

RELATIONAL DATABASE DESIGN AND SQL

1. . Which of the following is/are true with reference to 'view' in DBMS?
(a) A 'view' is a special stored procedure executed when certain event occurs.
(b) A 'view' is a virtual table, which occurs after executing a pre-compiled query.

Code:

- (1) Only (a) is true
(2) Only (b) is true
(3) Both (a) and (b) are true
(4) Neither (a) nor (b) are true

Answer: 2

2. . In SQL, is an Aggregate function.

- (1) SELECT
(2) CREATE
(3) AVG
(4) MODIFY

Answer: 3

3. . Match the following with respect to RDBMS:

List - I

- (a) Entity integrity
(b) Domain integrity
(c) Referential integrity
(d) Userdefined integrity

List - II

- (i) enforces some specific business rule that do not fall into entity or domain
(ii) Rows can't be deleted which are used by other records
(iii) enforces valid entries for a column
(iv) No duplicate rows in a table

Code:

- (a) (b) (c) (d)
(1) (iii) (iv) (i) (ii)
(2) (iv) (iii) (ii) (i)
(3) (iv) (ii) (iii) (i)
(4) (ii) (iii) (iv) (i)

Answer: 2

4. . In RDBMS, different classes of relations are created using technique to prevent modification anomalies.

- (1) Functional Dependencies
(2) Data integrity
(3) Referential integrity
(4) Normal Forms

Answer: 4

5. SQL command changes one or more fields in a record.

- (1) LOOK-UP
(2) INSERT
(3) MODIFY

(4) CHANGE

Answer: 3

6. . An attribute A of datatype varchar(20) has value 'Ram' and the attribute B of datatype char(20) has value 'Sita' in oracle. The attribute A has memory spaces and B has memory spaces.
- (1) 20, 20
 - (2) 3, 20
 - (3) 3, 4
 - (4) 20, 4

Answer: 2

7. . Integrity constraints ensure that changes made to the database by authorized users do not result into loss of data consistency. Which of the following statement(s) is (are) true w.r.t. the examples of integrity constraints?
- (A) An instructor Id. No. cannot be null, provided Instructor Id. No. being primary key.
 - (B) No two citizens have same Adhar-Id.
 - (C) Budget of a company must be zero.
- (1) (A), (B) and (C) are true.
 - (2) (A) false, (B) and (C) are true.
 - (3) (A) and (B) are true; (C) false.
 - (4) (A), (B) and (C) are false.

Answer: 3

8. Let M and N be two entities in an E-R diagram with simple single value attributes. R_1 and R_2 are two relationship between M and N, whereas R_1 is one-to-many and R_2 is many-to-many. The minimum number of tables required to represent M, N, R_1 and R_2 in the relational model are
- (1) 4
 - (2) 6
 - (3) 7
 - (4) 3

Answer: 4

9. . Consider a schema R(MNPQ) and functional dependencies $M \rightarrow N$, $P \rightarrow Q$. Then the decomposition of R into $R_1(MN)$ and $R_2(PQ)$ is
- (1) Dependency preserving but not lossless join.
 - (2) Dependency preserving and lossless join
 - (3) Lossless join but not dependency preserving
 - (4) Neither dependency preserving nor lossless join.

Answer: 1

10. DBMS provides the facility of accessing data from a database through
- (A) DDL
 - (B) DML
 - (C) DBA
 - (D) Schema

Answer: B

11. Relational database schema normalization is NOT for:
- (A) reducing the number of joins required to satisfy a query.
 - (B) eliminating uncontrolled redundancy of data stored in the database.

- (C) eliminating number of anomalies that could otherwise occur with inserts and deletes.
- (D) ensuring that functional dependencies are enforced.

Answer: A

12. Consider the following statements regarding relational database model:

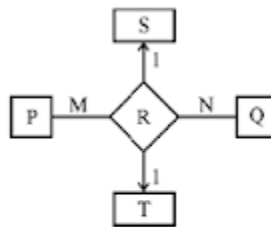
- (a) NULL values can be used to opt a tuple out of enforcement of a foreign key.
- (b) Suppose that table T has only one candidate key. If Q is in 3NF, then it is also in BCNF.
- (c) The difference between the project operator (P) in relational algebra and the SELECT keyword in SQL is that if the resulting table/set has more than one occurrences of the same tuple, then P will return only one of them, while SQL SELECT will return all.

One can determine that:

- (A) (a) and (b) are true. (B) (a) and (c) are true.
- (C) (b) and (c) are true. (D) (a), (b) and (c) are true.

Answer: D

13. Consider the following Entity-Relationship (E-R) diagram and three possible relationship sets (I, II and III) for this E-R diagram:



I:

P	Q	S	T
p ₁	q ₁	s ₁	t ₁
p ₁	q ₁	s ₁	t ₂

II:

P	Q	S	T
p ₁	q ₁	s ₁	t ₁
p ₁	q ₁	s ₂	t ₂

III:

P	Q	S	T
p ₁	q ₁	s ₁	t ₁
p ₁	q ₂	s ₁	t ₁

If different symbols stand for different values (e.g., t₁ is definitely not equal to t₂), then which of the above could not be the relationship set for the E-R diagram ?

- (A) I only (B) I and II only
- (C) II only (D) I, II and III

Answer: A

14. Consider a database table R with attributes A and B. Which of the following SQL queries is illegal ?

- (A) SELECT A FROM R;
- (B) SELECT A, COUNT(*) FROM R;
- (C) SELECT A, COUNT(*) FROM R GROUP BY A;
- (D) SELECT A, B, COUNT(*) FROM R GROUP BY A, B;

Answer: B

15. In RDBMS, the constraint that no key attribute (column) may be NULL is referred to as:

- (A) Referential integrity (B) Multi-valued dependency
- (C) Entity Integrity (D) Functional dependency

Answer: C

16. Which of the following statement(s) is/are FALSE in the context of Relational DBMS ?

- I. Views in a database system are important because they help with access control by allowing users to see only a particular subset of the data in the database.

