

PART-A Questions

1. What does Data Model mean?
2. What are different types of keys?
3. Define the term tuple.
4. When two relations are said to be union compatible.
5. Write the uses of functional dependency.
6. What is referential integrity?
7. There are two approaches to creating an Object – Oriented database. What are they?
8. Define Persistent Storage Module (PSM).
9. What are the different types of storage media?
10. Write the primary disadvantage of the index – sequential file organization
11. Which of the following data model is widely applied in many real world database applications?
(a) Network model (b) Relational model (c) Hierarchical model
12. A _____ describes any field that could serve as a primary key.
13. Give any two characteristics of a Relational Database System.
14. Name the basic Relational Algebra operations.
15. Foreign keys cannot be NULL (Say TRUE or FALSE)
16. Find the ODD one out of the following (a) ALTER (b) INSERT (c) UPDATE (d) SELECT
17. Which normal Form is called as a Strict 3 NF?
18. In Select Intensive real word database applications, it is better to normalize up to _____ Normal Form
19. The presence of a _____ allows the system to streamline its recovery process.
(a) Checkpoint (b) Fact table (c) Rollbacks
(d) none of the above
20. Which one is the example for stable storage?
(a) Main Memory b(b) Cache (c) RAID (d) None of the above
21. The Over all design of the database is called as _____



22. What is the language in which user instructs the system to perform a sequence of operations on the database to compute the desired result?
23. Name the commands used for controlling a transaction
24. _____ constraints ensure that a value that appears in one relation for a given set of attributes also appears for a certain set of attributes in another relation.
25. Represent the following scenario in ER Diagram- Residents in a city
26. What are the different types of Server system architectures?
27. How Boyce-Codd Normal form is different from 3NF?
28. Give the Syntax for Triggers
29. What are kinds of Indices?
30. What is the state a Transaction can occupy, when it has been rolled back and the database has been restored to its prior state to the start of the transaction?
31. What are the various levels of data abstraction?
32. _____ is a set of one or more attributes that, taken collectively, allow us to identify uniquely an entity in the entity set.
33. Give the use of dynamic SQL component.
34. _____ is a nonprocedural query language based on the logic programming language Prolog.
35. What is an assertion?
36. List the pitfalls in relational-database design.
37. What does the ODMG standard define?
38. What do you mean by persistent storage module?
39. _____ is organized logically as a sequence of records.
40. Define dense indices.
41. Define data model?
42. _____ is called weak entity types.
43. What are the constraints of relational model?
44. Natural Join is a combination of _____
45. Define View?
46. What is the task of preprocessor in embedded SQL?



47. Define candidate Key?
48. Another name for fifth normal is _____
49. File header contains information about _____.
50. Where the data pointers are stored in B+ tree?
51. The _____ clause corresponds to the projection operation of the relational algebra.
52. The _____ are the functions that take a collection of value as input and return a single value.
53. _____ allows the creation of complex data types with nested structures, arrays, and multisets.
54. Expand CLOB
55. For each attribute, there is a set of permitted values called _____
56. The functional dependency is referred as _____.
57. The Passing of authorization from one user to another user can be represented by a _____
58. _____ is the programming language extended with constructs to handle persistent data
59. An index record appears for every search key value in the file is called _____
60. Database system provides a _____ to specify the database schema.
61. A _____ is a set of one or more attributes that taken collectively; allow us to identify uniquely a tuple in the relation.
62. The _____ clause causes the tuples in the result of a query to appear in sorted order.
63. Expand BLOB.
64. The functional dependency is referred as _____.
65. The transformation of a nested relation into a form with fewer relation valued attributes is called _____
66. _____ is organized as a sequence of records.
67. An index record appears for only some of the search key is called _____
68. _____ is the component used for Ensuring durability in the database system.

69. A database system provides a _____ to specify the database schema.
70. _____ is the lowest level of abstraction describes how the data are actually stored
71. Logical level is also known as _____ schema which describes the structure and constraints for the whole database.
72. Associations between two or more entities are called as _____
73. Project operation is used to select the _____ from the relation.
74. _____ function takes a collection of values and returns a single value as output.
75. The constraint Primary Key does not have _____ values.
76. Built in function Count is a _____ function.
77. _____ is a process of ensuring a schema design is free of redundancy.
78. Attributes may only have _____ values.
79. _____ storage is a non-volatile storage.
80. _____ Hashing allows the hash function to be modified automatically.
81. _____ is the logical structure of the database.
82. Associations are also called as _____.
83. _____ operation is used to query the rows from the relation.
84. _____ key is used to refer the related tables.
85. _____ Language is used to set access privileges.
86. _____ is an example of Aggregate function.
87. DKNF stands for _____.
88. If $\alpha \rightarrow \beta \gamma$ holds, then $\alpha \rightarrow \beta$ holds and $\alpha \rightarrow \gamma$ holds _____.
89. _____ hashing does not allow the hash function to be modified automatically.
90. _____ storage survives even when the system crashes.
91. What is query language?
92. Define database instance.
93. Write the query to find all customers who have an account but no loan at the bank.
94. List the built-in data types available in SQL.

