VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF INFORMATION TECHNOLOGY

QUESTION BANK

IV SEMESTER

CS 8492 – DATABASE MANAGEMENT SYSTEMS

Regulation – 2017

CHOICE BASED CREDIT SYSTEM

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SUBJECT : CS 8492 – DATABASE MANAGEMENT SYSTEMS

SEM / YEAR: IV Sem / II Year

UNIT I - RELATIONAL DATABASES

Purpose of Database System – Views of data – Data Models – Database System Architecture – Introduction to relational databases – Relational Model – Keys – Relational Algebra – SQL fundamentals – Advanced SQL features – Embedded SQL– Dynamic SQL

PART-A

Q.No.	Question	Level	Competence
1	Differentiate File processing system with Database Management system.	BTL2	Understanding
2	Point out the disadvantages of file processing system.	BTL4	Analysing
3	List out the components of DBMS.	BTL1	Remembering
4	Discuss the purpose of Database Management System?	BTL2	Understanding
5	What is data definition language? Give example.	BTL2	Understanding
6	What are the three levels of data abstraction?	BTL1	Remembering
7	Mention some of the major responsibilities of a database administrator.	BTL1	Remembering
8	List out the use of creating view?	BTL1	Remembering
9	Give the syntax to create the table.	BTL2	Understanding
10	What are aggregate functions? List the aggregate functions supported by SQL?	BTL1	Remembering
11	Write a SQL statement to find the names and loan numbers of all customers who have a loan at XYZ branch.	BTL6	Creating
12	Name the categories of SQL commands.	BTL3	Applying
13	Distinguish between key and super key.	BTL2	Understanding
14	What are primary key constraints?	BTL1	Remembering
15	Show the need for referential integrity key constraints.	BTL3	Applying
16	Apply the significance of TCL commands with suitable example?	BTL5	Evaluating
17	List the string operations supported by SQL?	BTL1	Remembering
18	Point out the set operations of SQL?	BTL4	Analysing
19	Analyze about DCL command.	BTL4	Analysing
20	Differentiate between Dynamic SQL and Static SQL	BTL4	Analysing

PART-B

1	(i) Briefly describe about Views of data.(07) (ii) What are the functions of database administrator?(06)	BTL1	Remembering

2	(i) List the operations of relational algebra and the purpose of each with example.(05) (ii) Illustrate the overall architecture of the data base system in detail.(8)	**BTL1** **BTL3**	**Remembering** **Applying**
3	(i)Why would you choose a database system instead of simply storing data in operating system files? What would it makes sense not to use a database system?(07) (ii)Explain the difference between logical and physical data independence.(06)	**BTL1** **BTL4**	**Remembering** **Analysing**
4	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. (i) Find the names of employees who have borrowed a book Published by XYZ Ltd.,(03) (ii) Find the names of employees who have borrowed all books Published by XYZ Ltd.,(03) (iii) Find the names of employees who have borrowed more than five different BOOKS Published by XYZ Ltd.,(03) (iv) For each Publisher, find the names of employees who have borrowed more than five books of that Publisher.(04)	**BTL2**	**Understanding**
5	Exaplain the select ,project,Cartesian product and join operations in relational algebra with an example. (13)	**BTL2**	**Understanding**
6	Explain the aggregate functions in SQL with an example.(13)	**BTL1**	**Remembering**
7	State and explain the command DDL,DCL,DML with suitable example Justify the need of embedded SQL. Consider the relation student (Reg No, name, mark, and grade).Write embedded dynamic SQL program in C language to retrieve all the students' records whose mark is more than 90.(13)	**BTL5**	**Evaluating**
8	Explain the following with examples: i. DDL (03) ii. DML (03) iii. Embedded SQL (07)	**BTL4**	**Analyzing**
9	Assume the following table. Degree(degcode,name,subject) Candidate(seatno,degcode,name,semester,month,year,result) Marks(seatno,degcode,name,semester,month,year,papcode,marks) Degcode-degree code, Name-name of the degree(MSc,MCom) Subject-subject of the course Eg,Phy,Pap code—paper code eg Ai. Serve the following queries using SQL. (i) Write a SELECT statement to display all the degree codes which are there in the candidate table but not present in degree table in the order of degcode. (03) (ii) Write a SELECT statement to display the name of all the candidate who have got less than 40 marks in exactly 2 subjects.(03) (iii)Write SELECT statement to display the name,subject and number of candidates for all degrees in which there are less than 5 candidates.(03) (iv) Write a SELECT statement to display the names of all the candidate who have get highest total marks in MSc.,(Maths) (04)	**BTL4**	**Analyzing**

