

**Part A**  
**Unit – I**

	<b>Computer Science and Engineering</b>		
	<b>23CS302-Database Management Systems</b>		
	<b>Second</b>		
<b>Q.No</b>	<b>Questions</b>	<b>CO's</b>	<b>Bloom's Level</b>
1.	Define Database Management System and its applications.	CO1	K1
2.	List the advantages of DBMS.	CO1	K1
3.	Classify the levels of abstraction.	CO1	K1
4.	What are the types of data models?	CO1	K1
5.	What is Embedded SQL?	CO1	K1
6.	Define relational algebra.	CO1	K1
7.	What are referential integrity constraints?	CO1	K1
8.	Define SQL .	CO1	K1
9.	List the DML Commands used in SQL.	CO1	K1
10.	Differentiate Delete and Truncate command in SQL.	CO1	K2
11.	List few advanced SQL commands.	CO1	K1
12.	Define instance and schemas.	CO1	K1
13.	List the aggregation functions in SQL.	CO1	K1
14.	Define views.	CO1	K1
15.	What is Derived attribute? Give an Example.	CO1	K1
16.	What is meant by Trigger in Database Management System? Give example .	CO1	K1
17.	Differentiate between Trigger and stored procedure.	CO1	K2
18.	What is the need of embedded SQL?	CO1	K1
19.	Draw the structure of embedded SQL in DBMS.	CO1	K1
20.	List the pros and cons of embedded SQL.	CO1	K1
<b>Part – B</b>			
1.	Explain the basic architecture of a database management system. (16)	CO1	K2
2.	a. Discuss about the different types of model in DBMS.(8) b. Explain in detail about Embedded SQL.(8)	CO1	K2
3.	With relevant example to discuss about the various operations of Relation Algebra. (16)	CO1	K2
4.	Interpret the cons of File Processing System. How they can be overcome by Database Management System (16).	CO1	K2

5.	<p>What are the different types of keys? Explain with example.(8)</p> <p>What are the different types of constraints used in DBMS?(8)</p>	CO1	K2																																			
6.	<p><b>EMPLOYEE</b></p> <table><tr><th>ENO</th><th>NAME</th><th>DOB</th><th>GENDER</th><th>DCODE</th></tr><tr><td>12345</td><td>HAMEN</td><td>24-MAR-2001</td><td>M</td><td>201</td></tr><tr><td>12346</td><td>VINI</td><td>12-MAR-2001</td><td>F</td><td>202</td></tr><tr><td>12347</td><td>ANI</td><td>11-JAN-1999</td><td>F</td><td></td></tr><tr><td>12348</td><td>PETER</td><td>14-FEB-2001</td><td>M</td><td></td></tr></table> <p><b>DEPARTMENT</b></p> <table><tr><th>DCODE</th><th>DNAME</th></tr><tr><td>201</td><td>COMPUTER SC</td></tr><tr><td>202</td><td>INFN SC</td></tr><tr><td>203</td><td>CIVIL</td></tr><tr><td>204</td><td>MECHANICAL</td></tr></table> <p>Consider the above relations:</p> <p>The Primary key of each relation is underlined. Outline Cartesian product, equi join, left outer join, right outer join, full outer join operations in relational algebra.</p> <p>Illustrate the above relational algebra operations with the EMPLOYEE and DEPARTMENT relations. (16)</p>	ENO	NAME	DOB	GENDER	DCODE	12345	HAMEN	24-MAR-2001	M	201	12346	VINI	12-MAR-2001	F	202	12347	ANI	11-JAN-1999	F		12348	PETER	14-FEB-2001	M		DCODE	DNAME	201	COMPUTER SC	202	INFN SC	203	CIVIL	204	MECHANICAL	CO1	K2
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7.	<p>Consider the following relations for a company Database Application:</p> <p>Employee(<u>Eno</u>, Name, Sex, Dob, Doj, Designation, Basic_Pay, Deptno) Department(<u>Dept_no</u>, Name)</p> <p>Project(<u>Proj_no</u>, Name, Dept_no)</p> <p>Worksfor(<u>Eno</u>, <u>Proj_no</u>, <u>Date</u>, Hours)</p> <p>The attributes specified for each relation is self-explanatory. However the business rules are stated as follows. A department can control any number of projects. But only one department can control a project. An employee can work on any number of projects on a day. However an employee cannot work more than once on a project he she worked on that day. The primary keys are underlined.</p> <p>(i) Identify the foreign keys. Develop DDL to implement the above schema.( 5)</p> <p>(ii) Develop an SQL query to list the department number and the number of employees in each department. (5)</p> <p>(iii) Develop a view that will keep track of the department number, the number of employees in the department, and the total basis pay expenditure for each department. (5)</p>	CO1	K2																																			

8.	Explain the different types of commands in SQL with an example.(16)	CO1	K2
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## UNIT II Data Base Design

