SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

QUESTION BANK

III SEMESTER

1904001 – DATABASE MANAGEMENT SYSTEM

Regulation – 2019

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Prepared by

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SUBJECT: 1904001 - DATABASE MANAGEMENT SYSTEM
SEM/YEAR: IV / II

UNIT I - INTRODUCTION TO DATABASES
Purpose of Database System – Views of data – Data Models – Database System Architecture – Introduction to relational databases – Relational Model – Keys – Entity Relationship model – E-R Diagrams – Enhanced-ER Model – ER-to-Relational Mapping.

PART – A

Q.No	Question	Level	Competence
1	Differentiate between physical schema and logical schema.	BTL3	Applying
2	Point out the importance of Object based data model	BTL4	Analyzing
3	List any five applications of DBMS.	BTL1	Remembering
4	Discuss about relational data model.	BTL2	Understanding
5	Define atomicity and consistency.	BTL2	Understanding
6	List the purpose of Database Management System.	BTL1	Remembering
7	Define Entity – Relationship Model.	BTL1	Remembering
8	List the Database Languages.	BTL1	Remembering
9	Differentiate instance and schema.	BTL2	Understanding
10	Define Data independence.	BTL1	Remembering
11	Generalize your view about Semi structured data model.	BTL6	Creating
12	Analyze Normalization.	BTL4	Analyzing
13	Distinguish between Object oriented model and Relational Model.	BTL3	Applying
14	Define database management system.	BTL2	Understanding
15	Show the advantages of file processing system.	BTL3	Applying
16	Assess the various levels of Data Abstraction.	BTL5	Evaluating
17	List the components of Query Processor.	BTL1	Remembering
18	Compare: DDL and DML	BTL4	Analyzing
19	Investigate the importance of super key.	BTL6	Creating
20	Assess the characteristics that distinguish the strong entity with weak entity.	BTL5	Evaluating
21	List the role of DBA.	BTL3	Applying
22	What is weak entity? Give example.	BTL2	Understanding
23	Differentiate between conventional file processing and database management system.	BTL4	Analyzing
24	Explain the two types of participation constraint.	BTL5	Evaluating

PART – B

Q.No	Question	Level	Competence
1	With the help of the block diagram, describe the basic architecture of a databasemanagement system. (13)	BTL1	Remembering
2	(i) List the disadvantages of File system over database. (6) (ii) List the components of Storage Manager and Query processor and explainthem .(7)	BTL1	Remembering
3	Describe in detail about Relational Database and explain with necessary example.(13)	BTL1	Remembering

4	(i) Describe about views of data.(7) (ii) What are the functions of database administrator? (6)	BTL2	Understanding
5	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 forcertain types of vehicles: 1) Trucks: cargo capacity. 2) Sports cars: horsepower, renter age requirement. 3) Vans: number of passengers. Off-road vehicles: ground clearance, drive train (four- or two-wheel drive). Construct an E- R model for all operations.(13)	BTL2	Understanding
6	Describe the Relational Model in detail with an example. (13)	BTL1	Remembering
7	Examine about (i) Data Models. (6) (ii) Structure of Relational Databases..(7)	BTL3	Applying
8	Explain the following with examples: i) DDL. (3) ii) DML. (3) iii) View of Data. (7)	BTL4	Analyzing
9	i) Explain a note on database languages. (6) ii) Draw an ER diagram corresponding to customers and loans. (7)	BTL4	Analyzing
10	Draw an E-R diagram for a banking enterprise with almost all components and explain(13)	BTL2	Understanding
11	Compare the following (i)Network model (6) (ii) Hierarchical model (7)	BTL3	Applying
12	i) Discuss the main characteristics of the database approach and how does it differ from traditional file system. (8) ii) What are the three levels of abstraction in DBMS? (5)	BTL6	Creating
13	Draw and Explain an E-R diagram for a small marketing company database and assuming your own data requirements. (13)	BTL 5	Evaluating
14	Analyze and Explain an E-R diagram for a Life insurance company with almost all components. (13)	BTL4	Analyzing
15	Briefly explain on the Extended E-R Model. (13)	BTL2	Understanding
16	What is aggregation in an ER model? Develop an ER diagram using aggregation that captures the following information : Employees work for projects. An employee working for a particular project uses various machinery. A unnecessary attributes. State any options you make. Also discuss about the ER diagram you have designed. (13)	BTL3	Applying
17	Define generalization and aggregation. Demonstrate generalization and aggregation using E-R diagram. (13)	BTL 5	Evaluating