II. E-R diagrams are useful to logically model concepts.

III. An update anomaly is when it is not possible to store information unless some other, unrelated information is stored as well.

IV. SQL is a procedural language.

- (A) I and IV only (B) III and IV only
(C) I, II and III only (D) II, III and IV only

Answer: D

17. In a relational database model, NULL values can be used for all but which one of the following?

- (A) To allow duplicate tuples in the table by filling the primary key column(s) with NULL.
(B) To avoid confusion with actual legitimate data values like 0 (zero) for integer columns and ‘ ’ (the empty string) for string columns.
(C) To leave columns in a tuple marked as “unknown” when the actual value is unknown.
(D) To fill a column in a tuple when that column does not really “exist” for that particular tuple.

Answer: A

18. Consider the following two commands C1 and C2 on the relation R from an SQL database:

C1: drop table R;

C2: delete from R;

Which of the following statements is TRUE?

- I. Both C1 and C2 delete the schema for R.
II. C2 retains relation R, but deletes all tuples in R.
III. C1 deletes not only all tuples of R, but also the schema for R.

- (A) I only (B) I and II only
(C) II and III only (D) I, II and III

Answer: C

19. Consider the following database table having A, B, C and D as its four attributes and four possible candidate keys (I, II, III and IV) for this table:

A	B	C	D
a1	b1	c1	d1
a2	b3	c3	d1
a1	b2	c1	d2

- I: {B} II: {B, C} III: {A, D} IV: {C, D}

If different symbols stand for different values in the table (e.g., d1 is definitely not equal to d2), then which of the above could not be the candidate key for the database table?

- (A) I and III only (B) III and IV only
(C) II only (D) I only

Answer: C

20. Consider a “CUSTOMERS” database table having a column “CITY” filled with all the names of Indian cities (in capital letters). The SQL statement that finds all cities that have “GAR” somewhere in its name, is:

- (A) Select *from customers where city='%GAR%';
(B) Select *from customers where city='\$GAR\$';
(C) Select *from customers where city like '%GAR%';
(D) Select *from customers where city as '%GAR';

Answer: C

21. Match the following database terms to their functions:

List-I

- (a) Normalization
- (b) Data Dictionary
- (c) Referential Integrity
- (d) External Schema

List-II

- (i) Enforces match of primary key to foreign key
- (ii) Reduces data redundancy in a database
- (iii) Define view(s) of the database for particular user(s).
- (iv) Contains metadata describing database structure.

Codes:

- (a) (b) (c) (d)
- (A) (iv) (iii) (i) (ii)
- (B) (ii) (iv) (i) (iii)
- (C) (ii) (iv) (iii) (i)
- (D) (iv) (iii) (ii) (i)

Answer: B

22. Which of the following provides the best description of an entity type?

- (A) A specific concrete object with a defined set of processes (e.g. Jatin with diabetes)
- (B) A value given to a particular attribute (e.g. height-230 cm)
- (C) A thing that we wish to collect data about zero or more, possibly real world examples of it may exist.
- (D) A template for a group of things with the same set of characteristics that may exist in the real world

Answer: D

23. Data which improves the performance and accessibility of the database are called:

- (A) Indexes
- (B) User Data
- (C) Application Metadata
- (D) Data Dictionary

Answer: A

24. A relation $R = \{A, B, C, D, E, F, G\}$ is given with following set of functional dependencies:

$F = \{AD \rightarrow E, BE \rightarrow F, B \rightarrow C, AF \rightarrow G\}$

Which of the following is a candidate key?

- (A) A
- (B) AB
- (C) ABC
- (D) ABD

Answer: D

25. An Assertion is a predicate expressing a condition we wish database to always satisfy. The

correct syntax for Assertion is :

- (A) CREATE ASSERTION 'ASSERTION Name' CHECK 'Predicate'
- (B) CREATE ASSERTION 'ASSERTION NAME'
- (C) CREATE ASSERTION, CHECK Predicate
- (D) SELECT ASSERTION

Answer: A

17. Which of the following concurrency protocol ensures both conflict serializability and freedom from deadlock ?

- (a) 2-phase Locking
- (b) Time stamp - ordering
- (A) Both (a) and (b)
- (B) (a) only
- (C) (b) only
- (D) Neither (a) nor (b)

Answer: C

18. Drop Table cannot be used to drop a Table referenced by constraint.
(a) Primary key (b) Sub key (c) Super key (d) Foreign key
(A) (a) (B) (a), (b) and (c)
(C) (d) (D) (a) and (d)

Answer: C

19. Database applications were built directly on top of file system to overcome the following drawbacks of using file-systems
(a) Data redundancy and inconsistency
(b) Difficulty in accessing Data
(c) Data isolation
(d) Integrity problems
(A) (a) (B) (a) and (d)
(C) (a), (b) and (c) (D) (a), (b), (c) and (d)

Answer: D

20. For a weak entity set to be meaningful, it must be associated with another entity set in combination with some of their attribute values, is called as :
(A) Neighbour Set (B) Strong Entity Set
(C) Owner entity set (D) Weak Set

Answer: C

16. Division operation is ideally suited to handle queries of the type :
(A) customers who have no account in any of the branches in Delhi.
(B) customers who have an account at all branches in Delhi.
(C) customers who have an account in atleast one branch in Delhi.
(D) customers who have only joint account in any one branch in Delhi

Answer: B

17. Which of the following is true ?
I. Implementation of self-join is possible in SQL with table alias.
II. Outer-join operation is basic operation in relational algebra.
III. Natural join and outer join operations are equivalent.
(A) I and II are correct. (B) II and III are correct.
(C) Only III is correct. (D) Only I is correct.

