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S.K.S.S ARTS COLLEGE, THIRUPPANANDAL - 612504

QUESTION BANK

Title of the Paper

DATABASE SYSTEMS

Course: II B.Sc. (CS)
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Prepared by

Mr. M. ANANDAKUMAR, M.Sc., M.Phil.,
Head &Assistant Professor
Department of Computer Science

DEPARTMENT OF COMPUTER SCIENCE

CORE COURSE IV
DATABASE SYSTEMS

Unit I

Introduction: Database-System Applications- Purpose of Database Systems - View of Data --Database Languages - Relational Databases - Database Design -Object- Based and Semi structured Databases - Data Storage and Querying Transaction Management -Data Mining and Analysis - Database Architecture - Database Users and Administrators - History of DatabaseSystems.

Unit II

Relational Model: Structure of Relational Databases - Fundamental Relational-Algebra Operations Additional Relational-Algebra Operations- Extended Relational- Algebra Operations - Null Values -Modification of the Database.

Unit III

SQL: Data Definition - Basic Structure of SQL Queries - Set Operations- Aggregate Functions - NullValues - Nested Subqueries- Complex Queries - Views -Modification of the Database - Joined Relations - SQL Data Types and Schemas - Integrity Constraints -Authorization - EmbeddedSQL

Unit IV

Relational Languages: The Tuple Relational Calculus - The Domain Relational Calculus - Query-by- Example. Database Design and the E-R Model: Overview of the Design Process - The Entity-Relationship Model - 3 Constraints - Entity- Relationship Diagrams - Entity-Relationship Design Issues - Weak Entity Sets - Database Design for BankingEnterprise

Unit V

Relational Database Design: Features of Good Relational Designs - Atomic Domains and First Normal Form - Decomposition Using Functional Dependencies - Functional-Dependency Theory - Decomposition Using Functional Dependencies - Decomposition Using Multivalued Dependencies- More Normal Forms - Database- Design Process

UNIT – I
Choose the Correct Answer

1. The collection of data is referred to as the _____.
a) DBMS
b) Information
c) Instance
d) Database.

2. The overall design of the database is called _____.
a) database schema
b) instance
c) sub schema
d) none of the above.

3. The _____ is a collection of conceptual tools for describing data.
a) Logical schema
b)data model
c) instance
d) none of the above.

4. Entities are described in a database by a set of _____.
a) entity set
b) attributes
c) relationships
d) cardinalities.

5. Data about data known as _____.
a) meta data
b) raw
c) data dictionary
d) none of the above.

6. _____ tools are tools that enable an application programmer to construct forms and   reports without writing a program.
a) RAD
b) RAID
c) OLAP
d) Data mining.

7. A _____ is a collection of operations that performs a single logical function in a database application.
a) consistency
b) atomicity
c) transaction
d) durability.

8. _____ executes low level instructions generated by the DML compiler.
a) query optimization

b) query evaluation engine
c) query processor
d) interpreter.

9. _____ provide fast access to data items that hold particular values.
   a) indices
 b) data files
 c) data dictionary
 d) none of the above.

10. In _____ architectures, the front end directly communicates with a data base running at the back end.
a) two-tier
 b) three-tier
 c) database server
   d) none of the above.

Answers: 1.d2. a3.b4.b   5. a6.a   7. c8. b   9. a   10.a

Short Questions (2 Marks)

11. What is a DBMS?
12. What is a data inconsistency?
13. What is an abstract view of data?
14. What is a database instance?
15. Define the term physical schema.
16. What is a logical schema?
17. Define physical data independence.
18. What is a data dictionary?
19. What is a query language?
20. What is a transaction?

Paragraph Questions (5 Marks)

21. Describe the various database system applications.
22. Explain about data abstraction.
23. What is data independence? Explain its types.
24. Explain the difference between physical and logical data independence.
25. Write notes about data models with diagram.
26. Describe about database languages.
27. Discuss about data models.
28. Describe the various data base users.
29. Write notes about client and server machines.
30. Briefly explain the history of data base systems.