PART - C			
Q.No	**Question**	**Level**	**Competence**
1	i) Explain why would you choose a database system instead of simply storing data in operating system files? When would it make sense not to use a databasesystem? (8) ii) Explain the difference between logical and physical data independence. (7)	BTL5	Evaluating
2	(i) Develop an E-R diagram for a car-insurance company whose customers ownone or more cars each. Each car has associated with it zero to any number of recorded accidents. State any assumptions you make. (5) (ii) A university registrar's office maintains data about following entities: (1) Courses, including number, title, credits, syllabus, and prerequisites; (2) Course offerings, including course number, year, semester, section number,instructor, timings and classroom; (3) Students, including student-id, name, and program; and Instructors, including identification number, name, department, and title. Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled. Construct an E-R diagram for the registrar's office. Document all assumptions that you make about the mapping constraints. (10)	BTL6	Creating
3	Develop an ER diagram for the "Restaurant Menu Ordering System", which will facilitate the food items ordering and services within a restaurant. The entire restaurant scenario is detailed as follows. The customer is able to view the food items menu, call the waiter, place orders and obtain the final bill through the computer kept in their table. The waiters through their wireless tablet PC are able to initialize a table for customers, control the table functions to assist customers, orders, send orders to food preparation staff (chef) and finalize the customer's bill. The food preparation staffs (chefs), with their touch-display interfaces to the system, are able to view orders sent to the kitchen by waiters. During preparation, they are able to let the waiter know the status of each item, and can send notifications when items are completed. The system should have full accountability and logging facilities, and should support supervisor actions to account for exceptional circumstances, such as ameal being refunded or walked out on. (15)	BTL6	Creating
4	(i) Compare the features of file system with database system. (6) (ii) Explain the differences between physical level, conceptual level and viewlevel of data abstraction. (5) (iii) Write short note on attributes of an entity. State an example. (4)	BTL5	Evaluating
5	With the help of a neat block diagram explain the basic architecture of a database management system? (15)	BTL5	Evaluating

UNIT II – SQL FUNDAMENTALS			
Relational Algebra – SQL fundamentals – Advanced SQL features–Triggers–Nested Queries-Joins-Inner Join-Outer join-Functions.			
PART – A			
Q.No	**Question**	**Level**	**Competence**
1	Define SQL.	BTL1	Remembering
2	Analyze about relational algebra.	BTL4	Analyzing
3	What is the difference between DELETE and TRUNCATE commands?	BTL2	Understanding
4	What are the three classes of SQL expression?	BTL1	Remembering
5	**EmpID** **EmpPosition** **DateOfJoining** **Salary** 1 Manager 01/05/2019 500000 2 Executive 02/05/2019 75000 3 Manager 01/05/2019 90000 2 Lead 02/05/2019 85000 1 Executive 01/05/2019 300000 Consider the given table &write a query to find all the employees whose salaryis between 50000 to 100000.	BTL5	Evaluating
6	Define Sub query and give its types	BTL2	Understanding
7	Write a SQL statement to find the names and loan numbers of all customers who have a loan at XYZ branch.	BTL6	Creating
8	What are aggregate functions? List the aggregate functions supported by SQL.	BTL1	Remembering
9	Give the definition for instance and schema.	BTL2	Understanding
10	How do you drop triggers?	BTL1	Remembering
11	Generalize the types of SQL Triggers.	BTL6	Creating
12	Examine the differentiate between Dynamic SQL and Static SQL.	BTL3	Applying
13	Distinguish between DDL and DML trigger.	BTL4	Analyzing
14	What are primary key constraints?	BTL1	Remembering
15	What functions are performed by trigger?	BTL3	Applying
16	Assess the significance of TCL commands with suitable example.	BTL5	Evaluating
17	List out the operations of the relational algebra.	BTL1	Remembering
18	Define: Data manipulation language	BTL2	Understanding
19	Discover the types of join and explain each?	BTL3	Applying
20	Analyze the characteristics that distinguish the union operation with intersection operation in relational algebra.	BTL4	Analyzing
21	Use SELECT sand WHERE statement and write a query.	BTL4	Analyzing
22	Differentiate Primary key and Foreign key.	BTL 3	Applying
23	Write the syntax of trigger.	BTL5	Evaluating
24	What are Joins?	BTL 2	Understanding