<table>
<tr>
<td>10</td>
<td>Consider a student registration database comprising of the below given table schema.
Student File
<table><tr><td>Student Number</td><td>Student Name</td><td>Address</td><td>Telephone</td></tr></table>
Course File
<table><tr><td>Course Number</td><td>Description</td><td>Hours</td><td>Professor Number</td></tr></table>
Professor File
<table><tr><td>Professor Number</td><td>Name</td><td>Office</td></tr></table>
Registration File
<table><tr><td>Student Number</td><td>Course Number</td><td>Date</td></tr></table>
Consider a suitable sample of tuples/records for the above mentioned tables and write DML statements (SQL) to answer for the queries listed below.
(i) Which courses does a specific professor teach? (02)
(ii) What courses are taught by two specific professors? (02)
(iii)Who teaches a specific course and where is his/her office?(02)
(iv) For a specific student number, in which courses is the student registered and what is his/her name? (02)
(v) Who are the professors for a specific student? (02)
(vi) Who are the students registered in a specific course? (03)</td>
<td>BTL2</td>
<td>Understanding</td>
</tr>
<tr>
<td>11</td>
<td>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)</td>
<td>BTL2</td>
<td>Understanding</td>
</tr>
<tr>
<td>12</td>
<td>Consider the following schema:
Supplier(sid:integer,sname:string,address:string)
Parts(pid: integer,pname: string,color: string)
Catalog(sid: integer,pid:integer,cost:red)
The key fields are underlined and the domain of each field is listed after the field name.Thereforesid is the key for Suppliers,pid is the key for Parts and sid and pid together form the key for Catalog. The Catalog relation lists the prices charged for parts by suppliers.Write the following queries in relational algebra and SQL.
(i) Find the sids of suppliers who supply some red or green part (4)
(ii) Find the sids of suppliers who supply every part.(4)
(iii) Find the sids of suppliers who supply every red part or supply every green part.(5)</td>
<td>BTL6</td>
<td>Creating</td>
</tr>
<tr>
<td>13</td>
<td>Consider the relational table given below and answer the following SQL queries.Employee(Empno, Name, Department, Salary) .(03)
(i) List all the employees whose name starts with the letter 'L'.(02)
(ii) Find the maximum salary given to employees in each department. (02)
(iii) Find the number of employees working in 'accounts' department. (02)
(iv) Find the second maximum salary from the table.(02)
(v) Find the employee who is getting the minimum Salary. (02)</td>
<td>BTL5</td>
<td>Evaluating</td>
</tr>
</table>

14	Write the DDL, DML, DCL commands for the student's database.(13) Which contains student details: name, id, DOB, branch, DOJ Course details: Course name, Courseid, Stud. Id, Faculty name, id, marks.	**BTL1**	**Remembering**
	PART-C		
1	Given: VAR Exam_Marks BASE RELATION {Student_ID SID,Course_ID CID,Mark INTEGER}KEY{Student ID,Course ID}; Write down the relational algebra expression to give, for each pair of students sitting in the same exam, the absolute value of difference between the marks. Assume you can write ABS(x) to obtain the absolute value of x. (15)	**BTL2**	**Understanding**
2	Design and draw an ER diagram that captures the information of this schema. (5) Employee(empno,name,office,age) Books(isbn,title,authors,publisher) Loan(empno,isbn,date) Write the following queries in relational algebra and SQL. i)Find the names of employees who have borrowed a book published by McGraw-Hill.(5) ii)Find the names of employees who have borrowed all books published by McGraw-Hill.(5)	**BTL4**	**Analysing**
3	Consider the following relations for a database that keeps track of business trips of 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 in expenses. (ii) Print the SSN of salesman who took trips to 'Honolulu' (iii) Print the trip expenses incurred by the salesman with SSN='234-56-7890'. Write a program in embedded SQL to retrieve the total trip expenses of the salesman named 'Bill' for the above relations.(15)	**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 in more than three projects on a day.(4)	**BTL6**	**Creating**