Answer: D

18. What kind of mechanism is to be taken into account for converting a weak entity set into strong entity set in entity-relationship diagram ?
(A) Generalization (B) Aggregation
(C) Specialization (D) Adding suitable attributes

Answer: D

19. The best normal form of relation scheme R(A, B, C, D) along with the set of functional dependencies $F = \{AB \twoheadrightarrow C, AB \twoheadrightarrow D, C \twoheadrightarrow A, D \twoheadrightarrow B\}$ is
(A) Boyce-Codd Normal form (B) Third Normal form
(C) Second Normal form (D) First Normal form

Answer: B

20. Identify the minimal key for relational scheme R(A, B, C, D, E) with functional dependencies $F = \{A \twoheadrightarrow B, B \twoheadrightarrow C, AC \twoheadrightarrow D\}$

- (A) A (B) AE
- (C) BE (D) CE

Answer: A

46. Manager's salary details are hidden from the employee. This is called as
- (A) Conceptual level data hiding
 - (B) Physical level data hiding
 - (C) External level data hiding
 - (D) Local level data hiding

Answer: C

47. Which of the following statements is false ?
- (A) Any relation with two attributes is in BCNF.
 - (B) A relation in which every key has only one attribute is in 2NF.
 - (C) A prime attribute can be transitively dependent on a key in 3NF relation.
 - (D) A prime attribute can be transitively dependent on a key in BCNF relation.

Answer: D

48. A clustering index is created when
- (A) primary key is declared and ordered
 - (B) no key ordered
 - (C) foreign key ordered
 - (D) there is no key and no order

Answer: A

49. Let $R = \{A, B, C, D, E, F\}$ be a relation schema with the following dependencies $C \rightarrow F, E \rightarrow A, EC \rightarrow D, A \rightarrow B$
Which of the following is a key for R ?

- (A) CD (B) EC
- (C) AE (D) AC

Answer: B

50. Match the following:

List-I

- a. DDL
- b. DML
- c. TCL
- d. BINARY Operation

List-II

- i. LOCK TABLE
- ii. COMMIT
- iii. Natural Difference
- iv. REVOKE

Codes:

- a b c d
- (A) ii i iii iv
- (B) i ii iv iii
- (C) iii ii i iv
- (D) iv i ii iii

Answer: D

11. The student marks should not be greater than 100. This is
- (A) Integrity constraint (B) Referential constraint
 - (C) Over-defined constraint (D) Feasible constraint

Answer: A

12. GO BOTTOM and SKIP-3 commands are given one after another in a database file of 30 records. It shifts the control to
(A) 28th record (B) 27th record
(C) 3rd record (D) 4th record
Answer: B
13. An ER Model includes
I. An ER diagram portraying entity types.
II. Attributes for each entity type
III. Relationships among entity types.
IV. Semantic integrity constraints that reflects the business rules about data not captured in the ER diagram.
(A) I, II, III & IV (B) I&IV
(C) I, II & IV (D) I & III
Answer: A
14. Based on the cardinality ratio and participation associated with a relationship type, choose either the Foreign Key Design, the Cross Referencing Design or Mutual Referencing Design.
(A) Entity (B) Constraints
(C) Rules (D) Keys
Answer: B
15. Data Integrity control uses
(A) Upper and lower limits on numeric data.
(B) Passwords to prohibit unauthorised access to files.
(C) Data dictionary to keep the data
(D) Data dictionary to find last access of data
Answer: B
37. Usage of Preemption and Transaction Rollback prevents
(A) Unauthorised usage of data file
(B) Deadlock situation
(C) Data manipulation
(D) File pre-emption
Answer: B
41. Cross_tab displays permit users to view of multidimensional data at a time.
(A) One dimension (B) Two dimensions
(C) Three dimensions (D) Multidimensions
Answer: B
43. Thoma's-write rule is
(A) Two phase locking protocol (B) Timestamp ordering protocol
(C) One phase locking protocol (D) Sliding window protocol
Answer: B
10. Which of the following is not a type of Database Management System?
(A) Hierarchical (B) Network
(C) Relational (D) Sequential
Answer: D
11. Manager's salary details are to be hidden from Employee Table. This Technique is called as

- (A) Conceptual level Datahiding
- (B) Physical level Datahiding
- (C) External level Datahiding
- (D) Logical level Datahiding

Answer: C

12. A Network Schema

- (A) restricts to one to many relationship
- (B) permits many to many relationship
- (C) stores Data in a Database
- (D) stores Data in a Relation

Answer: B

13. Which normal form is considered as adequate for usual database design?

- (A) 2NF (B) 3NF
- (C) 4NF (D) 5NF

Answer: B

14. If D_1, D_2, \dots, D_n are domains in a relational model, then the relation is a table, which is a subset of

- (A) $D_1 + D_2 + \dots + D_n$
- (B) $D_1 \times D_2 \times \dots \times D_n$
- (C) $D_1 \cup D_2 \cup \dots \cup D_n$
- (D) $D_1 - D_2 - \dots - D_n$

Answer: B

31. Repository of information gathered from multiple sources, storing under unified scheme at a single site is called as

- (A) Data mining (B) Meta data
- (C) Data warehousing (D) Database

Answer: C

32. The task of correcting and pre processing data is called as

- (A) Data streaming (B) Data cleaning
- (C) Data mining (D) Data storming

Answer: B

34. The relation "divides" on a set of positive integers is

- (A) Symmetric and transitive
- (B) Anti symmetric and transitive
- (C) Symmetric only
- (D) Transitive only

Answer: B

Explanation:

The 'divide' operation is antisymmetric because if a divides b does not necessarily implies that b divides a. If a divides b and b divides c then a divides c. So, it is transitive as well.

13. Which of the following is true ?

- (A) A relation in BCNF is always in 3NF.
- (B) A relation in 3NF is always in BCNF.
- (C) BCNF and 3NF are same.
- (D) A relation in BCNF is not in 3NF.