95. List out the components used in ER model.
96. What is the coarse-granularity parallelism?
97. Write the use and syntax of revoke command.
98. What is need for data dictionary?
99. List the different types of indices.
100. List out the various states of transactions.
101. List the applications of database system.
102. List two reasons why null values might be introduced in the database.
103. List the different types of data types supported by SQL.
104. How will you add primary -key constraint in create table command?
105. Define the term superkey.
106. Specify the types of server system.
107. What is functional dependency?
108. Give an example for granting privileges in SQL.
109. What are the advantages of B+ tree?
110. List out ACID properties.
111. What is an attribute?
112. What is a Database system?
113. What is DDL (Data Definition Language)?
114. What is degree of a Relation?
115. What is an assertion?
116. What is stored procedure?
117. What is 2NF?
118. What is Domain-Key Normal Form?
119. Expand RAID.
120. What is B-Tree?
121. What do you mean by meta-data?
122. Define data independence.
123. Write short notes on relational schema.
124. List the aggregate functions.
125. What is the use of order by clause?

126. What is the use of Like operator in SQL?
127. What are prime attributes?
128. What are the properties of decomposition?
129. What is rotational delay?
130. What is linear search?
131. Define an entity.
132. What is query language?
133. Define the term Instance.
134. What is an Aggregation?
135. State Multivalued Dependencies.
136. What is the purpose of buffer manager?
137. What is static hashing function?
138. State natural join operation.
139. What is a throughput?
140. List the purpose of sequential file.
141. Define Instance and Schema.
142. Define Data Model.
143. What is a Super Key?
144. In what way is an Embedded SQL different from SQL?
145. What is a SELECT operation?
146. What is view in SQL? How is it defined?
147. What is multivalued dependency?
148. What is Authorization Graph?
149. What is a B+ Tree index?
150. List the properties that must be satisfied by a transaction.
151. What is the purpose of the database?
152. Define the term relational algebra.
153. What is view?
154. Which operation does Automatically Eliminate Duplicates?
155. Which diagram is representing weak entity sets in the E-R Model?
156. The ISA relationship may also refer to as which relationship?

157. What is the need for normalization?
158. Which is imposed as a very basic requirement on relation?
159. Which is organized logically as a sequence of records?
160. Which is supported to store related records of two or more relations in each block?
161. Where is the output of DDL stored?
162. Name the different levels of Abstraction.
163. What are the different types of outer joins?
164. Define View.
165. What is multivalued attribute?
166. Define Fine granularity.
167. What is the need for normalization?
168. Compare 3NF with BCNF.
169. What is Page shipping?
170. What are the advantages of B+ tree?
171. In the relational modes, cardinality is termed as _____.
172. In the architecture of a database system external level is the _____.
173. In case of entity integrity, the primary key may be _____.
174. The way a particular application views the data from the database, that application uses is a _____.
175. In an ER diagram attributes are represented by _____.
176. Define the term Weak entity set.
177. What are Atomic domains?
178. What is meant by De-normalization?
179. The file organization that provide very fast access to any arbitrary record of a file is called as a _____ file.
180. Expand ACID.
181. Mention the two categories of people who work with a database.
182. Define primary key.
183. What are the basic components in relational model?
184. List the various join operations.



185. Assume a sample database and mention how to add, remove and change information in database.
186. Write the general syntax for creating view.
187. What is the key role of functional dependency?
188. Mention any two purpose of normalization.
189. What is mean by access time?
190. Mention any two secondary storage devices.
191. State any two applications of DBMS.
192. A _____ is a variable whose domain is the set of all tuples.
193. SQL stands for _____.
194. What are the attributes of primary key?
195. Write any two mapping cardinalities.
196. What is meant by centralized database systems?
197. A domain is _____ if elements of the domain are considered to be indivisible units.
198. A _____ is a statement that the system executes automatically as a side effect of a modification to the database.
199. What are the two basic kinds of indices?
200. A _____ is a unit of program execution.

PART-B Questions

1. What are the responsibilities of DBA?
2. In what way is an Embedded SQL different from SQL?
3. What are the desirable properties of decomposition?
4. Give a comparison of Object - oriented and Object - relational databases.
5. Give the comparison between ordered indexing and hashing.
6. What are five main functions of a database administrator?
7. Let $R = (A, B, C)$, and let r_1 and r_2 both be relations on schema R . Give an expression in the domain relational calculus that is equivalent to the $r_1 \cap r_2$
8. What is static SQL? How does it differ from dynamic SQL?
9. Write short notes on DKNF.