UNIT II - DATABASE DESIGN

Entity-Relationship model – E-R Diagrams – Enhanced-ER Model – ER-to-Relational Mapping – 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	Give an example for one to one and one to many relationships	**BTL4**	**Analysing**
2	Express an entity relationship model with one example.	**BTL2**	**Understanding**
3	Explain about weak entity set with suitable example.	**BTL4**	**Analysing**
4	Describe Functional dependency.	**BTL2**	**Understanding**
5	Analyze about single valued and multi valued attributes	**BTL4**	**Analysing**
6	Define a foreign key? Give example.	**BTL3**	**Applying**
7	Classify different types of Anomalies in relational databases.	**BTL3**	**Applying**
8	What are the desirable properties of decomposition?	**BTL1**	**Remembering**
9	Assess the significance of cardinality ratio.	**BTL5**	**Evaluating**
10	Demonstrate the need for Normalization.	**BTL3**	**Applying**
11	State the anomalies of 1NF.	**BTL1**	**Remembering**
12	Show how 4NF in Normal form is more desirable than BCNF?	**BTL1**	**Remembering**
13	Design a Database to illustrate BCNF.	**BTL6**	**Creating**
14	List out the steps needed to perform demoralization.	**BTL1**	**Remembering**
15	Discuss about Transitive Functional dependency.	**BTL2**	**Understanding**
16	Is it possible for several attributes to have the same domain? Illustrate your answer with suitable examples.	**BTL3**	**Applying**
17	What are the problems caused by redundancy?	**BTL2**	**Understanding**
18	Design a Database to illustrate 3NF.	**BTL6**	**Creating**
19	List out the Extended E-R features available in Entity Relationship diagram.	**BTL1**	**Remembering**
20	Sketch specialization with your own example.	**BTL5**	**Evaluating**

PART-B

1	Construct an E-R diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. Each insurance policy covers one or more cars, and has one or more	**BTL6**	**Creating**

	premium payments associated with it. Each payment is for a particular period of time, and has an associated due date, and the date when the payment was received. (13)		
2	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 Cars : horsepower, renter age requirement Vans : number of passengers Off-road vehicles : ground clearance, drivetrain(four or two wheel driven) Construct an ER model for the car rental company database.(13)	**BTL2**	**Understanding**
3	Write short Notes on. (i) Data Model and its Types.(07) (ii) E-R Diagram for Banking System.(06)	**BTL1**	**Remembering**
4	Draw E-R 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 item 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 a meal being refunded or walked out on.(13)	**BTL3**	**Applying**
5	What is Normalization? Explain First normal form. second normal form and third normal with an example.(13)	**BTL2**	**Understanding**
6	Notown Records has decided to store information about musicians who perform on its album(as well as other company data) in a database. The company has wisely chosen to hire you as a database designer. Each musician that records at Notown has an SSN,a name, an address, and a phone number. Poorly paid musicians often share the same address and no address has more than one phone. Each instrument used in songs recorded at Notown has a unique identification number, a name(eg,guitar,synthesizer,flute and a musical key(e.g,C,B-flat,E-flat) Each album recorded on the Notown label has a unique identification number, a title, a copyright date, a format (eg,CD or MC) and an album identifier. Each song recorded at Notown has a title and an author. Each musician may play several instruments and a given instrument may be played by several musicians. Each album has a number of songs on it. but no song may appear on more than one album. Each song is performed by one or more musicians and a musician may perform a number of songs. Each album has exactly one musician who acts as its producer.	**BTL2**	**Understanding**