Answer: A

22. In DML, RECONNECT command cannot be used with
(A) OPTIONAL Set (B) FIXED Set
(C) MANDATOR Set (D) All of the above
Answer: B
32. The User Work Area (UWA) is a set of Program variables declared in the host program to communicate the contents of individual records between
(A) DBMS & the Host record
(B) Host program and Host record
(C) Host program and DBMS
(D) Host program and Host language
Answer: C
50. Given a Relation POSITION (Posting-No, Skill), then query to retrieve all distinct pairs of posting-nos. requiring skill is
(A) Select p.posting-No, p.posting-No
from position p
where p.skill = p.skill
and p.posting-No < p.posting-No
(B) Select p1.posting-No, p2.posting-No
from position p1, position p2
where p1.skill = p2.skill
(C) Select p1.posting-No, p2.posting-No
from position p1, position p2
where p1.skill = p2.skill
and p1.posting-No < p2.posting-No
(D) Select p1.posting-No, p2.posting-No
from position p1, position p2
where p1.skill = p2.skill
and p1.posting-No = p2.posting-No
Answer: C
7. In multiuser database if two users wish to update the same record at the same time, they are prevented from doing so by
(A) Jamming (B) Password
(C) Documentation (D) Record lock
Answer: D
9. What deletes the entire file except the file structure ?
(A) ERASE (B) DELETE
(C) ZAP (D) PACK
Answer: C
10. Which command is the fastest among the following ?
(A) COPY TO <NEW FILE>
(B) COPY STRUCTURE TO <NEW FILE>
(C) COPY FILE <FILE 1> <FILE 2>
(D) COPY TO MFILE-DAT DELIMITED
Answer: B
12. A Transaction Manager is which of the following ?
(A) Maintains a log of transactions

- (B) Maintains before and after database images
- (C) Maintains appropriate concurrency control
- (D) All of the above

Answer: D

21. What deletes the entire file except the file structure?
- (A) ERASE (B) DELETE
 - (C) ZAP (D) PACK

Answer: C

22. Which command closes text file, which has been created using "SET ALTERNATIVE" <FILE NAME> "Command" ?
- (A) SET ALTERNATE OFF
 - (B) CLOSE DATABASE
 - (C) CLOSE ALTERNATE
 - (D) CLEAR ALL

Answer: A

23. Data security threats include
- (A) privacy invasion
 - (B) hardware failure
 - (C) fraudulent manipulation of data
 - (D) encryption and decryption

Answer: C

24. Which of the following statements is true, when structure of database file with 20 records is modified?
- (A) ? EOF () Prints T
 - (B) ? BOF () Prints F
 - (C) ? BOF () Prints T
 - (D) ? EOF () Prints F

Answer: A

25. The SQL Expression
Select distinct T. branch name from branch T, branch S where T. assets > S. assets and S. branch-city = DELHI, finds the name of
- (A) all branches that have greater asset than any branch located in DELHI.
 - (B) all branches that have greater assets than allocated in DELHI.
 - (C) the branch that has the greatest asset in DELHI.
 - (D) any branch that has greater asset than any branch located in DELHI.

Answer: A

16. Which of the following is the recovery management technique in DDBMS ?
- (A) 2PC (Two Phase Commit) (B) Backup
 - (C) Immediate update (D) All of the above

Answer: D

17. Which of the following is the process by which a user's privileges ascertained ?
- (A) Authorization (B) Authentication
 - (C) Access Control (D) None of these

Answer: A

18. The basic variants of time-stampbased method of concurrency control are

- (A) Total time stamp-ordering
- (B) Partial time stamp ordering
- (C) Multiversion Time stamp ordering
- (D) All of the above

Answer: D

19. A transaction can include following basic database access operations :
- (A) Read_item(X) (B) Write_item(X)
 - (C) Both (A) and (B) (D) None of these

Answer: C

20. Decomposition help in eliminating some of the problems of bad design
- (A) Redundancy (B) Inconsistencies
 - (C) Anomalies (D) All of the above

Answer: D

16. In generalisation, the differences between members of an entity is
- (A) maximized
 - (B) minimized
 - (C) both (A) & (B)
 - (D) None of these

Answer: A

17. The dependency preservation decomposition is a property to decompose database schema D, in which each functional dependency $X \rightarrow Y$ specified in F,
- (A) appeared directly in one of the relation schemas R_i in the decomposed D.
 - (B) could be inferred from dependencies that appear in some R_i .
 - (C) both (A) and (B)
 - (D) None of these

Answer: C

18. Which of the following is an optimistic concurrency control method?
- (A) Validation based
 - (B) Time stamp ordering
 - (C) Lock-based
 - (D) None of these

Answer: A

19. Optical storage is a
- (A) high-speed direct access storage device.
 - (B) low-speed direct access storage device.
 - (C) medium-speed direct access storage device.
 - (D) high-speed sequential access storage device.

Answer: C

20. Which of the following is the process by which a user's access to physical data in the application is limited, based on his privileges?
- (A) Authorization
 - (B) Authentication
 - (C) Access Control
 - (D) All of these

Answer: C

16. An entity instance is a single occurrence of an

- (A) entity type
- (B) relationship type
- (C) entity and relationship type
- (D) None of these

Answer: A

17. Generalization is process.
- (A) top-down
 - (B) bottom up
 - (C) both (A) & (B)
 - (D) None of these

Answer: B

18. Match the following:

Set-I

- I. 2 NF
- II. 3 NF
- III. 4 NF
- IV. 5 NF

Set-II

- (a) transitive dependencies eliminated
- (b) multivalued attribute removed
- (c) contain no partial functional dependencies
- (d) contains no join dependency

Codes :

- | | | | | |
|-----|-----|-----|-----|-----|
| I | II | III | IV | |
| (A) | (a) | (c) | (b) | (d) |
| (B) | (d) | (a) | (b) | (c) |
| (C) | (c) | (d) | (a) | (b) |
| (D) | (d) | (b) | (a) | (c) |

Answer: B

19. Which data management language component enabled the DBA to define the schema components?
- (A) DML
 - (B) Sub-schema DLL
 - (C) Schema DLL
 - (D) All of these

Answer: C

20. The PROJECT Command will create new table that has
- (A) more fields than the original table
 - (B) more rows than original table
 - (C) both (A) & (B)
 - (D) none of these

Answer: D

16. The E-R model is expressed in term of
- I. Entities
 - II. The relationship among entities.
 - III. The attributes of the entities.