Essay Type Questions (10 Marks)

31. Discuss the various advantages of database systems.

32. Discuss the various disadvantages of file processing systems.

33. Explain the three levels of data abstraction with diagram.

34. Explain the functions of database administrator.

35. Illustrate different types of database system users and user interfaces.

36. Briefly explain the database languages with example.

37. List seven programming languages that are procedural and two that are non procedural. Which group is easier to learn and use? Explain your answer.

38. Briefly explain about database system structure and its components with diagram.

39. Illustrate the history of data base systems.

40. Describe the concept of data models with diagram.

UNIT - II
Choose the Correct Answer

1. A relational database consists of a collection of _____.
a) rows
b) tables
c) columns
d) values.

2. For each attribute, there is a set of permitted values called the _____.
a) domain
b) tuple
c) table
d) row.

3. The logical design of the database is _____.
a) database instance
b) relation schema
c) relation instance
d) database schema.

4. A _____ is a set of one or more attributes that taken collectively, allow us to identify uniquely an entity in the entity set.
a) candidate key
b) superkey
c) primary key
d) secondary key.

5. The primary key of the entity set becomes the primary key of the relation is _____.
a) weak entity set
b) strong entity set
c) relationship set
d) combined tables.

6. A database schema, along with primary key and foreign key dependencies, can be depicted pictorially by _____.
a) entity relationship diagram
b) ER diagram
c) schema diagram
d) none of the above.

7. The _____ operation selects tuples that satisfy a given predicate.
a) project
b) rename
c) union
d) select.

8. _____ functions take a collection of value and return a single value as a result.
a) aggregate
b) projection
c) built in
d) assignment.

9. The _____ operation is an extension of the join operation to deal with missing information.
a) natural join
b) assignment
c) outer join
d) projection.

10. A _____ is a language in which a user requests information from the database.
a) C
b) query language
c) relational
d) compiler.

Answers: 1. b   2. a   3. d   4. b   5. b   6. c   7. d   8. a   9. c   10.b

Short Questions (2 Marks)

11. Define a relation.
12. What is called domain?
13. What is a tuple variable?
14. What is a relational schema?
15. Define the term primary key.
16. What is the weak entity set?
17. What is the relational algebra?
18. What is the set intersection operation?
19. What is the domain relational calculus?
20. What is the purpose of delete command?

Paragraph Questions (5 Marks)

21. Write notes about basic structure of a relation.
22. Discuss about database schema with example.
23. Describe about the various keys with example.
24. Illustrate the concept of strong and weak entity set with ER diagram.
25. Draw the schema diagram for the university database and discuss the features.
26. Explain the various fundamental operations in the relational algebra with example.
27. Write notes about formal definition of the relational algebra.
28. Illustrate the features of null values.
29. List two reasons why we may choose to define a view.
30. Write notes about view definition with example.

Essay Type Questions (10 Marks)

31. Briefly explain the structure of relational databases with example.
32. Describe the differences in meaning between the terms relation and relation schema.
33. Discuss the concept of schema diagram and draw schema diagram for the banking enterprise.
34. Explain the various categorized of query languages,
35. Briefly explain the concept of relational algebra with its additional operations.
36. Discuss about aggregate functions with example.
37. Describe the concept of outer join operation and its forms with example.
38. Using the bank example, write relational algebra queries to find the accounts held by more than two customers in the following ways. a) using an aggregate function b) without using any aggregate functions.
39. Briefly explain about modification of the database with example.
40. List two major problems with processing update operations expressed in terms of views.

UNIT –III
Choose the Correct Answer

1. SQL uses a combination of relational algebra and _____ constructs.
 a) relational calculus
b) domain calculus
c) tuple calculus
d) none of the above.

2. In SQL, the elimination of duplicates using keyword _____.
a) distinct
b) unique
c) redundancy
d) null.

3. The _____ character matches any substring (using the operator like)
 a) underscore
 b) escape
 c) percent
 d) filter.

4. _____ functions take a collection (a set or multiset) of values as input and return a single value.
a) aggregate
b) built in
c) mathematical
d) recursive.

5. A _____indicates an absent value that may exist but be unknown or that may not exist atall.
a)Empty tuple
b)New value
c)Null value
d)Old value

6. The ____ connective tests for set membership, where the set is a collection of values produced by a select clause.
a) not in
b) exists
c) in
d) unique.