	A musician may produce several albums, of course, Design a conceptual schema for Notown and draw an ER diagram for your schema. The preceding information describes the situation that the Notown database must model. Be sure to indicate all keys and cardinality constraints and any assumptions you make. Identify any constraints you are unable to capture in the ER diagram and briefly explain why you could not express them.(13)		
7	(i) Draw an E-R diagram for a banking enterprise with almost all components and explain.(06) (ii) Explain Functional dependency and trivial functional dependency with examples.(07)	**BTL4**	**Analysing**
8	Demonstrate the features supported in Enchanced ER Model with your own database.(13)	**BTL3**	**BTL3**
9	i) Summarize the term anomalies. Explain BCNF in detail.(07) ii) Decide why BCNF is used and how it differs from 3 NF?(06)	**BTL5**	**Evaluating**
10	(i) Analyze about lossless Decomposition.(07) (ii) Design your own database to illustrate 3NF.(06)	**BTL4** **BTL3**	**Analysing** **BTL3**
11	(i) Draw the E-R diagram for bank systems(Home Loan applications)(7) (ii) Illustrate specialization and generalization with your own example.(6)	**BTL2**	**Understanding**
12	Explain about Functional Dependencies and its impact on the data base.(13)	**BTL1**	**Remembering**
13	Write short Notes on. (i) Non loss decomposition(6) (ii) Lossy decomposition(7)	**BTL1**	**Remembering**
14	Write short Notes on. (i) Join Dependencies(7) (ii) 5th Normal Form(6)	**BTL4**	**Analysing**
	PART-C		
1	Give an example of a relation that is in 3NF but not in BCNF.How will you convert that relation in to BCNF.(15)	**BTL2**	**Understanding**
2	Consider the following scenario: A university registrar's office maintains data about the following entities: a)courses,includingnumber,title,credits,syllabus,and prerequisites b)course offerings,including course number,year,semester,sectionnumber,instructor,timings and classroom (c)students,including student-id,name and program and (d)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. i)Model an entity relationship diagram for the above scenario.(6) ii)Map the entity relationship diagram you have modeled to relations.(9)	**BTL6**	**Creating**
3	Consider the following bitmap technique for tracking free space in a file. For each block in the file, two bits are maintained in the bitmap. If the block is between 0 and 30 percent full the bits are 00,between 30 and 60 percent the bits are 01,between 60 and 90 percent the bits are 10, and above 90 percent the bits are 11.Such bitmaps can be kept in memory even for quite large files. (15) i) Describe how to keep the bitmap up to date on record insertions and deletions.	**BTL5**	**Evaluating**

	ii) Outline the benefit of the bitmap technique over free lists in searching for free space and in updating free space information.		
4	State the need for Normalization of a database and explain the various Normal Forms(1^{st},2^{nd},3^{rd},BCNF,4^{th},5^{th} and Domain Key)with suitable examples(15)	**BTL5**	**Evaluating**

UNIT III - TRANSACTIONS

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 the properties of Transaction.	**BTL1**	**Remembering**
2	Discuss about the states of transaction.	**BTL2**	**Understanding**
3	Analyze the requirements of transaction properties.	**BTL4**	**Analysing**
4	Illustrate the situation to roll back a transaction.	**BTL3**	**Applying**
5	Discuss the term aborted state.	**BTL2**	**Understanding**
6	Summarize the term committed state.	**BTL2**	**Understanding**
7	What is serializable schedule?	**BTL1**	**Remembering**
8	What is Serializability? How it is tested?	**BTL5**	**Evaluating**
9	Show recoverable schedule with suitable example.	**BTL3**	**Applying**
10	Analyze the term concurrency control.	**BTL4**	**Analysing**
11	Recommend the need of concurrency control.	**BTL5**	**Evaluating**
12	Design your own example to illustrate cascaded rollback.	**BTL6**	**Creating**
13	Define conflict serializable.	**BTL1**	**Remembering**
14	What type of locking needed for insert and delete operations?	**BTL6**	**Creating**
15	What are the different modes of lock?	**BTL1**	**Remembering**
16	Examine the use of lock compatibility matrix.	**BTL3**	**Applying**
17	List the four conditions for deadlock.	**BTL1**	**Remembering**
18	Give an example of Two phase commit protocol.	**BTL2**	**Understanding**
19	Differentiate strict two phase locking protocol and rigorous two phase locking protocol.	**BTL4**	**Analysing**
20	Name the available dead lock prevention schemes.	**BTL1**	**Remembering**

PART-B

1	(i) Explain the ACID Properties of a transaction. (07) (ii) What benefit does rigorous two phase locking provide? Examine how does it compare with other forms of two phase locking?(06)	**BTL1** **BTL3**	**Remembering** **Applying**
2	i) What is concurrency control?Explain the two phase locking protocol with an example.(7) ii) Explain conflicitserializability and view serializability.(6)	**BTL2**	**Understanding**
3	Write short notes on: i) Transaction concept (06) ii) Deadlock (07)	**BTL1**	**Remembering**