Q.No	Questions	CO's	Bloom's Level
1.	What is an entity-relationship model?	CO2	K1
2.	What is an entity and entity set?	CO2	K1
3.	Define single valued and multivalued attributes.	CO2	K1
4.	Define null values.	CO2	K1
5.	Define Mapping cardinalities.	CO2	K1
6.	Define the terms Generalization and Aggregation.	CO2	K1
7.	Compare weak and strong entity sets.	CO2	K1
8.	What is ER diagrams?	CO2	K1
9.	What are the steps involved in creating ERD?	CO2	K1
10.	What is normalization?	CO3	K1
11.	Define 1NF.	CO3	K1
12.	Define BCNF.	CO3	K1
13.	Define De-normalization.	CO3	K1
14.	What is sub-class and super class?	CO2	K1
15.	List out the constraints on Specialization and Generalization.	CO2	K1
16.	What is a view in dbms? Why views are used instead of tables?	CO2	K1
17.	Define cardinality with example.	CO2	K1
18.	Define BOYCE CODD normal form.	CO3	K1
19.	What is meant by dependency preserving in dbms?	CO3	K1
20.	Is 3NF is always dependency preserving? Justify.	CO3	K1
<b>Part - B</b>			
1.	Explain about Entity relationship model with ER diagram and example. (16)	CO2	K2
2.	Apply an ER diagram for Banking System. (16)	CO2	K3
3.	What is functional dependency? Explain the types of it with an example. (16)	CO2	K2
4.	What is normalization? Explain the different types of normal forms with an example. (16)	CO3	K2
5.	Apply an ER diagram for Hospital Management System. (16)	CO2	K3
6.	Explain in detail about Boyce/Codd Normal form with an example. (16)	CO3	K2

7.	<p>Initial Table: Student_Courses</p> <table><tr><th>StudentID</th><th>StudentName</th><th>CourseID</th><th>CourseName</th><th>InstructorName</th></tr><tr><td>1</td><td>Alice</td><td>C101</td><td>Math</td><td>Prof. Smith</td></tr><tr><td>2</td><td>Bob</td><td>C102</td><td>Science</td><td>Prof. Jones</td></tr><tr><td>3</td><td>Charlie</td><td>C101</td><td>Math</td><td>Prof. Smith</td></tr><tr><td>4</td><td>Alice</td><td>C103</td><td>History</td><td>Prof. Brown</td></tr></table> <p>Convert the above table to third normal form. (16)</p>	StudentID	StudentName	CourseID	CourseName	InstructorName	1	Alice	C101	Math	Prof. Smith	2	Bob	C102	Science	Prof. Jones	3	Charlie	C101	Math	Prof. Smith	4	Alice	C103	History	Prof. Brown	CO3	K3
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8.	<p>Consider following table for information about student</p> <table><tr><th>sid</th><th>Course</th><th>Skill</th></tr><tr><td>1</td><td>C C++</td><td>English German</td></tr><tr><td>2</td><td>Java</td><td>English French</td></tr></table> <p>Compute to normal form using multivalued dependency. (16)</p>	sid	Course	Skill	1	C C++	English German	2	Java	English French	CO3	K3																
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### Unit - III Transaction Management

Q.No	Questions	CO's	Bloom's Level
1.	What is a transaction?	CO4	K1

2.	What are the ACID properties?	CO4	K1
3.	List any four SQL statements used for transaction control.	CO4	K1
4.	What are the two types of serializability?	CO4	K1
5.	What is Conflict-Serializability?	CO4	K1
6.	What are two pitfalls (problem) of lock-based protocols?	CO4	K1
7.	What is meant by deadlock?	CO4	K1
8.	Define the phases of two phase locking protocol.	CO4	K1
9.	What is Time-stamp based protocol?	CO4	K1
10.	What is concurrency control?	CO4	K1
11.	Differentiate between starvation and deadlock	CO4	K2
12.	What are the four conditions for dead lock?	CO4	K1
13.	Difference between deadlock prevention and deadlock avoidance.	CO4	K2
14.	What are the broad phases of ARIES?	CO4	K1
15.	What is shadow paging?	CO4	K1
16.	List the different states of transaction.	CO4	K1
17.	Draw the state diagram of a transaction.	CO4	K1
18.	What is meant by cascadeless schedule.	CO4	K1
19.	List the benefits of snapshot isolation.	CO4	K1
20.	What are the principal methods for dealing with the deadlock problem?	CO4	K1

### Part – B

1.	Why is Recovery needed? Discuss any two Recovery Techniques(16)	CO4	K2
2.	Explain about ACID properties with suitable example.(8) What are the four conditions for a deadlock to occur? (8)	CO4	K2
3.	Discuss in detail about two phase commit protocol.(16)	CO4	K2
4.	What is Deadlock? List the four conditions for Deadlock and explain about different Deadlock handling Techniques?(16)	CO4	K2
5.	Explain about serializability and its types with example.(16)	CO4	K2
6.	Consider the following schedules. The actions are listed in the order they are scheduled, and prefixed with the transaction name.  S1:T1:R(X),T2:R(X),T1:W(Y),T2:W(Y),T1:R(Y),T2:R(Y) S2:T3:W(X),T1:R(X),T1:W(Y),T2:R(Z),T2:W(Z),T3:R(Z)  For each of the schedule, answer the following questions: (i)What is the precedence graph for the schedule? (4) (ii)Is the schedule conflict –serializable? (4) (iii)if so,what are all the conflict equivalent serial schedules?	CO4	K2

