

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***MCA DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025****Second Semester****Master of Computer Applications****BX4004/PMCVA104 - Database Management Systems****Regulations -2021/2024****Duration : 3 Hrs****Maximum : 100 Marks****PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

Q.No	Questions	BLT	CO	Marks
1.	State the primary purpose of a database system.	L1	1	2
2.	Define a relationship in the context of E-R diagrams.	L1	1	2
3.	Show any two properties of a relational database.	L2	2	2
4.	Write an SQL query to select all records from a table named Employees.	L2	2	2
5.	Consider the relation scheme R (A, B, C) R (A, B, C) with the following functional dependencies: $A, B \rightarrow CC \rightarrow AA$, $B \rightarrow CC \rightarrow A$. Show that the scheme RR is the Third Normal Form (3NF) but not in Boyce-Codd Normal Form (BCNF).	L2	3	2
6.	Why is it important to preserve dependencies during decomposition?	L2	3	2
7.	Demonstrate recoverable schedule with suitable example.	L2	4	2
8.	Illustrate with an example for cascaded rollback.	L2	4	2
9.	Write about B+ tree index file.	L1	5	2
10.	When is it preferable to use a dense index rather than a sparse index?	L2	5	2

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

Q.No	Questions	BLT	CO	Marks
11.	a i Explain about the Three-Schema architecture of a DBMS in detail.	L2	1	8
	i How does it help in achieving data independence? Give an example.	L2	1	8
	Or			
	b i Compare and contrast file systems and database management systems.	L2	1	8
	i Explain the limitations of file systems and how DBMS overcomes them.	L2	1	8
12.	a i Explain the different types of constraints in SQL. Why are they important?	L2	2	8

	i	Apply SQL commands to define and enforce constraints on a table.	L3	2	8
	i				
		Or			
b	i	Describe the concept of integrity constraints in relational database design.	L2	2	8
	i	Identify the different types of integrity constraints with an example.	L3	2	8
	i				
13.	a	i Illustrate the multi-value dependency and the fourth normal form 4NF with an example.	L2	3	8
	i	Discuss about schema refinement in database design.	L2	3	8
	i				
		Or			
b	i	What is Non-loss (Lossless) Decomposition? Why is it important in database design?	L2	3	8
	i	Explain the conditions for non-loss decomposition with an example.	L2	3	8
	i				
14.	a	i What is concurrency control? Illustrate the two-phase locking protocol with an example.	L3	4	8
	i	Describe the ACID properties of a transaction.	L4	4	8
	i				
		Or			
b	i	Discuss view serializability and conflict serializability with examples.	L3	4	8
	i	How are logs used to maintain atomicity and durability during recovery?	L4	4	8
	i				
15.	a	i Demonstrate the structure of B+ tree.	L3	5	8
	i	Write an algorithm for search in the B+ tree with example.	L4	5	8
	i				
		Or			
b	i	How would you apply Indexing techniques? Explain with suitable examples.	L3	5	8
	i	The following key values are organized in an extendable hashing technique. 1 3 5 8 9 12 17 28 show the extendable hash structure for this file if the hash function is $h(X) = X \bmod 8$ and buckets can hold three records.	L4	5	8
	i				