10. In the sequential file organization, why is an overflow *block* used even if there is, at the moment, only one overflow record?
11. Write querying in a Database System
12. Consider the following relational database :
employee (employee_name, street, city)
works (employee_name, company_name, salary)
company (company_name, city)
manages (employee_name, manager_name)
Each of the following queries given an expression in a relational algebra :
(a) Find the names of all employees who work for First Bank Corporation.
(b) Find the names, address and cities of residence of all employees.
(c) Find the names of all employees in the data base who do not work for First Bank Corporation.
13. Construct an E-R diagram for a car insurance company with a set of customers, each of whom owns a number of cars. Each car has associated with it zero to any number of recorded accidents.
14. How Roles are used in Granting Authorization
15. Brief about Conflict Serializability.
16. List the main functions of a database administrator.
17. What are the three clauses of an SQL expression?
18. What are the limitations of SQL authorization?
19. What do the object-relational database systems provide?
20. Name the parts of physical object identifiers.
21. Define three levels in three schema architecture.
22. Define Procedural query language and Non Procedural query Language?
23. Write basic structure of SQL query statement?
24. What are the inference rules for functional dependency?
25. What are the methods for collision resolution?
26. Explain about the Generalization concepts?
27. What is the use of using null values in relation?
28. What is the need for trigger in the DB?

29. How will you implement the Atomicity and durability?
30. Compare 3NF with BCNF.
31. Explain about the roles of the administrator?
32. What is the need for integrity constraints with examples?
33. Draw the ER diagram for Banking Enterprises system.
34. Give the advantages and disadvantages of B.
35. How will you avoid the collision in the hashing techniques?
36. Write short notes on Entity types.
37. Define the importance of Relational Algebra.
38. Write about Assertions.
39. Write notes on Functional Dependency.
40. Discuss the needs of Indexing.
41. Write about the different views of data.
42. Write short notes on Set Intersection operations.
43. Write about Assertions.
44. Define Functional dependency.
45. What is Multi Level Indexing?
46. Describe the three levels of data abstraction.
47. Explain embedded SQL in detail.
48. Design a generalization – specialization hierarchy of employee details.
49. List the three design goals for relational databases and explain why each is desirable.
50. Explain the ACID properties.
51. Describe database uses and administrators in database systems.
52. In what are the ways can we modify a database – Explain.
53. Discuss specialization with an example.
54. Explain triggers in SQL.
55. Differentiate sparse and dense indices.
56. What is E-R model and Object Oriented model?
57. What is Relational Calculus? How does Tuple-oriented relational calculus differ from domain-oriented relational calculus?

58. Differences between TRUNCATE & DELETE Commands.
59. What is Multivalued dependency?
60. What is Hashing technique?
61. Explain in brief about the three-schema architecture.
62. Write short notes on referential integrity constraint.
63. Discuss about Group by clause.
64. What do you mean by functional dependency?
65. How are file blocks allocated on disk?
66. Write down the pros and cons of file processing system.
67. How do you modify the information in the database?
68. Distinguish weak and strong entity set.
69. State the theory of multivalued dependencies.
70. What is the secondary index?
71. What are the functions of a DataBase Administrator?
72. What are the three characteristics of a Relational Database System?
73. With an example, explain a weak entity in an ER Diagram.
74. Explain with an example the lossless-join decomposition.
75. What is a Heap file? How are pages organised in a heap file?
76. Write the role of the Database Administrator.
77. Give Short notes about SELECT, WHERE, FROM Clause.
78. What is Extended E-R Features? Write a short note on it.
79. What do you understand on First Normal Form?
80. What is Data Dictionary Storage?
81. Consider the following table:

Employee

Person_name	Street	city
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Works

Person_name	Company_name	salary
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Give the expression in SQL:

- a. Find the names of all employees who work for TCS.
 - b. Find the names and cities of residence of all employees who work for TCS.
 - c. Find the sum of salary of all employees.
82. How are views updated? What are the restrictions in updating views?
 83. How are Roles used in Granting Authorization? Give the syntax to create role.
 84. State the theory of BCNF.
 85. What is the sparse index?
 86. What is meant by Transaction management?
 87. List out the various Aggregate functions.
 88. Define Weak entity with an example.
 89. What are the features of a good relational design?
 90. Define B+ tree with an example.
 91. Construct an E-R diagram for Bank transaction.
 92. Explain three forms of outer join.
 93. Write a short note on DDL statements with example.
 94. Give a simple definition for multivalued dependencies.
 95. Explain about B-tree index files. Also give example for typical nodes of B-tree.
 - a. Leaf node
 - b. Non-leaf node
 96. Represent the three levels of data abstraction in the form of block diagram.
 97. List out the built-in aggregate functions.
 98. Draw a sample E-R diagram for any one application.
 99. Explain the concept of multivalued dependency.
 100. With the help of state diagram, explain the concept of transaction.

PART-C Questions

1. Explain the architecture of Database Management System with neat diagram.
2. Compare file system with database system.
3. Define the following terms.
 - a. Entity Types,
 - b. Entity Sets,
 - c. Attributes, Keys
4. Draw an ER diagram for a Bank database.