PART – B			
Q.No	**Question**	**Level**	**Competence**
1	Describe different set operations in Relational algebra with an example(13)	BTL1	Remembering
2	(i) Give the diagrammatic representation to indicate the basic steps in queryprocessing. (8)	BTL2	Understanding

	(ii) Differentiate Static SQL and Dynamic SQL. (5)		
3	Define trigger and explain its three parts. Differentiate row level and statement Knowledge 10 level triggers. (13)	BTL1	Remembering
4	Consider the employee database, where the primary keys underlined. employee(empname,street,city)works(empname,companyname,salary)company (companyname,city)manages(empname,management)Give an expression in the relational algebra for each request. 1) Find the names of all employees who work for First Bank Corporation.(4) 2) Find the names, street addresses and cities of residence of all employees whowork for First Bank Corporation and earn more than 200000 per annum.(4) 3) Find the names of all employees in this database who live inthe same city as the company for which they work.(5)	BTL3	Applying
5	Consider the following relational schema: Employee(empno,name,office,age) Books(isbn,title,authors,publisher) Loan(empno,isbn,date) Write the following queries in relational algebra and give your explanation. i) Find the names of employees who have borrowed a book Published by XYZLtd.,(3) ii) Find the names of employees who have borrowed all books Published byXYZ Ltd.,(3) iii) Find the names of employees who have borrowed more than five differentBOOKS Published by XYZ Ltd.,(3) iv) For each Publisher, find the names of employees who have borrowed more than five books of that Publisher.(4)	BTL2	Understanding
6	Describe the aggregate functions in SQL with an example. (13)	BTL1	Remembering
7	Examine about (i) Data Models. (6) Mapping cardinalities.(7)	BTL3	Applying
8	Explain the following with examples: i) DDL. (3) ii) DML. (3) Embedded SQL. (7)	BTL4	Analyzing
9	Explain the select, project, Cartesian product and join operation in relational algebra with an example. (13)	BTL4	Analyzing
10	Consider the following relational database Employee(Employee-Name,street,city) Works(Employee-Name,Company-Name,Salary) Company(Company-Name,City) Manager(Employee-Name,Manager-Name) Give an SQL DDL definition of this database,Identify referential integrity constraints that should hold,and include them in the DDL definition.(13)	BTL2	Understanding
11	Describe the DDL, DML, DCL commands for the student's database, which contains	BTL1	Remembering

	Student details: name, id, DOB, branch, DOJ, and Course details: Course name, Course id, Stud Id, Faculty name, id, marks.(13)		
12	(i) Explain about SQL fundamentals.(6) (ii) Develop the overall architecture of the data base system in detail.(7)	BTL6	Creating
13	Consider the relational table given below and assess about the following SQLqueries. Employee (Empno, Name, Department, Salary). (i) list all the employees whose name starts with the letter 'L'. (3) (ii) Find the maximum salary given to employees in each department.(3) (iii)Find the number of employees working in 'accounts' department. (2) (iv)Find the second maximum salary from the table. (3) (v) Find the employee who is getting the minimum Salary. (2)	BTL5	Evaluating
14	(i) Draw and explain an ER diagram that captures the information of this schema.Employee(empno, name, office, age) Books(isbn, title, authors, publisher) Loan(empno, isbn, date).(5) Write the following queries in SQL. (ii) Find the names of employees who have borrowed a book published by McGraw-Hill.(4) (iii) Find the names of employees who have borrowed all books published by McGraw-Hill. (4)	BTL4	Analyzing
15	List the operations of relational algebra and the purpose of each with example?	BTL3	Applying
16	Explain the usage of aggregate functions with example.	BTL2	Understanding
17	Explain various Data Definition Commands in details with syntax& examples	BTL5	Evaluating