	(4) (iv) Is the schedule view-serializable? If so, what are all the view equivalent serial schedules? (4)		
7.	<p>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).</p> <p>Add lock and unlock instruction to transactions T1 and T2, so that they observe the two-phase locking protocol. Can the execution of these transactions result in a deadlock. (16)</p>	CO4	K2
8.	<p>a. With a neat sketch explain the states of transaction. (8)</p> <p>b. During execution, a transaction passes through several states, until it finally commits or aborts. List all possible sequences of states through which transaction may pass. Explain why each state transaction may occur? (8)</p>	CO4	K2

### Unit - IV Implementation Techniques

Q.No	Questions	CO's	Bloom's Level
1.	List out the levels of RAID.	CO5	K1
2.	List the merits and demerits of B+ tree.	CO5	K1
3.	What are the two types of ordered indices?	CO5	K1
4.	What are different types of file organization?	CO5	K1
5.	List the difference between RAID 0 and RAID 1.	CO5	K1
6.	What is B+ tree?	CO5	K1
7.	Define Seek time.	CO5	K1
8.	Define File organization.	CO5	K1
9.	List the difference between static and dynamic hashing.	CO5	K2
10.	What are the factors to evaluate the indexing technique?	CO5	K1
11.	What are the two types of blocks in the fixed-length representation?	CO5	K1
12.	List the five methods of file organization.	CO5	K1

13.	Show the advantages and disadvantages of B+ tree.	CO5	K1
14.	List the difference between Primary index and Secondary index.	CO5	K1
15.	Differentiate dense index and sparse index.	CO5	K2
16.	List the methods for implementing sequential file organization.	CO5	K1
17.	What are the pros and cons of heap file organization.	CO5	K1
18.	What are the different methods of inserting data in hashing file organization to avoid collision?	CO5	K1
19.	List the uses of extendable hash structure.	CO5	K1
20.	What are the basic steps in query processing?	CO5	K1

### Part - B

1.	What are the various ways in organizing the records in files? Explain any one file organization in detail.(16)	CO5	K2
2.	Describe the structure of B+ tree and list the characteristics of B+ tree with example. (16)	CO5	K2
3.	What is RAID? Briefly explain different level of RAID. (16)	CO5	K2
4.	Describe about catalog information for cost estimation. (16)	CO5	K2
5.	Discuss about query optimization in detail. (16)	CO5	K2
6.	Write about ordered indices.(16)	CO5	K2
7.	Explain about query processing in detail. (16)	CO5	K2
8.	Explain about dynamic hashing with an example. (16)	CO5	K2

### Unit - V NO SQL Database

Q.No	Questions	CO's	Bloom's Level
1.	Define Distributed Database System.	CO6	K1
2.	Mention the advantages of distributed databases.	CO6	K1
3.	What is the use of graph database?	CO6	K1
4.	What are the characteristics of distributed DBMS?	CO6	K1
5.	What is ment by data fragmentation? List its types.	CO6	K1
6.	What are the different types of NoSQL databases?	CO6	K1
7.	How does a NoSQL database work?	CO6	K1
8.	Why are NoSQL databases better than relational databases?	CO6	K1
9.	How does the CAP theorem apply to distributed systems?	CO6	K1
10.	What is key-Value Store in DBMS?	CO6	K1
11.	What is RBAC?	CO6	K1

12.	Why is DBMS security important?	CO6	K1
13.	Mention the challenges of database security in DBMS.	CO6	K1
14.	What is SQL injection?	CO6	K1
15.	What is database encryption?	CO6	K1
16.	Differentiate transactional replication and snapshot replication.	CO6	K2
17.	What is the main purpose of data fragmentation?	CO6	K1
18.	What is meant by CRUD operation in DBMS?	CO6	K1
19.	Write down the differences between SQL and NoSQL.	CO6	K2
20.	List down the features of NoSQL.	CO6	K1
<b>Part – B</b>			
1.	Explain about Distributed Databases and its characteristics, advantages and disadvantages. (16)	CO6	K2
2.	Describe the Distributed Database Architecture in DBMS.(16)	CO6	K2
3.	Explain the types of distributed database.(16)	CO6	K2
4.	Discuss in detail about NoSQL Database and its key features, advantages and disadvantages. (16)	CO6	K2
5.	Explain about MongoDB database.(8) Discuss about the Access Control Mechanisms and Cryptography Methods to secure the Databases. (8)	CO6	K2
6.	With a real time example, explain in detail about CAP theorem. (16)	CO6	K2
7.	Illustrate different types of NOSQL with an example. (16)	CO6	K2
8.	Outline the main role of data fragmentation and replication in distributed database. (16)	CO6	K2