5. Discuss in detail the fundamental operations of relational algebra.
6. Explain nested query statements using SQL with a suitable example.
7. Discuss with examples, the five built in aggregate functions offered by SQL.
8. Why is a relation that is in 3 NF generally considered good?
9. Define BCNF with an example. And compare BCNF with 3 NF.
10. What is normalization? Give the various normal forms of relational schema.
11. Discuss about triggers. How do triggers offer a powerful mechanism for dealing with the changes to a database with suitable example?
12. Explain in detail the several aspects of the object – oriented data model.
13. (a) What are the various approaches of persistence of objects?
(b) Brief about Reference Types.
14. (a) Describe the structure of a B+ tree.
(b) How update operations are performed on B+ tree.
15. (a) Describe a hash file organization.
(b) In the sequential file organization, why is an overflow block used if there is, at the moment, only one overflow record?
16. a. List four significant differences between a file-processing system and a DBMS.
b. Explain the difference between physical and logical data independence .
c. Describe about classification of Database Management System
17. a. Construct an E-R diagram for a hospital with a set of patients and a set of doctors. Associate with each patient a log of the various tests and examinations conducted.
b. Explain about three schema architecture
18. Explain in detail about Relational model concepts
19. a. Consider the Relational Database
 - Employee (empname,street,city)
 - Works (empname,companyname,salary)
 - Company (companyname,city)
 - Manages (empname,managername)

Give an expression in the relational algebra for each request.



- (i) Find the names of all employees who work for First Bank Corporation
- (ii) Find the names, street addresses and cities of residence of all employees Who work for First Bank Corporation and earn more than 200000 per Annum
- (iii) Find the names of all employees in this database who live in the same City as the company for which they work
- (iv) Find the names of all the employees who earn more than every Employees of small Bank Corporation

(b) Write short notes on Tuple Relational calculus

20. a. Write about DML and schema change statements in SQL with suitable examples.

b. Explain in detail about Database programming.

21. a. Differentiate between Base table and View

b. Consider the following Schema:

Sailors (sid: integer, sname: string, rating: integer, age:real)

Boats (bid: integer, bname: string, color: string)

Reserves (sid: integer, bid: integer, day: date)

Write SQL Queries for the following problems using the above schema

- i. Find the names and ages of all sailors
- ii. Find the names of sailors who have reserved boat number 103
- iii. Find the names of sailors who have reserved a red boat
- iv. Find the names of sailors who have reserved at least one boat
- v. Find the sids of all sailors who have reserved red boats but not green boats

22. a. Compute the closure of the following set F of functional dependencies for relation schema $R = (A, B, C, D, E)$.

$A \rightarrow BC$

$CD \rightarrow E$

$B \rightarrow D$

$E \rightarrow A$

List the candidate keys for R .

b. Differentiate between 3NF and BCNF

23. a. Explain in detail about informal design guidelines for Relation Schemas

b. What is normalization? Explain 1NF, 2NF, 3NF and BCNF with simple example.

24. a. Explain the different properties of indexes in detail
b. Explain various hashing techniques
25. a. Describe the structure of B⁺ tree and list the characteristics of a B⁺ tree
b. A power failure that occurs while a disk block is being written could result in the block being only partially written. Assume that partially written blocks can be detected.

An atomic block write is one where either the disk block is fully written or nothing is written (i.e., there are no partial writes). Suggest schemes for getting the effect of atomic block writes with the following RAID schemes. Your schemes should involve work on recovery from failure.

- i. RAID level 1 (mirroring)
ii. RAID level 5 (block interleaved, distributed parity)
26. a. Detail about the database Architecture.
b. Enumerate the duties of Database Administrator.
c. How data abstraction is made in Database.

27. a. Define primary key, super key and candidate key.
b. Consider the following relational database:

employee (*person_name*, *street*, *city*)

works (*person_name*, *company_name*, *salary*)

company (*company_name*, *city*)

manages (*person_name*, *manager_name*)

Each of the following queries given an expression in a relational algebra :

- (1) Find the names of all employees who work for "Safe and Trust Bank".
(2) Find the names, address and cities of residence of all employees.
(3) Find the names of all employees in the data base who do not work for Safe and Trust bank.
(4) Give all managers a 10 per cent salary raise.
(5) Delete all tuples in the works relation for employees of Hopeful

Finance.