PART – C			
Q.No	**Question**	**Level**	**Competence**
1	Discuss about an employee detail relation and explain referential integrity using SQL queries. (13)	BTL6	Creating
2	Consider a student registration database comprising of the below given tableschema. Student File Student Number, Student Name, Address, Telephone Course File Course Number, Description, Hours, Professor Number Professor File Professor Number, Name, Office Registration File Student Number, Course Number, Date Consider a suitable sample of tuples/records for the above mentioned tables and analyze and write DML statements (SQL) to answer for the queries listed below. 1. Which courses does a specific professor teach? (2) 2. What courses does specific professors? (2) 3. Who teaches a specific course and where is his/her office? (2)	BTL5	Evaluating

	4. For a specific student number, in which courses is the studentregistered and what is his/her name? (2) 5. Who are the professors for a specific student? (2) 6.Who are the students registered in a specific course? (3)		
3	Consider the following relations for a database that keeps track of business tripsof salespersons in a sales office: SALESPERSON(SSN, Name, start_year, Dept_no) TRIP(SSN, From_city, To_city, Departure_Date, Return_Date,Return_Date, Trip_ID) EXPENSE(Trip_id, Account#, Amount) Specify the following queries in SQL on the above database schema (i) Give the details (all attributes of TRIP) for trips that exceeded $2000 inexpenses. (3) (ii) Print the SSN of salesman who took trips to 'Honolulu' (3) (iii) Print the trip expenses incurred by the salesman with SSN='234-56-7890'. (3) (iv) Write a program in embedded SQL to retrieve the total trip expenses of the salesman named 'Bill' for the above relations and explain it. (6)	BTL5	Evaluating
4	Consider the following relations for a company Database Application: Employee(Eno, Name, Sex, Dob, Doj, Designation, Basic_Pay, Deptno)Department(Dept_no, Name) Project(Proj_no, Name, Dept_no) Worksfor(Eno, Proj_no, Date, Hours) 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. (i) Identify the foreign keys. Develop DDL to implement the above schema.(3) (ii) Develop an SQL query to list the department number and the number of employees in each department.(4) (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.(4) (iv) Develop an SQL query to list the details of employees who have marked inmore than three projects on a day.(4)	BTL6	Creating
5	Explain Aggregate functions, GROUP BY, HAVING Clause with example.	BTL5	Evaluating

UNIT III - NORMALIZATION

Functional Dependencies – Non-loss Decomposition – First, Second, Third Normal Forms, Dependency Preservation –Boyce Codd Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

PART – A

Q.No	Question	Level	Competence
1	Define Functional Dependency.	BTL2	Understanding
2	Discuss about 2NF.	BTL2	Understanding
3	Analyze about normalization.	BTL4	Analyzing
4	Assess how 'Boyce-Codd normal form is found to be stricter than third normal form'.	BTL4	Analyzing
5	List the properties of decomposition.	BTL4	Analyzing
6	State the advantage of the First Normal Form.	BTL1	Remembering
7	Show the disadvantage of the Second Normal Form.	BTL3	Applying
8	List the anomalies of 1NF.	BTL1	Remembering
9	Assess the significance of cardinality ratio.	BTL5	Evaluating
10	Examine about BCNF.	BTL3	Applying
11	Define 3 Normal Form.	BTL1	Remembering
12	Write about transitive functional dependency.	BTL1	Remembering
13	Prepare a Database to illustrate BCNF.	BTL6	Creating
14	Which normal form is considered adequate for normal relational database design?	BTL1	Remembering
15	Consider the relation scheme R(A,B,C)R(A,B,C) with the following functionaldependencies: A,B→CC→AA,B→CC→A Show that the scheme RR is the Third Normal Form (3NF) but not in Boyce-Code Normal Form (BCNF).	BTL2	Understanding
16	What is the output of following statement? $\sigma_{subject = "database"}(Books)$	BTL3	Applying
17	Develop a Database to illustrate 3NF.	BTL6	Creating
18	What do you mean by trivial dependency?	BTL5	Evaluating
19	What is meant by computing the closure of a set of functional dependency?	BTL1	Remembering
20	What do you mean by the statement $\prod_{subject, author}(Books)$?	BTL2	Understanding
21	Define 4^{th} normal Form.	BTL2	Understanding
22	List the issues faced in 3^{rd} normal form.	BTL3	Applying
23	What is Lossless Decomposition?	BTL4	Analyzing
24	Recall the term Join Dependency.	BTL5	Evaluating