IV. Functional relationship.

- (A) I, II
- (B) I, II, IV
- (C) II, II, IV
- (D) I, II, III

Answer: D

17. Specialization is process.

- (A) top-down
- (B) bottom up
- (C) both (A) and (B)
- (D) none of these

Answer: A

18. Match the following :

List-I

- (1) Determinants
- (2) Candidate key
- (3) Non-redundancy

(4) Functional dependency

List-II

- (a) No attribute can be added
- (b) Uniquely identified a row
- (c) A constraint between two attribute

(d) Group of attributes on the left hand side of arrow of function dependency.

- (A) 1 – d, 2 – b, 3 – a, 4 – c
- (B) 2 – d, 3 – a, 1 – b, 4 – c
- (C) 4 – a, 3 – b, 2 – c, 1 – d
- (D) 3 – a, 4 – b, 1 – c, 2 – d

Answer: A

19. A function that has no partial functional dependencies is in form.

- (A) 3 NF
- (B) 2 NF
- (C) 4 NF
- (D) BCNF

Answer: B

20. Which of the following statement is wrong?

- I. 2-phase locking protocol suffer from dead lock.
- II. Time stamp protocol suffer from more aborts.

III. A block hole in a DFD is a data store with only inbound flows.

IV. Multivalued dependency among attribute is checked at 3 NF level.

V. An entity-relationship diagram is a tool to represent event model.

- (A) I, II, II
- (B) II, III, IV
- (C) III, IV, V
- (D) II, IV, V

Answer: C

18. (i) DML includes a query language based on both relation algebra and tuple calculus

- (ii) DML includes a query language based on tuple calculus
- (iii) DML includes a query language based on relational algebra
- (iv) DML includes a query language based on none of the relational algebra and tuple calculus

Which one is correct?

- (A) (i) only
- (B) (ii) only
- (C) (iii) only
- (D) (iv) only

Answer: A

19. Suppose it takes 100 ns to access a page table and 20 ns to access associative memory with a 90% hit rate, the average access time equals:

- (A) 20 ns
- (B) 28 ns
- (C) 90 ns
- (D) 100 ns

Answer: B

20. There exists a construct which returns a value 'true' if the argument subquery is:

- (A) empty
- (B) non-empty
- (C) in error
- (D) none of the above

Answer: B

21. Which construct in SQL is used to test whether a subquery has any tuples in its result?

- (A) UNIQUE
- (B) EXISTS
- (C) GROUP BY
- (D) EXCEPT

Answer: B

22. ORACLE supports:

- (A) inner join and outer join only
- (B) outer join and semi join only
- (C) inner join, outer join, semi join only
- (D) inner join, outer join, semi join and anti join

Answer:

30. An entity has:

- (i) a set of properties
- (ii) a set of properties and values for all the properties
- (iii) a set of properties and the values for some set of properties may non-uniquely identify an entity
- (iv) a set of properties and the values for some set of properties may uniquely identify an entity

Which of the above are valid?

- (A) (i) only
- (B) (ii) only
- (C) (iii) only
- (D) (iv) only

Answer: D

31. Aggregation is:
(A) an abstraction through which relationships are treated as lower level entities
(B) an abstraction through which relationships are treated as higher level entities
(C) an abstraction through which relationships are not treated at all as entities
(D) none of the above
Answer: B
32. Suppose R is a relation schema and F is a set of functional dependencies on R. Further, suppose R_1 and R_2 form a decomposition of R. Then the decomposition is a lossless join decomposition of R provided that:
(A) $R_1 \cap R_2 \rightarrow R_1$ is in F^+
(B) $R_1 \cap R_2 \rightarrow R_2$ is in F^+
(C) both $R_1 \cap R_2 \rightarrow R_1$ and $R_1 \cap R_2 \rightarrow R_2$ functional dependencies are in F^+
(D) at least one from $R_1 \cap R_2 \rightarrow R_1$ and $R_1 \cap R_2 \rightarrow R_2$ is in F^+
Answer: D
16. A superkey for an entity consists of:
(A) one attribute only
(B) at least two attributes
(C) at most two attributes
(D) one or more attributes
Answer: D
17. Which of the following set of keywords constitutes a mapping in SQL?
(A) SELECT, FROM, TABLE
(B) SELECT, FROM, WHERE
(C) CONNECT, TABLE, CREATE
(D) SELECT, TABLE, INSERT
Answer: B
18. If a relation is in 2NF then:
(A) every candidate key is a primary key
(B) every non-prime attribute is fully functionally dependent on each relation key
(C) every attribute is functionally independent
(D) every relational key is a primary key
Answer: B
19. Which of the following is true?
(A) A relation in 3NF is always in BCNF
(B) A relation in BCNF is always in 3NF
(C) BCNF and 3NF are totally different
(D) A relation in BCNF is in 2NF but not in 3NF
Answer: B
20. Consider the query : `SELECT student_name FROM student_data WHERE rollno (SELECT rollno FROM student_marks WHERE SEM1_MARK=SEM2_MARK);`
Which of the following is true?
(A) It gives the name of the student whose marks in semester 1 and semester 2 are same.
(B) It gives all the names and roll nos of those students whose marks in semester 1 and semester 2 are same.
(C) It gives the names of all the students whose marks in semester 1 and semester 2 are same.
(D) It gives roll numbers of all students whose marks in semester 1 and semester 2 are same.