4	What is dead lock? How does it occur? How transactions be written to (i) Avoid deadlock (06) (ii) Guarantee correct execution (07) Illustrate with suitable examples.	**BTL3**	**Applying**
5	Explain why timestamp based concurrency control allows schedules that are not recoverable. Describe how it can be modified through buffering to disallow such schedules. (13)	**BTL6**	**Creating**
6	What is two-phase locking and how does it guarantee serializability give suitable example. (13)	**BTL5**	**Evaluating**
7	What is Concurrency? Explain it in terms of locking mechanism and two phase Commit Protocol. (13)	**BTL4**	**Analysing**
8	Explain the Two phase Commit and Three-Phase Commit Protocols. (13)	**BTL4**	**Analysing**
9	i) Illustrate two phase locking protocol with an example. (6) ii) Outline deadlock handling mechanisms.(7)	**BTL1** **BTL3**	**Remembering** **Applying**
10	(i) Differentiate strict two phase locking protocol and rigorous two phase locking protocol.(6) (ii) How the time stamps are implemented? Explain.(7)	**BTL1** **BTL2**	**Remembering** **Understanding**
11	When is a transaction said to be deadlocked? Explain the deadlock prevention methods with an example? (13)	**BTL4**	**Analysing**
12	(i) Describe about the deadlock prevention schemes. (07) (ii)With a neat Sketch explain the states of a transaction. (06)	**BTL2** **BTL1**	**Understanding** **Remembering**
13	(i) Describe about deadlock detection. (07) (ii)Define the term Recoverable schedule and Cascadeless schedules (06)	**BTL1**	**Remembering**
14	Discuss the violations caused by each of the following: dirty read, non-repeatable read and phantoms with suitable example. (13)	**BTL2**	**Understanding**
	PART-C		

1	Consider schedules s3,s4,and s5 below. Determine whether each schedule is strict, cascadeless, recoverable or nonrecoverable. (Determine the strictest recoverability condition that each schedule satisfies.) (15)
	S3:r1(X);r2(Z);r3(X);r3(Y);w1(X);c1;w3(Y);c3;r2(Y);w2(Z);w2(Y);C2;
	s4 : r1(X);r2(Z);r1(Z);r3(X),r3(Y);w1(X);w3(Y);r2(Y);w2(Z);w2(Y);c1;c2;c3;
	s5 : r1(X);r2(Z);r3(X);r1(Z);r2(Y);r3(Y);w1(X);C1;w2(Z);w3(Y);w2(Y);c3;c2;
		BTL5	**Evaluating**

2	Explain why transaction atomicity is the one of the most important requirement for concurrency control? Justify : "Concurrent execution of transactions is more important when data must be fetched from (slow) disk or when transactions are long and is less important when data is in memory and transactions are very short".(15)	**BTL6**	**Creating**
3	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? (8) Consider the following extension to the tree locking protocol, which allows both shared and exclusive locks: i) A transaction can be either a read only transaction, in which case it can	**BTL6**	**Creating**

	request only shared locks or an update transaction in which case it can request only exclusive locks. ii) Each transaction must follow the rules of the tree protocol. Read only transactions may lock any data item first,where as update transactions must lock the root first. Show that the protocol ensures Serializability and deadlock freedom. (7)		
4	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:W(Z),T3:R(Z) For each of the schedules answer the following questions: (i) What is the precedence graph for the schedule?(02) (ii)Is the schedule conflict serializable? If so what are all the conflict equivalent serial schedules? (07) (iii) Is the schedule view serializable? If so what are all the view equivalent serial schedule? (06)	**BTL5**	**Evaluating**

UNIT IV - 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 Hashing – Query Processing Overview – Algorithms for SELECT and JOIN operations – Query optimization using Heuristics and Cost Estimation.