PART – B

Q.No	Question	Level	Competence
1	Illustrate with an example what is meant by partial functional dependency and describe how this type of dependency relates to 2NF. (13)	BTL6	Creating
2	Briefly discuss about the functional dependency concepts. (13)	BTL2	Understanding
3	What is the minimal normal form that a relation must satisfy? Provide a definition for this normal form.(13)	BTL1	Remembering

4	Illustrate the multi-value dependency and the fourth normal form-4NF with an example (13)	BTL3	Applying
5	(i) What is Normalization? Explain the need for normalization. (6) (ii) Discuss First normal form, Second normal form and third normal with an example. (7)	BTL2	Understanding
6	Discuss in detail, the join dependency and the fifth normal form-5NF. (13)	BTL2	Understanding
7	Explain Functional dependency and trivial functional dependency with examples.(13)	BTL5	Evaluating
8	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 candidatekeys. (13)	BTL3	Applying
9	(i) Summarize the term anomalies. Explain BCNF in detail.(7) (ii) Decide why BCNF is used and how it differs from 3 NF.(6)	BTL5	Evaluating
10	(i) Analyze about lossless Decomposition.(7) (ii) Design your own database to illustrate 3NF.(6)	BTL4	Analyzing
11	Describe what is meant by transitive dependency and describe how this type of dependency relates to 3NF. Provide an example to illustrate your answer.(13)	BTL1	Remembering
12	Explain about Functional Dependencies and its impact on the data base.(13)	BTL1	Remembering
13	Describe in detail about the following (i) Non loss decomposition. (7) (ii) Lossy decomposition. (6)	BTL1	Remembering
14	Analyze the following: (i) Join Dependencies. (7) (ii) 5^{th} Normal Form. (6)	BTL4	Analyzing
15	Explain the following terms: a. Fully functional Dependencies (7) b. Transitive Dependencies (6)	BTL3	Applying
16	Discuss about schema refinement in database design.	BTL2	Understanding
17	Explain the following: Multi-valued dependencies and Fourth normal forms.	BTL4	Analyzing

PART - C			
Q.No	**Question**	**Level**	**Competence**
1	Consider the following database relations containing the attributesBook–id Subject–Category–of– bookName–of–Author Nationality–of–Author With book–id as the primary key. a) What is the highest normal form satisfied by this relation?Explain in detail.(8) b) Suppose the attributes Book–title and Author–address are added to the relation, and the primary key is changed to {Name–of–Author, Book–title}, what will be the highest normal form satisfied by the relation? (7)	BTL5	Evaluating
2	Given a relation R(A, B, C, D) and Functional Dependency set FD = { AB → CD, B → C }, determine whether the given R is in 2NF? If not convert it into 2 NF. (15)	BTL6	Creating
3	(i) Give an example of a relation that is in 3NF but not in BCNF. How will youconvert that relation into BCNF? (15)	BTL6	Creating
	An agency called Instant Cover supplies part-time/temporary staff to hotels in Scotland. The below lists the time spent by agency staff working at various	BTL5	Evaluating

