.</p> <p style="text-align: center;">Or</p> <p>b Designate in detail about the first, second and third normal forms and normalize the following table using the above-mentioned normal forms.</p> | L2 | 3 | 16 |
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Module	Dept	Lecturer	Text
M1	D1	L1	T1,T2
M2	D1	L1	T1,T3
M3	D1	L2	T4
M4	D2	L3	T1,T5
M5	D2	L4	T6

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| 14. | <p>a Exemplify the ACID properties of transactions with suitable examples. Why are they important?</p> <p style="text-align: center;">Or</p> <p>b Examine how deadlocks may occur in two-phase locking. Suggest techniques for prevention, detection, and recovery.</p> | L4 | 4 | 16 |
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| 15. | <p>a i Sketch the concept of user-defined routines (UDRs) in object databases. Illustrate with a suitable example.</p> <p>ii Deliberate the features of Object Query Language (OQL). Show how OQL supports querying complex objects with an example.</p> <p style="text-align: center;">Or</p> <p>b Illustrate the MongoDB data model. Write and explain CRUD operations (Insert, Find, Update, Delete) with examples.</p> | L2 | 5 | 8 |
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