7. To change a value in a tuple without changing all values in the tuple, says
a) insert
b) updates
c) commit
d) rollback.

8. The join condition _____, in terms of which tuples from the two relations match, is straightforward.
a) right outer join
b) left outer join
c) full outer join
d) natural.

9. A combination of date and time, says
a) timestamp
b) time
c) date
d) all the above.

10. The _____ clause specifies a predicate P that must be satisfied by every tuple in the relation.
 a) check
 b) primary key
 c) unique

d) cursor.

Answers: 1. a   2. a   3. c   4. a   5. c   6. c   7. b   8. d   9. a   10. a

Short Questions (2 Marks)

11. What is interactive data manipulation language?
12. Define authorization.
13. What is dynamic SQL?
14. Write a query, to find all customers having a loan, an account, or both at the bank.
15. List the difference between intersect and intersect all operation.
16. What is the use of distinct with count (*)?
17. Distinguish between some and all comparisons.
18. Write a query, delete all account tuples at every branch located in Chennai.
19. What is the purpose of rollback work?
20. Define embedded SQL.

Paragraph Questions (5 Marks)

21. Describe the basic structure of an SQL with example.
22. Write notes about the rename operation with example.
23. Discuss the concept of tuple variables with example.
24. Illustrate the importance of order by clause with example.
25. List the advantages of duplicates using relations.
26. Demonstrate the SQL set operations with example.
27. Discuss the test for empty relations with example.
28. Explain, how to define a views with example.
29. Write notes about updates with queries.
30. Briefly explain about embedded SQL with example.

Essay Type Questions (10 Marks)

31. Illustrate the background of SQL and its parts.
32. Discuss about string operations in SQL with example
33. Describe the various set operations on relations with example.
34. Briefly explain the various aggregate functions with example.
35. List out the use of null values with example.
36. Discuss the mechanism for nesting subqueries with example.
37. Briefly explain the complex queries with example.
38. Discuss the concept of modification of the database with queries.
39. Explain the usage of transactions with example.
40. Illustrate the importance of join types and conditions with example.