<table>
<tr>
<td>4</td>
<td>hotels. The national insurance number (NIN) is unique for every member of staff.
<table>
<tr><th>NIN</th><th>ContractNo</th><th>Hours</th><th>eName</th><th>hNo</th><th>hLoc</th></tr>
<tr><td>1135</td><td>C1024</td><td>16</td><td>Smith J.</td><td>H25</td><td>East Killbride</td></tr>
<tr><td>1057</td><td>C1024</td><td>24</td><td>Hocine D.</td><td>H25</td><td>East Killbride</td></tr>
<tr><td>1068</td><td>C1025</td><td>28</td><td>White T.</td><td>H4</td><td>Glasgow</td></tr>
<tr><td>1135</td><td>C1025</td><td>15</td><td>Smith J.</td><td>H4</td><td>Glasgow</td></tr>
</table>
(i) This table is susceptible to update anomalies. Provide examples of insertion,deletion and update anomalies. (10)
(ii) Normalize this table to third normal form. State any assumptions. (5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Explain about 3NF and BCNF with relevant table structure. (15)</td>
<td>BTL6</td>
<td>Creating</td>
</tr>
</table>

UNIT IV - TRANSACTION PROCESSING AND CONCURRENCY CONTROL			
Transaction Concepts – ACID Properties – Schedules – Serializability – Concurrency Control – Need for Concurrency –Locking Protocols – Two Phase Locking – Deadlock – Transaction Recovery - Save Points – Isolation Levels – SQL Facilities for Concurrency and Recovery.			
PART – A			
Q.No	**Question**	**Level**	**Competence**
1	Define transaction.	BTL1	Remembering
2	Give the reasons for allowing concurrency.	BTL2	Understanding
3	Analyze on average response time.	BTL4	Analyzing
4	Evaluate the situation to roll back a transaction.	BTL4	Analyzing
5	Discuss the term aborted state.	BTL2	Understanding
6	Summarize the properties of transaction.	BTL2	Understanding
7	What are the different modes of lock?	BTL1	Remembering
8	Assess about Serializability. How it is tested?	BTL5	Evaluating
9	Show the time stamps associated with each data item.	BTL3	Applying
10	Demonstrate recoverable schedule with suitable example.	BTL3	Applying
11	Recommend the need of shadow paging.	BTL5	Evaluating
12	Generalize the type of locking needed for insert and delete operations.	BTL6	Creating
13	Define deadlock.	BTL1	Remembering
14	Design your own example to illustrate cascaded rollback.	BTL6	Creating
15	List the phases of two-phase locking protocol	BTL1	Remembering
16	Examine the use of lock compatibility matrix.	BTL3	Applying
17	List the types of serializability.	BTL1	Remembering
18	Give the states of transaction.	BTL2	Understanding
19	Differentiate strict two-phase locking protocol and rigorous two-phase locking protocol.	BTL4	Analyzing
20	Define upgrade and downgrade.	BTL1	Remembering
21	List the types of Locking protocols.	BTL5	Evaluating
22	State the need for concurrency.	BTL4	Analyzing
23	Define Save point.	BTL2	Understanding
24	Define Serializability.	BTL3	Applying

PART - B			
Q.No	**Question**	**Level**	**Competence**
1	(i) Describe the ACID Properties of a transaction. (7) (ii) What benefit does rigorous two-phase locking provide? Show how does it compare with other forms of two-phase locking? (6)	BTL1	Remembering
2	Illustrate the conflict serializability and view serializability with an example. (13)	BTL3	Applying
3	Write a short note on: i) Transaction concept. (6) (ii) Deadlock. (7)	BTL1	Remembering
4	(i) What is deadlock? How does it occur? (6) (ii) How transactions are to be written to Avoid deadlock and guarantee correct execution. Illustrate with suitable example. (7)	BTL3	Applying
5	(i)What is concurrency control? How is it implemented in DBMS? (6)	BTL6	Creating