Answer: C

16. A primary key for an entity is:
(A) a candidate key (B) any attribute
(C) a unique attribute (D) a super key

Answer: C

17. Aggregate functions in SQL are:
(A) GREATEST, LEAST and ABS
(B) SUM, COUNT and AVG
(C) UPPER, LOWER and LENGTH
(D) SQRT, POWER and MOD

Answer: B

18. If a relation is in 2NF and 3NF forms then:
(A) no non-prime attribute is functionally dependent on other non-prime attributes
(B) no non-prime attribute is functionally dependent on prime attributes
(C) all attributes are functionally independent
(D) prime attribute is functionally independent of all non-prime attributes

Answer: A

19. The end of an SQL command is denoted by:
(A) an end-of-line character
(B) an 'enter-key' marker
(C) entering F4 key
(D) a semicolon (;)

Answer: D

20. Consider the query : `SELECT student_name FROM students WHERE class_name=(SELECT class_name FROM students WHERE math_marks=100)`; what will be the output ?
(A) the list of names of students with 100 marks in mathematics
(B) the names of all students of all classes in which at least one student has 100 marks in mathematics
(C) the names of all students in all classes having 100 marks in mathematics
(D) the names and class of all students whose marks in mathematics is 100

Answer: B

16. Which of the following statements is wrong?
(A) 2-phase Locking Protocols suffer from deadlocks
(B) Time-Stamp Protocols suffer from more aborts
(C) Time-Stamp Protocols suffer from cascading roll back where as 2-Phase locking Protocol do not
(D) None of these

Answer: C

17. A recursive foreign key is a:
(A) references a relation
(B) references a table
(C) references its own relation
(D) references a foreign key

Answer: C

18. A sub class having more than one super class is called:

- (A) Category
- (B) Classification
- (C) Combination
- (D) Partial Participation

Answer: A

19. A relation $R = \{A, B, C, D, E, F\}$ is given with following set of functional dependencies: $F = \{A \rightarrow B, AD \rightarrow C, B \rightarrow F, A \rightarrow E\}$. Which of the following is Candidate Key?
- (A) A
 - (B) AC
 - (C) AD
 - (D) None of these

Answer: C

20. Which statement is false regarding data independence?
- (A) Hierarchical data model suffers from data Independence
 - (B) Network model suffers from data Independence
 - (C) Relational model suffers only from logical data Independence
 - (D) Relational model suffers only from physical data Independence

Answer: C

16. Which possibility among the following is invalid in case of a Data Flow Diagram ?
- (A) A process having in-bound data flows more than out-bound data flows
 - (B) A data flow between two processes
 - (C) A data flow between two data stores
 - (D) A data store having more than one in-bound data flows

Answer: C

17. In DBMS, deferred update means:
- (A) All the updates are done first but the entries are made in the log file later
 - (B) All the log files entries are made first but the actual updates are done later
 - (C) Every update is done first followed by a writing on the log file
 - (D) Changes in the views are deferred till a query asks for a view

Answer: B

18. Which statement is false regarding data independence ?
- (A) Hierarchical data model suffers from data independence
 - (B) Network model suffers from data independence
 - (C) Relational model suffers only from logical data independence
 - (D) Relational model suffers only from physical data independence

Answer: C

19. Which of the following tools is not required during system analysis phase of system development life cycle?
- (A) Case tool
 - (B) RAD tool
 - (C) Reverse engineering
 - (D) None of these

Answer: C

20. Two phase protocol in a database management system is:
- (A) a concurrency mechanism that is not deadlock free
 - (B) a recovery protocol used for restoring a database after a crash
 - (C) Any update to the system log done in 2-phases
 - (D) not effective in Database

Answer: A

16. A relation $R = \{A, B, C, D, E, F\}$ is given with following set of functional dependencies:
 $F = \{A \rightarrow B, AD \rightarrow C, B \rightarrow F, A \rightarrow E\}$

Which of the following is candidate key ?

- (A) A
- (B) AC
- (C) AD
- (D) None of these

Answer: C

17. Immediate updates as a recovery protocol is preferable, when:

- (A) Database reads more than writes
- (B) Writes are more than reads
- (C) It does not matter as it is good in both the situations
- (D) There are only writes

Answer: B

18. Which of the following statement is wrong ?

- (A) 2-phase locking protocol suffers from deadlocks
- (B) Time-Stamp protocol suffers from more abort
- (C) Time stamp protocol suffers from cascading rollbacks where as 2-phase locking protocol do not
- (D) None of these

Answer: C

19. Which data management language component enabled the DBA to define the schema components?

- (A) DML
- (B) Subschema DLL
- (C) Schema DLL
- (D) All of these

Answer: C

20. A subclass having more than one super class is called

- (A) Category
- (B) Classification
- (C) Combination
- (D) Partial Participation

Answer: A

16. A schema describes:

- (A) data elements
- (B) records and files
- (C) record relationship
- (D) all of the above

Answer: D

17. One approach to standardizing storing of data:

- (A) MIS
- (B) CODASYL
- (C) Structured Programming
- (D) None of the above

Answer: B

18. In a relational schema, each tuple is divided in fields called:

- (A) Relations
- (B) Domains
- (C) Queries
- (D) All the above

Answer: B

19. An embedded pointer provides:
- (A) Physical record key
 - (B) An inserted Index
 - (C) A secondary access path
 - (D) All the above

Answer: C

20. A locked file can be:
- (A) accessed by only one user
 - (B) modified by users with the correct password
 - (C) is used to hide sensitive information
 - (D) both (B) and (C)

Answer: A

16. An Entity - relationship diagram is a tool to represent:
- (A) Data model
 - (B) Process model
 - (C) Event model
 - (D) Customer model

Answer: A

17. Which of the following tools is not required during system analysis phase of system development Life cycle?
- (A) CASE Tool
 - (B) RAD Tool
 - (C) Reverse engineering tool
 - (D) None of these

Answer: C

18. A black hole in a DFD is a:
- (A) A data store with no inbound flows
 - (B) A data store with only in bound flows
 - (C) A data store with more than one in bound flow
 - (D) None of these.