PART-A

Q.No.	Question	Level	Competence
1	What is a B+ tree index file in DBMS?	**BTL1**	**Remembering**
2	Examine the need for query Optimization.	**BTL3**	**Applying**
3	Explain "Query Optimization" with your own database.	**BTL3**	**Applying**
4	Point out the methods for implementing JOINs.	**BTL4**	**Analyzing**
5	Define software and hardware RAID systems.	**BTL1**	**Remembering**
6	Illustrate the need for RAID.	**BTL3**	**Applying**
7	Distinguish between fixed length records and variable length records?	**BTL2**	**Understanding**
8	When is it preferable to use a dense index rather than a sparse index? Explain your answer.	**BTL6**	**Creating**
9	List the different Hashing techniques.	**BTL1**	**Remembering**
10	Give the procedure to reduce the occurrences of bucket overflows in a hash file organization?	**BTL2**	**Understanding**
11	What are ordered indices with example?	**BTL1**	**Remembering**
12	Contrast sparse index and dense index	**BTL2**	**Understanding**
13	Outline the steps involved in query processing.	**BTL2**	**Understanding**
14	Point out the disadvantages of B Tree over B+ Tree	**BTL4**	**Analyzing**
15	Differentiate between Static and Dynamic Hashing	**BTL4**	**Analyzing**
16	List out the mechanisms to avoid collision during hashing.	**BTL5**	**Evaluating**
17	What are select operations?	**BTL1**	**Remembering**
18	Assess why we need to go for cost estimation in query optimization.	**BTL5**	**Evaluating**

19	What is hash function? Give example.	**BTL1**	**Remembering**
20	Prepare the factors to be considered for the evaluation of indexing and hashing techniques?	**BTL6**	**Creating**
	PART-B		
1	Explain about RAID system. How does it improve performance and reliability. Discuss the level 3 and level 4 of RAID. (3+4+6)	**BTL2**	**Understanding**
2	(i) Describe the index schemas used in databases.(07) (ii) Since indices speed query processing, why might they not be kept on several search keys? List as many reasons as possible.(06)	**BTL1**	**Remembering**
3	(i) Describe the different types of file organization? Explain using a sketch of each of them with their advantages and disadvantages.(13)	**BTL1**	**Remembering**
4	(i) Describe the ordered indices with example.(10) (ii)Describe the different methods of implementing variable length records. (03)	**BTL1**	**Remembering**
5	Give a detailed description about Query Processing and Optimization. Explain the cost estimation of Query Optimization. (13)	**BTL2**	**Understanding**
6	Discuss briefly about B+ tree index file with example. (07) How does a B-tree differ from a B+ - tree? why is a B+-tree usually preferred as an access structure to a data file?(06)	**BTL2**	**Understanding**
7	(i) Illustrate indexing techniques with suitable examples (07) (ii) Write notes on Hashing.(06)	**BTL3**	**Applying**
8	Illustrate the Join order optimization and Heuristic optimization algorithms.(13)	**BTL3**	**Applying**
9	What is meant by semantic query optimization? How does it differ from other query optimization technique? Give example. (13)	**BTL4**	**Analysing**
10	Examine the algorithms for SELECT and JOIN operations (13)	**BTL4**	**Analysing**
11	Examine the catalog information for cost estimation for selection and sorting operation in database. (13)	**BTL4**	**Analysing**
12	Describe about B tree index file with example.(13)	**BTL1**	**Remembering**
13	Explain the distinction between static and dynamic hashing. Discuss the relative merits of each technique in database applications. (13)	**BTL5**	**Evaluating**
14	Develop a B+ tree to insert the following key elements(order of the tree 3)5,3,4,9,7,15,14,21,22,23. (13)	**BTL6**	**Creating**
	PART-C		
1	Construct 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. 1 3 5 8 9 12 17 28 Show the extendable hash structure for this file if the hash function is h(x)=x rod 8 and buckets can hold three records. Show how the extendable hash structure changes as the result of each of the following steps: INSERT 2 INSERT 24	**BTL6**	**Creating**

	DELETE 5 DELETE 12. (15)		
3	What is query optimization? Explain the steps in query optimization.(15)	**BTL5**	**Evaluating**
4	With suitable diagrams,Explain in detail about the RAID levels(level 0,level 1,level 0+1,level 3,level 4,level 5) (15)	**BTL5**	**Evaluating**

UNIT V - ADVANCED TOPICS

Distributed Databases: Architecture, Data Storage, Transaction Processing – Object-based Databases: Object Database Concepts, Object-Relational features, ODMG Object Model, ODL, OQL - XML Databases: XML Hierarchical Model, DTD, XML Schema, XQuery – Information Retrieval: IR Concepts, Retrieval Models, Queries in IR systems.