28. a. For each of the following, write suitable SQL commands and illustrate them

through an example:

- (i) Creation of views
 - (ii) Creation of a unique constraint
 - (iii) Checking the presence of NULL
 - (iv) To give access permission to a user
- b. Write about Group by and Having Clause
29. a. Write about Nested Subqueries
- b. Brief about any two Aggregate functions
30. a. Design an ER Diagram for keeping track of the exploits of your favorite sports team. You should store the matches played, the scores in each match, the players in each match and the individual player statistics, Summary statistics should be modeled as derived attributes.
- b. Write any five naming conventions used for ER schema diagram.
31. Explain the centralized and Client-Server Architecture
32. a. Why is normalization of database done?
- b. What are the insertion, deletion and update anomalies that occur in a database?
- c. Explain the 1NF, 2NF and 3 NF with proper examples
33. Write about File Organization and Organization of Records in File
34. a. Brief about Ordered Indices
- b. Explain various hashing techniques
35. a. Write about Transaction States
- b. Explain various recovery techniques during transaction in detail.
36. Explain the structure of a database system.
37. Explain the reduction of an E-R schema to tables.
38. Discuss the various operations of relational algebra.
39. Explain about the Query-by-Example (QBE) in detail.
40. a. Describe the referential integrity.
- b. Discuss the different forms of authorization on parts of a database.
41. a. Discuss the desirable properties of decomposition.
- b. Explain briefly the fourth normal form.



42. Explain the object oriented data model in detail.
43. a. Explain briefly how SQL allows complex types.
b. Explain the concept of querying with complex types.
44. a. Explain the organization of records in files.
b. Explain the hardware swizzling technique.
45. Explain the multiple-key access in detail.
46. a. Explain about characteristics of DBMS?
b. Write any three advantages of using the DBMS?
47. Draw the E-R diagram of Airline reservation?
48. Explain about relational algebra operations?
49. Discuss the properties of a relational table.
50. a. Explain about data definition in SQL with examples?
b. Write short note on aggregate functions and grouping with examples?
51. a. Explain about Assertions?
b. Explain about embedded SQL?
52. a. Write the informal design guidelines for relational schemas?
b. What are the inference rules for multivalued dependence?
53. Normalize the following table (up to 3rd normal form)
Customer(cust#,name,ord#,date,part#,desc,qty,price,supp#,name)
54. Explain about hashing techniques?
55. Write note on primary index and secondary index?
56. Explain about the datamining process in detail and compare it with KDD process.
57. a. Explain about various relation algebra operations with example.
b. Explain the desirable properties of Transaction.
58. a. Explain various SQL operations in detail.
b. Give the difference between Embedded SQL and Dynamic SQL.
59. a. Explain how modification has been done in SQL?
b. Briefly explain how views are helpful in solving complex queries.
60. Explain about ER model with neat diagram.
61. a. Explain about the Server System Architecture.



- b. Explain about the centralized and Client server architecture.
62.
 - a. Explain about the various types of File organization.
 - b. Explain about Data dictionary storage in detail.
63. Explain about 1NF, 2NF, 3NF, and BCNF in detail
64. Explain about various types of Indexing in detail
65. Explain about the types of serialization in detail with example.
66. Explain about the structure of DBMS with the neat sketch.
67.
 - a. Explain about datamining in detail.
 - b. Explain about the few relation algebra operations with examples.
68.
 - a. Explain about the SQL data types and SQL schema in detail.
 - b. How will you implement authorization in SQL
69.
 - a. Explain about the Set operations.
 - b. Explain about the Aggregate Functions.
 - c. Give the Diff between Embedded SQL and Dynamic SQL
70. Explain the overall design process of ER model
71.
 - a. Distinguished between centralized and Client Server architecture.
 - b. Explain about the server system architecture.
72. Explain about the various Normal Forms in detail.
73.
 - a. Explain about the Functional dependencies Theory.
 - b. Explain about the Data dictionary storage in detail.
74.
 - a. Compare Ordered Index and Hashing.
 - b. Compare Dynamic and Static Hashing.
75. Explain about the transaction and its desirable properties in detail with examples.
76. Explain the Client/ Server architecture available for DBMS in detail.
77. Explain EER model in detail with suitable examples.
78. Explain the various constraints involved in the design of a Relational Model.
79. Explain the Tuple Relational Calculus in Detail.
80. Discuss all the character based functions of SQL in detail
81. Explain the Views available in SQL with suitable examples.
82. Explain the various levels of Normalization in detail.



83. Convert an ER-model into normalized tables by taking a suitable example on your own.
84.
 - a. Explain primary index and secondary index in detail.
 - b. Write about Hash functions.
85. Explain Storage Hierarchy in detail.
86. Explain about DBMS architecture in detail.
87.
 - a. How are data models organized? Explain.
 - b. Differentiate Weak entity and Strong entity.
88. Explain Relational Algebra operations from set theory with suitable examples.
89. Explain the various operations involved in Domain Relational Calculus with suitable queries.
90. Explain the various constraints involved in the design of a Relational Model with suitable examples
91. Explain about the Views of SQL with suitable queries.
92. Explain the different levels of Normalization in detail with a suitable example.
93.
 - a. Discuss the design guidelines for relational schema.
 - b. Normalize relations from an E_R model of your own.
94. Explain the various Hashing techniques in detail with suitable examples.
95.
 - a. Explain Dynamic Multi level Indexing using B trees.
 - b. Compare the File organization with ordered and unordered records.
96. Explain briefly about database languages.
97. Explain about
 - a. Entity Relational model
 - b. Normalization
 - c. Semi structured data models
98. Explain about
 - a. Set operation.
 - b. Aggregate functions
 - c. Views
99. Discuss the various types of constraints in SQL Queries.
100. Explain the design of Entity- Relationship diagram with an example.
101. Explain briefly about server systems architecture.
102. What is Trigger? Explain the need and uses of Trigger in SQL.