Answer: B

19. Multi-valued dependency among attribute is checked at which level ?
- (A) 2 NF
 - (B) 3 NF
 - (C) 4 NF
 - (D) 5 NF

Answer: C

20. A WINDOW into a portion of a data base is:
- (A) Schema
 - (B) View
 - (C) Query
 - (D) Data Dictionary

Answer: B

16. The E-R model is expressed in terms of:
- (i) Entities
 - (ii) The relationship among entities
 - (iii) The attributes of the entities
- Then
- (A) (i) and (iii)
 - (B) (i), (ii) and (iii)
 - (C) (ii) and (iii)

(D) None of the above

Answer: B

17. Specialization is a process.
(A) Top - down (B) Bottom -Up
(C) Both (A) and (B) (D) None of the above

Answer: A

18. The completeness constraint has rules:
(A) Supertype, Subtype
(B) Total specialization, Partial specialization
(C) Specialization, Generalization
(D) All of the above

Answer: B

19. The entity type on which the type depends is called the identifying owner.
(A) Strong entity (B) Relationship
(C) Weak entity (D) E - R

Answer: C

20. Match the following:
(i) 5 NF (a) Transitive dependencies eliminated
(ii) 2 NF (b) Multivalued attribute removed
(iii) 3 NF (c) Contains no partial functional dependencies
(iv) 4 NF (d) Contains no join dependency
(A) i-a, ii-c, iii-b, iv-d
(B) i-d, ii-c, iii-a, iv-b
(C) i-d, ii-c, iii-b, iv-a
(D) i-a, ii-b, iii-c, iv-d

Answer: B

7. Consider following schedules involving two transactions:

S_1 : $r_1(X)$; $r_1(Y)$; $r_2(X)$; $r_2(Y)$; $w_2(Y)$; $w_1(X)$

S_2 : $r_1(X)$; $r_2(X)$; $r_2(Y)$; $w_2(Y)$; $r_1(Y)$; $w_1(X)$

Which of the following statement is true?

- (1) Both S_1 and S_2 are conflict serializable.
(2) S_1 is conflict serializable and S_2 is not conflict serializable.
(3) S_1 is not conflict serializable and S_2 is conflict serializable.
(4) Both S_1 and S_2 are not conflict serializable.

Answer: 3

8. Which one is correct w.r.t. RDBMS?

- (1) primary key \subseteq super key \subseteq candidate key
(2) primary key \subseteq candidate key \subseteq super key
(3) super key \subseteq candidate key \subseteq primary key
(4) super key \subseteq primary key \subseteq candidate key

Answer: 2

9. Let $pk(R)$ denotes primary key of relation R. A many-to-one relationship that exists between two relations R1 and R2 can be expressed as follows:

- (1) $pk(R_2) \rightarrow pk(R_1)$
- (2) $pk(R_1) \rightarrow pk(R_2)$
- (3) $pk(R_2) \rightarrow R_1 \cap R_2$
- (4) $pk(R_1) \rightarrow R_1 \cap R_2$

Answer: 2

10. For a database relation R(A,B,C,D) where the domains of A,B,C and D include only atomic values, only the following functional dependencies and those that can be inferred from them are:

$A \rightarrow C$

$B \rightarrow D$

The relation R is in

- (1) First normal form but not in second normal form
- (2) Both in first normal form as well as in second normal form
- (3) Second normal form but not in third normal form
- (4) Both in second normal form as well as in third normal form

Answer: 1

11. Consider the following relation:
Works (emp_name, company_name, salary)

Here, emp_name is primary key.

Consider the following SQL query

```
Select emp_name
From Works T
where salary > (select avg (salary)
from Works S
where T.company_name =
S. Company_name)
```

The above query is for following:

- (1) Find the highest paid employee who earns more than the average salary of all employees of his company.
- (2) Find the highest paid employee who earns more than the average salary of all the employees of all the companies.
- (3) Find all employees who earn more than the average salary of all employees of all the companies.
- (4) Find all employees who earn more than the average salary of all employees of their company.

Answer: 4

7. Which of the following statements is/are True regarding some advantages that an object-oriented DBMS (OODBMS) offers over a relational database?

- I. An OODBMS avoids the “impedance mismatch” problem.
 - II. An OODBMS avoids the “phantom” problem.
 - III. An OODBMS provides higher performance concurrency control than most relational databases.
 - IV. An OODBMS provides faster access to individual data objects once they have been read from disk.
- (A) II and III only (B) I and IV only
 (C) I, II, and III only (D) I, III and IV only

Answer: B

8. The Global conceptual Schema in a distributed database contains information about global relations. The condition that all the data of the global relation must be mapped into the fragments, that is, it must not happen that a data item which belongs to a global relation does not belong to any fragment, is called :
- (A) Disjointness condition (B) Completeness condition
 (C) Reconstruction condition (D) Aggregation condition

Answer: B

9. Suppose database table T1(P, R) currently has tuples {(10, 5), (15, 8), (25, 6)} and table T2 (A, C) currently has {(10, 6), (25, 3), (10, 5)}. Consider the following three relational algebra queries RA1, RA2 and RA3:

RA1 : $T1 \bowtie_{T1.P = T2.A} T2$ where \bowtie is natural join symbol

RA2 : $T1 \ltimes_{T1.P = T2.A} T2$ where \ltimes is left outer join symbol

RA3 : $T1 \bowtie_{T1.P = T2.A \text{ and } T1.R = T2.C} T2$

The number of tuples in the resulting table of RA1, RA2 and RA3 are given by:

- (A) 2, 4, 2 respectively (B) 2, 3, 2 respectively
 (C) 3, 3, 1 respectively (D) 3, 4, 1 respectively

Answer: D

10. Consider the table R with attributes A, B and C. The functional dependencies that hold on R are : $A \rightarrow B, C \rightarrow AB$. Which of the following statements is/are True?
- I. The decomposition of R into R1(C, A) and R2(A, B) is lossless.
 - II. The decomposition of R into R1(A, B) and R2(B, C) is lossy.
- (A) Only I (B) Only II
 (C) Both I and II (D) Neither I nor II

Answer: C

11. Consider the following ORACLE relations:

One (x, y) = {<2, 5>, <1, 6>, <1, 6>, <1, 6>, <4, 8>, <4, 8>}

Two (x, y) = {<2, 55>, <1, 1>, <4, 4>, <1, 6>, <4, 8>, <4, 8>, <9, 9>, <1, 6>}

Consider the following two SQL queries SQ1 and SQ2:

SQ1 : SELECT * FROM One)

EXCEPT

(SELECT * FROM Two);

SQ2 : SELECT * FROM One)

EXCEPT ALL

(SELECT * FROM Two);

For each of the SQL queries, what is the cardinality (number of rows) of the result obtained when applied to the instances above?