UNIT – IV
Choose the Correct Answer

1. The tuple relational calculus is a _____ query language.
a) nonprocedural
b) procedural
c) nonperforming
d) none.

2. An _____ is a thing or object in the real world that is distinguishable from all other objects.
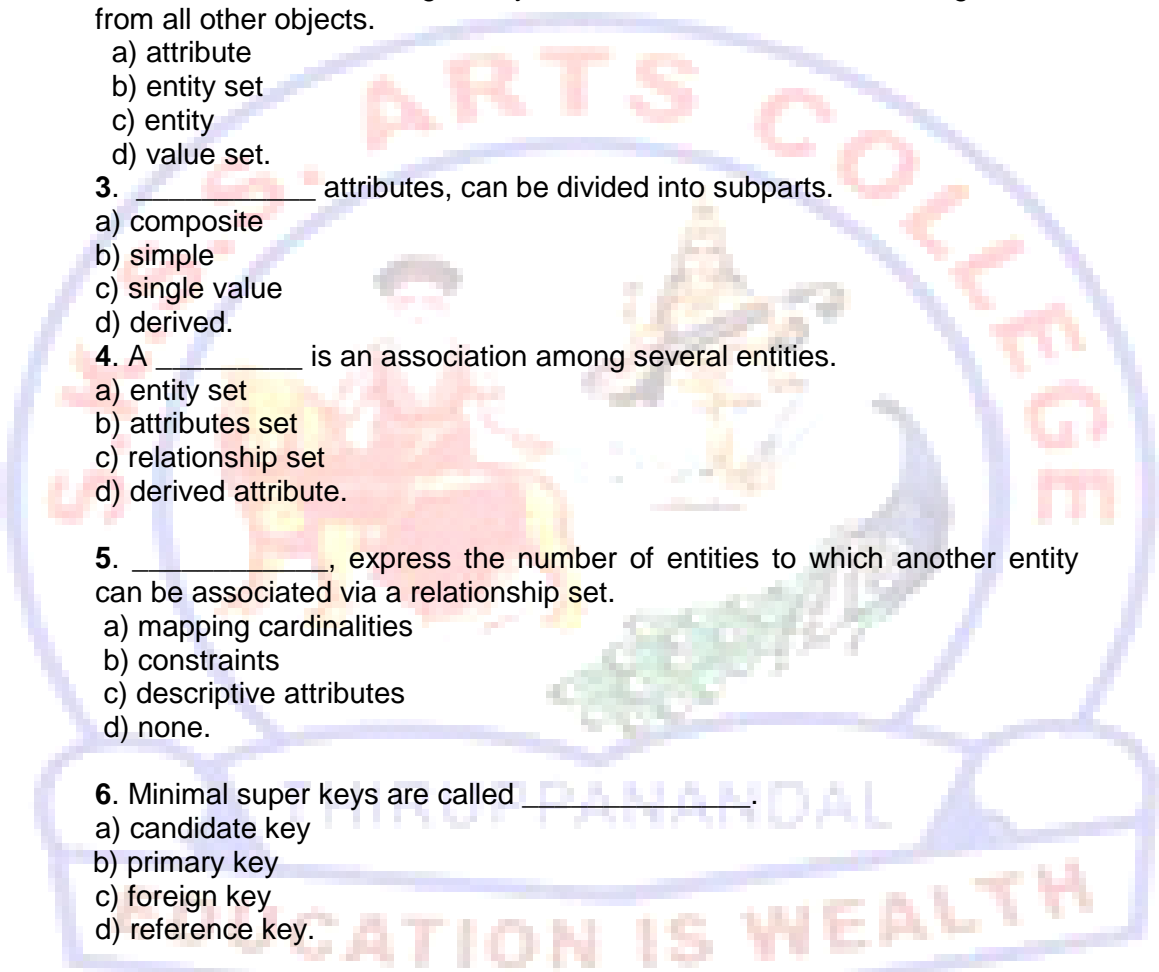 a) attribute
 b) entity set
 c) entity
 d) value set.

3. _____ attributes, can be divided into subparts.
a) composite
b) simple
c) single value
d) derived.

4. A _____ is an association among several entities.
a) entity set
b) attributes set
c) relationship set
d) derived attribute.

5. _____, express the number of entities to which another entity can be associated via a relationship set.
 a) mapping cardinalities
 b) constraints
 c) descriptive attributes
 d) none.

6. Minimal super keys are called _____.
a) candidate key
b) primary key
c) foreign key
d) reference key.

7. _____ represents entity sets.
 a) ellipses
 b) rectangles
 c) diamonds
 d) double ellipses.

8. _____ represent weak entity sets.
a) diamonds
b) rectangles
c) double rectangles
d) dashed ellipses.

9. _____, which link attributes to entity sets and entity sets to relationship sets.
   a) lines
   b) double lines
   c) dashed ellipses
   d) double rectangles.

10. The process of designating subgroupings within an entity set is called _____.
   a) generalization
   b) weak entity set
   c) strong entity set
   d) specialization.

Answers: 1. a   2.c   3. a   4. c   5. a   6. a   7. b   8. c   9. a   10. d

Short Questions (2 Marks)

11. Define tuple relational calculus.
12. What is domain relational calculus?
13. Write a query in the tuple relational calculus; find the loan number for each loan of an amount greater than 15000.
14. Write a query in the domain relational calculus; find the names of all customers who have a loan from the Chennai branch and find the loan amount.
15. What is an entity?
16. What is the purpose of derived attribute?
17. Define mapping cardinalities.
18. What is an ER diagram?
19. Define the term strong entity set.
20. What is an overlapping generalizations?

Paragraph Questions (5 Marks)

21. Write notes about the tuple relational calculus with queries.
22. Express the formal definition of the domain relational calculus with queries.
23. Demonstrate the safety of expressions in the tuple relational calculus.
24. Illustrate the safety of expressions in the domain relational calculus.
25. Discuss the expressive power of languages in the domain relational calculus.
26. Describe the expressive power of languages in the tuple relational calculus.
27. Explain the distinctions among the terms primary key, candidate key, and super key.
28. Explain the difference between a weak and a strong entity set with diagram.
29. Define the concept of aggregation. Give two examples of where this concept is useful.
30. Construct appropriate tables for a car insurance company of the ER diagram.