103. Explain File organization mechanism in database.
104. With a neat sketch explain the insertion and deletion of nodes in a B+ tree.
105. Compare static hashing versus dynamic hashing.
106. Explain the implementation of atomicity and durability.
107. Explain briefly about architecture of a database system
108. Explain the relational Algebra operations with an example.
109. a. Explain basic structure of SQL Queries.
b. Write about joins in SQL.
110. Discuss on embedded SQL and dynamic SQL.
111. Explain database design requirements of a banking enterprise.
112. Explain about the centralized and client server architecture with diagrams.
113. What is normalization? Discuss the various normal forms with suitable example.
114. Discuss the possible ways of organizing records in files with an example.
115. Discuss on static and dynamic hashing.
116. Explain B+ tree index files organization with an example.
117. 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 database system?
118. Consider the following information about a university database:
- * Professors have an SSN, a name, an age, a rank, and a research specialty.
 - * Projects have a project number, a sponsor name (e.g., NSF), a starting date, an ending date, and a budget.
 - * Graduate students have an SSN, a name, an age, and a degree program (e.g., M.S., Ph.D.)
 - * Each project is managed by one professor (known as the project's principal investigator).
 - * Each project is worked on by one or more professors (known as the project's co-investigators).
 - * Professors can manage and/or work on multiple projects.
 - * Each project is worked on by one or more graduate students (known as the project's research assistants).

- * When graduate students work on a project, a professor must supervise their work on the project. Graduate students can work on multiple projects, in which case they will have a (potentially different) supervisor for each one.
- * Departments have a department number, a department name, and a main office.
- * Departments have a professor (known as the chairman) who runs the department.
- * Professors work in one or more departments, and for each department that they work in, a time percentage is associated with their job.
- * Graduate students have one major department in which they are working on their degree.
- * Each graduate student has another, more senior graduate student (known as a student advisor) who advises him or her on what courses to take.

Design and draw an ER diagram that captures the information about the university. Use only the basic ER model here; that is, entities, relationships, and attributes. Indicate any key and participation constraints.

119. Consider the following schema:

Suppliers(sid: integer, sname: string, address: string)

Parts(pid: integer, pname: string, color: string)

Catalog(sid: integer, pid: integer, cost: real)

The key fields are underlined, and the domain of each field is listed after the field name. Therefore sid 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, tuple relational calculus, and domain relational calculus:

- a. Find pairs of sids such that the supplier with the first sid charges more for some part than the supplier with the second sid.
- b. Find the pids of parts supplied by at least two different suppliers.
- c. Find the sids of suppliers who supply every red part.

120. a. Are the resulting relations of PRODUCT and JOIN operation the same?

Explain with example.

b. Give a brief account on Correlated sub query.

121. Consider the following relations:

Student (snum: integer, sname: string, major: string, level: string, age: integer)

Class (name: string, meets at: string, room: string, fid: integer)

Enrolled (snum: integer, cname: string)

Faculty (fid: integer, fname: string, deptid: integer)

The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class. Write the following queries in SQL. No duplicates should be printed in any of the answers.

a. Find the names of all Juniors (level = JR) who are enrolled in a class taught by I. Teach.

b. Find the age of the oldest student who is either a History major or enrolled in a course taught by I. Teach.

c. Find the names of all classes that either meet in room R128 or have five or more students enrolled.

d. Find the names of all students who are enrolled in two classes that meet at the same time.

e. Find the names of students not enrolled in any class.

122. Explain Embedded SQL and Dynamic SQL with example.

123. a. Give a set of FDs for the relation schema $R(A,B,C,D)$ with primary key AB under which R is in 2NF but not in 3NF.

b. Consider the relation schema $R(A,B,C)$, which has the FD $B \rightarrow C$. If A is a candidate key for R, is it possible for R to be in BCNF? If so, under what conditions? If not, explain why not.

124. What is Normalization? Explain various normal forms with suitable examples. List down the advantages and disadvantages of Normalization.