	(ii)Generalize with a suitable example. (7)		
6	Explain about the two-phase locking with suitable example. (13)	BTL5	Evaluating
7	What is Concurrency? Explain it in terms of locking mechanism and two-phase Commit Protocol. (13)	BTL4	Analyzing
8	Explain Two Phase Commit and Three-Phase Commit Protocols. (13)	BTL4	Analyzing
9	Describe about the Deadlock handling mechanisms. (13)	BTL1	Remembering
10	(i) Differentiate strict two-phase locking protocol and rigorous two-phase locking protocol. (6) (ii) How the time stamps are implemented? Explain. (7)	BTL2	Understanding
11	(i) When is a transaction said to be deadlocked? (6) (ii) Explain the deadlock prevention methods with an example? (7)	BTL4	Analyzing
12	(i) Describe about the deadlock prevention schemes. (7) (ii)With a neat Sketch explain the states of a transaction. (6)	BTL2	Understanding
13	(i) Describe about deadlock detection. (7) (ii) Define the term Recoverable schedule and Cascade less schedules. (6)	BTL1	Remembering
14	Discuss the violations caused by each of the following: dirty read, non-repeatableread and phantoms with suitable example. (13)	BTL2	Understanding
15	What is transaction? Explain the ACID Properties with neat diagram. (13)	BTL3	Applying
16	Explain about transaction, properties and phases of transaction in detail. (13)	BTL2	Understanding
17	Illustrate Concurrent execution of transaction with examples? (13)	BTL5	Evaluating

PART - C			
Q.No	**Question**	**Level**	**Competence**
1	Consider the following extension to the tree-locking protocol, which allows bothshared and exclusive locks: • A transaction can be either a read-only transaction, in which case it can requestonly shared locks, or an update transaction, in which case it can request only exclusive locks. • Each transaction must follow the rules of the tree protocol. Read-only transactions may lock any data item first, whereas update transactions must lockthe root first. Assess on that the protocol ensures serializability and deadlock freedom. (15)	BTL5	Evaluating

2	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. (15)
		BTL6	Creating

3	(i) Narrate the actions that are considered for deadlock detection and the recoveryfrom deadlock (7) (ii) Assess and discuss the properties of a transaction that ensure integrity of data in the database system. (8)	BTL5	Evaluating

4	For each of the following schedules, state whether it is conflict-serializable and/or view-serializable. If you cannot decide whether a schedule belongs toeither class, explain briefly. The actions are listed in the order they are scheduled, and prefixed with the transaction name. (i) T1: R(X) T2: R(X) T1: W(X) T2: W(X) (3) (ii) T1: W(X) T2: R(Y) T1: R(Y) T2: R(X) (3) (iii) T1: R(X) T2: R(Y) T3: W(X) T2: R(X) T1: R(Y) (3) (iv) T1: R(X) T1: R(Y) T1: W(X) T2: R(Y) T3: W(Y) T1: W(X) T2:R(Y) (3) (v) T1: R(X) T2: W(X) T1: W(X) T3: W(X) (3)	BTL6	Creating
5	Explain the scenario of deadlocks in detail. Give relevant example for your answer.	BTL6	Creating

UNIT V – IMPLEMENTATION TECHNIQUES

RAID – File Organization – Organization of Records in Files – Indexing and Hashing – Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic – Query Processing Overview – Query optimization using Heuristics and Cost Estimation Distributed Databases.

PART – A

Q.No	Question	Level	Competence
1	Point out the ordered indices with example.	BTL4	Analyzing
2	Write about B+ tree index file.	BTL1	Remembering
3	Illustrate hash indexing.	BTL3	Applying
4	Define seek time.	BTL1	Remembering
5	Assess the factors to be considered for the evaluation of indexing and hashingtechniques.	BTL5	Evaluating
6	Define mirroring.	BTL1	Remembering
7	Discuss about Dense Index.	BTL2	Understanding
8	What is an index?	BTL2	Understanding
9	Differentiate BTree and B+Tree Index.	BTL4	Analyzing
10	Distinguish between fixed length record and variable length records?	BTL2	Understanding
11	Show the advantages and disadvantages of RAID Level 3.	BTL3	Applying
12	What are ordered indices? Give an example?	BTL1	Remembering
13	Prepare the need for Query Optimization.	BTL6	Creating
14	Define Primary index and Secondary Index.	BTL1	Remembering
15	When is it preferable to use a dense index rather than a sparse index?	BTL2	Understanding
16	Analyze query processing.	BTL3	Applying
17	Examine about query evaluation plan.	BTL1	Remembering
18	Differentiate Static Hashing and Dynamic Hashing.	BTL5	Evaluating
19	State the properties of B+Tree	BTL4	Analyzing
20	Develop the procedure to reduce the occurrences of bucket overflows in a hashfile organization.	BTL6	Creating
21	List the RAID levels.	BTL3	Applying
22	Differentiate Hashing and Indexing.	BTL5	Evaluating
23	State the properties of B-Tree	BTL4	Analyzing
24	What mechanisms applied to avoid collision during hashing.	BTL4	Analyzing