PART-A

Q.No.	Question	Level	Competence
1	Compare information retrieval Vs DBMS.	**BTL4**	**Analyzing**
2	Give the architecture models in distributed database.	**BTL2**	**Understanding**
3	Show how are transaction performed in Object oriented database?	**BTL2**	**Understanding**
4	List the Operations performed in transaction?	**BTL1**	**Remembering**
5	Define Information Retrieval system. Prepare how it is differs from database system.	**BTL3**	**Applying**
6	Define distributed database management system.	**BTL2**	**Understanding**
7	Demonstrate the meaning of homogenous and heterogeneous DDBMS	**BTL3**	**Applying**
8	What are ODL and OQL.	**BTL1**	**Remembering**
9	List out the IR models.	**BTL1**	**Remembering**
10	Tell how spatial databases are more helpful than active database?	**BTL3**	**Applying**
11	Differentiate XML schema and DTD.	**BTL4**	**Analyzing**
12	Discuss Relevance Ranking.	**BTL1**	**Remembering**
13	State the function of XML schema.	**BTL1**	**Remembering**
14	List the features of object relational.	**BTL1**	**Remembering**
15	How does the concept of an object in the object oriented model differ from the concept of an entity in the entity relationship model?	**BTL4**	**Analyzing**
16	Can we have more than one constructor in a class? If yes, explain the need for such a situation.	**BTL5**	**Evaluating**
17	Explain the need of object oriented database.	**BTL5**	**Evaluating**
18	Create a XML code for display a greeting message.	**BTL6**	**Creating**
19	Give the general syntax of XML file.	**BTL2**	**Understanding**
20	Develop addition of two numbers using XML.	**BTL6**	**Creating**

PART-B

1	List the languages used in XML databases. (13)	**BTL1**	**Remembering**

2	Describe the important models of information retrieval. (13)	**BTL1**	**Remembering**
3	Describe about Distributed Databases and their characteristics, functions and advantages and disadvantages.(13)	**BTL1**	**Remembering**
4	Explain the necessary characteristics a system must satisfy to be considered as an object oriented database management system. (13)	**BTL5**	**Evaluating**
5	Differentiate between Document Type Definition and XML schema. (13)	**BTL2**	**Understanding**
6	i) Discuss about Distributed Transactions (07) ii) Show the challenges in object relational database.(6)	**BTL2**	**Understanding**
7	i) Compare and contrast between object oriented and XML databases. (7) ii)Give XML representation of bank management system and also explain about DTD and XML schema (6)	**BTL4**	**Analyzing**
8	Discuss briefly about object database concepts. (13)	**BTL2**	**Understanding**
9	Illustrate the concepts for information retrieval. (13)	**BTL3**	**Applying**
10	Illustrate the hierarchical data model in XML. (13)	**BTL3**	**Applying**
11	Point out the types of queries in IR systems. (13)	**BTL4**	**Analyzing**
12	Describe in detail about Object Model of ODMG. (13)	**BTL1**	**Remembering**
13	i) Explain the features of object relational. (7) ii) Examine the process of querying XML data with an example. (6)	**BTL4**	**Analyzing**
14	Suppose that you have been hired as a consultant to choose a database system for your client's application. For each of the following applications, state what type of database system (relational, persistent programming language based OODB, object relational; do not specify a commercial product) you would recommend. Justify your recommendation. (13) i) A computer aided design system for a manufacturer of airplanes. ii) A system to track contributions made to candidates for public office. iii) An information system to support the making of movies.	**BTL6**	**Creating**
PART-C			
1	Give the DTD or XML Schema for an XML representation of the following nested-relational schema : (15) Emp=(ename,ChildrenSet setoff(Children),SkillsSet setoff (Skills)) Children=(name,Birthday) Birthday=(day,month,year) Skills=(type,ExamsSet setoff(Exams)) Exams=(year,city)	**BTL6**	**Creating**
2	Explain with diagrammatic illustration the architecture of a distributed database management system. (15)	**BTL5**	**Evaluating**

3	Consider the following LIBRARY relational database schema ; BOOK(Book_id,Title,Publisher_name) BOOK_AUTHORS(Book_id,Author_name) PUBLISHER(Name,Adress,Phone) BOOK_COPIES(Book_id,Branch_id,No_of_copies) BOOK_LOANS(Book_id,Branch_id,Card_no,Date_out,Due_date) LIBRARY_BRANCH(Branch_id,Branch_name,Address) BORROWER(Card_no,Name,Address,Phone) Create an XML schema document that corresponds to this database schema. (15)	**BTL6**	**Creating**
4	Explain in detail about Object Definition Language and Object Query Language in object database. (15)	**BTL5**	**Evaluating**