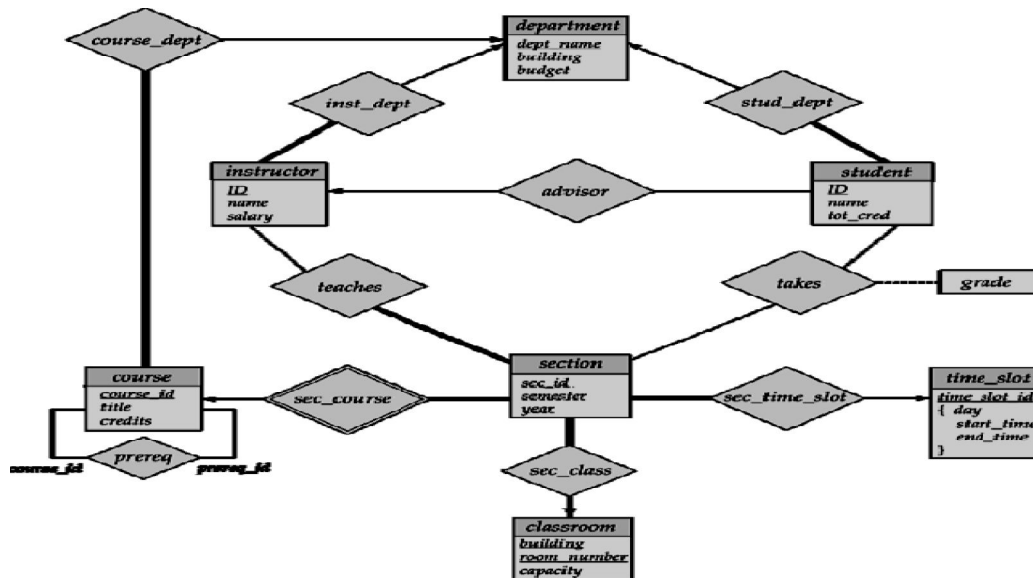
125. a. What is the minimum space utilization for a B+ tree index? What is the minimum space utilization for an ISAM index?

b. If your database system supported both a static and a dynamic tree index

- (say, ISAM and B+ trees), would you ever consider using the static index in preference to the dynamic index?
126.
 - a. Explain why local depth and global depth are needed.
 - b. Why is handling duplicate key values in Extendible hashing harder than in ISAM?
 127. Describe the advantages of using DBMS.
 128.
 - a. What are the different types of attributes?
 - b. Discuss about weak entity sets.
 129. Discuss about the various relational algebra operations.
 130. Describe about the relational model constraints.
 131. Discuss about the following with examples:
 - a. Schema change statements in SQL
 - b. Nested Queries
 - c. Correlated Nested Queries
 131.
 - a. Discuss about views in SQL.
 - b. Discuss about Stored procedure with an example.
 132. Define Functional Dependency. Explain the normal forms based on primary keys.
 133.
 - a. Define Multivalued Dependency. Explain about fourth normal form.
 - b. Define Join dependency. Explain about the fifth normal form.
 134. Explain about external hashing for disk files with a neat diagram.
 135. Discuss in detail about RAID concept with a neat diagram.
 136. With neat diagram, describe database system structure.
 137. Using bank example, write relational – algebra queries to find the account held more than two customers.
 138. Describe the circumstances in which you would choose to use embedded SQL.
 139. Explain in detail different join types and conditions.
 140. Explain different extended E-R features.
 141. How could you provide a database design for banking enterprise?
 142. How do the functional dependencies help in differentiating good database Design?

143. Explain in detail the Boyce-Codd Normal form.
144. Define Hashing. How can hash file organization be handled? Describe the various issues.
145. List out the ACID properties and explain the usefulness of each.
146.
 - a. Describe DataBase System Architecture with a neat diagram.
 - b. Write in detail about Data Mining.
147. Discuss the fundamental operations in the relational algebra with examples.
148.
 - a. SQL language has several parts. What are they?
 - b. How many clauses are there in the basic structure of an SQL? Explain.
149. Illustrate the issues to be considered while developing an ER diagram.
150. Describe briefly about the various constraints of the ER Enterprise Schema.
151. What is Normalization? Explain the various Normalization techniques with suitable examples.
152. What is FD? Explain the role of FD in the process of Normalization.
153. Describe the structure of B+ Tree and list the characteristics of a B+ Tree.
154. Explain about testing the serializability with respect to concurrency control Schemes. How will you determine whether a schedule is serializable or not.
155.
 - a. Compare ordered indexing and Hashing.
 - b. Explain about static hashing and dynamic hashing.
156. With neat diagram, describe database system structure.
157. Describe the various types of join in relational algebra.
158. Explain the following operators in subquery with example
 - a. set membership operator
 - b. set comparison operator
 - c. Exists operator
159. With relevant example, discuss the following
 - a. Data Definition Language
 - b. Data Manipulation Language
 - c. Triggers
160. Explain about the centralized and client server architecture with diagrams.
161. Convert the following ER Diagram to Relational table.