PART - B

Q.No	Question	Level	Competence
1	(i) Describe B+ tree in detail. (7) (ii) How do you represent leaf node of a B+ tree of order p? (6)	BTL1	Remembering
2	(i) Describe the ordered indices with example. (10) (ii) Describe the different methods of implementing variable length records. (3)	BTL2	Understanding
3	Examine about RAID system. How does it improve performance and reliability? Discuss the level 3 and level 4 of RAID. (13)	BTL1	Remembering
4	Demonstrate the structure of B+ tree and give the algorithm for search in the B+ tree with example. (13)	BTL3	Applying
5	Give a detailed description about Query processing and Optimization. Explain the cost estimation of Query Optimization. (13)	BTL1	Remembering

6	Describe the different types of file organization. Explain using a sketch of eachof them with their advantages and disadvantages. (13)	BTL2	Understanding
7	Explain about static and dynamic hashing with an example. (13)	BTL2	Understanding
8	(i) Show the various levels of RAID systems. (7) (ii) Why data dictionary storage is important. (6)	BTL3	Applying
	(i) With simple algorithms, define the computing of nested loop join and block nested loop join. (7) (ii) Sketch and concise the basic steps in query processing. (6)	BTL1	Remembering
10	Analyze about the index schemas used in databases. (13)	BTL4	Analyzing
11	(i) Analyze about the B+ Tree file organization in detail. (4) (ii) Identify a B+ tree to insert the following key elements (order - 3) 5, 3, 4, 9, 7, 15, 14, 21, 22, 23. (9)	BTL4	Analyzing
12	Examine the algorithms for SELECT and JOIN operations. (13)	BTL4	Analyzing
13	Summarize in detail about Heuristic optimization algorithms. (13)	BTL5	Evaluating
14	(i)Explain in detail about optimization of disk block access. (7) (ii)Generalize about mirrored (redundancy) RAID levels. (6)	BTL6	Creating
15	Discuss about B-Tree with an example. Write applications, merits and demerits of B-TREE. (13)	BTL2	Understanding
16	Discuss about B+-Tree with an example. Write applications, merits and demerits of B+-TREE. (13)	BTL5	Evaluating
17	Generalize your views about Static and Dynamic hashing with illustration. (13)	BTL3	Applying

PART - C			
Q.No	**Question**	**Level**	**Competence**
1	Create B tree and B^+ tree to insert the following key values (the order of the tree is three) 32, 11, 15, 13, 7, 22, 15, 44, 67, 4. (15)	BTL6	Creating
2	The following key values are organized in an extendable hashing technique. 2, 3, 5, 7, 11, 17, 19, 23, 29, 31. Show the extendable hash structure for this file if the hash function is h(x)=x mod 8 and buckets can hold three records. Assess how the extendable hash structure changes as the result of each of the following steps: (15) DELETE 11 DELETE 31 INSERT 1 INSERT 15	BTL5	Evaluating
3	(i) Evaluate how reliability can be improved through redundancy. (7) (ii) How records are represented and organized in a file. Explain it with suitable example. (8)	BTL5	Evaluating
4	(i) Explain the architecture of a distributed database system. (8) (ii) Generalize the concept of RAID. (7)	BTL6	Creating
5	Discuss the concept of Query Optimization in detail. (15)	BTL6	Creating