Essay Type Questions (10 Marks)

31. Briefly explain about the concept of the tuple relational calculus with queries.

32. Demonstrate the various features of the domain relational calculus with queries.

33. Describe the importance of entity sets, attributes and its types with examples.

34. Illustrate the important type of constraints with example.

35. Discuss the basic issues in the design of an ER database schema with diagram.

36. What is an ER diagram? And explain the various components of ER diagram with example.

37. Draw and explain the ER diagram for a banking enterprise.

38. Draw and explain the ER diagram for a university database.

39. Discuss about specialization, generalization and constraints on generalizations.

40. Describe the reduction of an E-R schema to tables with examples.

UNIT – V
Choose the Correct Answer

1. A relation schema R is in _____ if the domains of all attributes of R are atomic.
a) second normal form
b) third normal form
c) first normal form
d) fourth normal form.

2. A _____ is a type of constraint that is a generalization of the notion of key.
a) functional dependencies
b) multivalue dependencies
c) normalization
d) none.

3. Some functional dependencies are said to be _____ because they are satisfied by all relations.
a) non trivial
b) transitivity
c) trivial
d) reflexivity.

4. An attribute of a functional dependency is said to be _____, if we can remove it without changing the closure of the set of functional dependencies.
a) extraneous
b) decomposition
c) reflexivity

d) non trivial.

5. A BCNF defined as _____.
 a) boyscodd normal form
 b) boycecodd normal form
 c) boyce cost normal form
 d) none.

6. Functional dependencies sometimes are referred to as _____.
a) equality generating dependencies
b) tuple generating dependencies
c) domain generating dependencies
d) multi value dependency.

7. Multivalued dependencies are referred to as _____.
a) domain generating dependencies
b) functional dependency
c) tuple generating dependencies
d) decomposition.

8. _____ or rules of inference, provide a simple technique for reasoning about functional dependencies.
a) Reflexivity
b) augmentation rule
c) transitivity
d) axioms.

9. A decomposition that is not a lossy-join decomposition is a _____.
a) lossy-join decomposition
b)lossless join decomposition
c) preserving decomposition
d) functional dependency.

10. A relation schema R is in _____ with respect to a set D of functional and multivalued dependencies if, for all multivalued dependencies in D^+.
   a) first normal form
   b) second normal form
   c) fourth normal form
   d) third normal form.

Answers:1. c   2. a   3. c   4.a   5.b   6.a   7.c   8.d   9. b   10. c

Short Questions (2 Marks)

11. Define the term atomic.
12. What is a functional dependency?
13. What is a trivial?
14. What are Armstrong's axioms?
15. Define augmentation rule.
16. What is pseudotransitivity rule?
17. Define extraneous attributes.
18. What is dependency preservation?
19. What is third normal form?
20. Define multivalued dependency.

Paragraph Questions (5 Marks)

21. Writenotes about first normal form.
22. Discuss pitfalls in relational database design.
23. Describe about functional dependencies with example.
24. Illustrate about closure of a set of functional dependencies.
25. Explain the closure of attribute sets.
26. Briefly explain about decomposition with example.
27. Demonstrate the concept of BCNF with example.
28. Discuss the decomposition algorithm.
29. Describe the concept of third normal form with example.
30. Illustrate about multivalued dependencies with example.

Essay Type Questions (10 Marks)

31. Why and explain are certain functional dependencies called trivial functional dependencies?
32. Explain how functional dependencies can be used to indicate the following. A) A one to one relationship set exists between entity sets account and customer. B) A many to one relationship set exists between entity sets account and customer.
33. Use Armstrong's axioms to prove the soundness of the decomposition rule and explain.
34. Briefly explain the concepts of functional dependencies with example.
35. Discuss the concept of decomposition and desirable properties of decomposition with example.
36. Discuss the features of boyce-codd normal form.
37. Describe the BCNF decomposition algorithm.
38. List out the comparison of BCNF and 3NF.
39. Discuss the concept of Fourth normal form with example.
40. Explain why 4NF is a normal form more desirable than BCNF.

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