162. a. Explain 4 NF with an example.
b. What is the lossless join property of decomposition? Explain.
163. Discuss the various normal forms with suitable example.
164. Explain B+ Tree with example and draw the structure of the B+ tree. Explain how insertion takes place.
165. a. List out the ACID properties and explain them with example.
b. Explain the various states of transaction.
166. Explain briefly about architecture of a Database system with neat diagram.
167. Explain the fundamental relational algebra operations with an example.
168. Create the following two tables using SQL

Product

PRODUCT_ID	NOT NULL VARCHAR2(10)
PRODUCT_NAME	VARCHAR2(20)
MANUFACTURER_NAME	CHAR(20)
PRODUCT_RATE	NUMBER(9,4)
SELL_PRICE	NUMBER(9,4)
PRODUCT_DESCRIPTION	VARCHAR2(25)

Client

CLIENT_ID	NOT NULL VARCHAR2(10)
CLIENT_NAME	CHAR(20)

ADDRESS	VARCHAR2(15)
CITY	CHAR(15)
PIN	NUMBER(8)
STATE	CHAR(15)
BAL_DUE	NUMBER(9,4)

Write the SQL queries for the following.

- Retrieve the list of names and the cities of all the clients.
- Find the products whose selling price is greater than 2000 and less than or equal to 5000.
- Find the names of all clients having 'a' as the second letter in their names.
- List the names, city and state of the clients not in the state of 'ASSAM'.
- List all orders that were canceled in the month of March.

169. Write short notes on:

- Embedded SQL
- Dynamic SQL
- Integrity constraints

170. Briefly explain the Client-Server architecture and Server-system architecture with neat diagram.

171. Draw the ER diagram for an Online Book Store.

172. List out the various normal forms in a Relational database design with a suitable example.

173. Write short notes on:

- Decomposition algorithm
- Dependency preservation

174. Write short notes on:

- Atomicity
- Durability
- Concurrent executions

Serialization

175. a. Write briefly about B-tree index files.

b. Distinguish between Static hashing and Dynamic hashing.

d.



176. With the help of block diagram, explain the basic structure of a database management system.
177. Explain briefly about different data models.
178. Discuss the fundamental operations in relational algebra. Give example for each one.
179. Describe briefly about data constraints. Give example of different constraints that can be applied on the table?
180. What is aggregate function? Discuss with examples the 5 built-in aggregate function offered by SQL.
181. Explain briefly about procedures and triggers in SQL with example.
182. Why is a relation that is in 3NF generally considered good? Define BCNF with an example.
183. What is meant by normalization? Explain briefly about different Normalization forms.
184. What are the different types of storage media? Explain each one briefly.
185. The following key values are organized in an extendable hashing technique
1 3 5 8 9 12 17 28
Show that extendable hash structure for this file, if the hash function is $h(x)=x \text{ mod } 8$ and buckets can hold 3 records,
Show how the extendable hash structure changes as the result of each of the following steps.
- Insert 2
 - Insert 24
 - Delete 5
 - Delete 12
186. Explain the overall architecture of the database system with neat diagram.
187. Explain the basic Relational Algebra operations with the symbol used and an example for each.
188. Consider the employee-company relation. Write SQL statement for the following queries.

Employee-company relation:



Employees (person-name, street, city)

Works (person-name, company-name, salary)

Company (company-name, city)

Manages (person-name, manager-name)

a. Modify the database so that 'priya' now lives in 'chennai'.

b. Find the company that has the most employees.

c. Find all employees who are under the manager 'john'

d. Find all employees in the database who live in the same cities as the companies for which they work.

189. Justify the need of embedded SQL. Consider the relation student (stno, name, mark, grade). Write embedded dynamic SQL statements in C language to retrieve all the students' records whose mark is more than 90.

190. Explain the following with example:

a. Functional dependency b. Entity integrity c. Referential integrity

191. Draw the architecture of centralized computer system and explain.

192. With relevant examples, discuss First Normal Form, Second Normal Form and BCNF.

193. Discuss about any two techniques of organizing records in files.

194. How does a B-tree differ from a B+ tree? What is the order P of a B+ tree? Describe the structure of both internal and leaf nodes of a B+ tree. Give an example for each.

195. Describe the implementation of Atomicity and Durability with relevant block diagram.

196. a. Illustrate the relational algebra operation with an example.

b. What are the Additional Relational Algebra operations used for database manipulation?

197. a. What do you understand by Database Language?

b. How do you modify the database?

198. a. Illustrate the SET operation and Aggregate functions with an example.

b. What do you understand on nested sub queries?

199. Discuss on Embedded SQL and Dynamic SQL with example.
200. Design and create the Database for Banking Enterprise and explain.
201. Explain the Reduction of an E-R Schema to Tables with example.
202. What are Functional Dependencies? Explain with example.

203. Describe in detail on Multi valued Dependencies with example.
204.
 - a. Illustrate the concept of B+ Tree Index Files.
 - b. Write notes on B- Tree Index files.
205. With suitable example describe the Static and Dynamic Hashing with example.