- (A) 2 and 1 respectively (B) 1 and 2 respectively
(C) 2 and 2 respectively (D) 1 and 1 respectively

Answer: B

12. Which one of the following pairs is correctly matched in the context of database design?

List – I

(Database term)

I. Specialization

disjoint (lower-level) entity sets to produce a higher-level entity set.

II. Generalization

entity can be associated via a relationship set.

III. Aggregation

entity set to form a lower-level entity set.

IV. Mapping cardinalities

higher-level entity sets, and can participate in relationships.

List – II

(Definition)

A. Result of taking the union of two or more

B. Express the number of entities to which another

C. Result of taking a subset of a higher-level

D. An abstraction in which relationship sets (along

Codes :

I II III IV

(A) D A B C

(B) D C B A

(C) C D A B

(D) C A D B

Answer: D

7. Which of the following statements concerning Object-Oriented databases is FALSE?

(A) Objects in an object-oriented database contain not only data but also methods for processing the data.

(B) Object-oriented databases store computational instructions in the same place as the data.

(C) Object-oriented databases are more adapt at handling structures (analytical) data than relational databases.

(D) Object-oriented databases store more types of data than relational databases and access that data faster.

Answer: C

8. In distributed databases, location transparency allows for database users, programmers and administrators to treat the data as if it is at one location. A SQL query with location transparency needs to specify:

(A) Inheritances

(B) Fragments

(C) Locations

(D) Local formats

Answer: B

9. Consider the relations R(A,B) and S(B,C) and the following four relational algebra queries over R and S:

I. $\pi_{A,B}(R \bowtie S)$

II. $R \bowtie \pi_B(S)$

III. $R \cap (\pi_A(R) \times \pi_B(S))$

IV. $\pi_{A,R,B}(R \times S)$ where R.B refers to the column B in table R.

One can determine that:

(A) I, III and IV are the same query.

(B) II, III and IV are the same query.

(C) I, II and IV are the same query.

(D) I, III and III are the same query.

Answer: D

10. Which of the following statements is TRUE?

D₁: The decomposition of the schema R(A,B,C) into R₁(A,B) and R₂(A,C) is always lossless.

D₂: The decomposition of the schema R(A,B,C,D,E) having AD→B, C→DE, B→AE, AE→C into R₁(A,B,D) and R₂(A,C,D,E) is lossless.

(A) Both D₁ and D₂ (B) Neither D₁ and D₂

(C) Only D₁ (D) Only D₂

Answer: D

11. Consider the following ORACLE relations:

R(A,B,C) = {<1,2,3>, <1,2,0>, <1,3,1>, <6,2,3>, <1,4,2>, <3,1,4>}

S(B,C,D) = {<2,3,7>, <1,4,5>, <1,2,3>, <2,3,4>, <3,1,4>}

Consider the following two SQL queries SQ₁ and SQ₂:

SQ₁: SELECT R.B, AVG(S.B)

FROM R, S

WHERE R.A = S.C AND S.D < 7

GROUP BY R.B;

SQ₂: SELECT DISTINCT S.B, MIN (S.C)

FROM S

GROUP BY S.B

HAVING COUNT (DISTINCT S.D) > 1;

If M is the number of tuples returned by SQ₁ and N is the number of tuples returned by SQ₂ then

(A) M=4, N=2 (B) M=5, N=3

(C) M=2, N=2 (D) M=3, N=3

Answer: A

12. Semi-join strategies are techniques for query processing in distributed database system. Which of the following is a semi-join technique?

(A) Only the joining attributes are sent from one site to another and then all of the rows are returned.

(B) All of the attributes are sent from one site to another and then only the required rows are returned.

(C) Only the joining attributes are sent from one site to another and then only the required rows are returned.

(D) All of the attributes are sent from one site to another and then only the required rows are returned.

Answer: C

58. Which of the following statements regarding the features of the object-oriented approach to databases are true ?

(a) The ability to develop more realistic models of the real world.

(b) The ability to represent the world in a non-geometric way.

(c) The ability to develop databases using natural language approaches.

(d) The need to split objects into their component parts.

(e) The ability to develop database models based on location rather than state and behaviour.

Codes :

(A) (a), (b) and (c) (B) (b), (c) and (d)

(C) (a), (d) and (e) (D) (c), (d) and (e)

Answer: A

59. Consider the following database table :

Create table test(
 one integer,

 two integer,

 primary key(one),

 unique(two),

 check(one \geq 1 and \leq 10),

 check(two \geq 1 and \leq 5));

How many data records/tuples atmost can this table contain ?

(A) 5 (B) 10

(C) 15 (D) 50

Answer: A

60. Suppose ORACLE relation R(A, B) currently has tuples {(1, 2), (1, 3), (3, 4)} and relation S(B, C) currently has {(2, 5), (4, 6), (7, 8)}. Consider the following two SQL queries SQ1 and SQ2 :

SQ1 : Select *

From R Full Join S

On R.B=S.B;

SQ2 : Select *

From R Inner Join S

On R.B=S.B;

The numbers of tuples in the result of the SQL query SQ1 and the SQL query SQ2 are given by :

(A) 2 and 6 respectively (B) 6 and 2 respectively

(C) 2 and 4 respectively (D) 4 and 2 respectively

Answer: D

61. Consider the following three SQL queries (Assume the data in the people table) :

(a) Select Name from people where Age $>$ 21;

(b) Select Name from people where Height $>$ 180;

(c) Select Name from people where (Age $>$ 21) or (Height $>$ 180);

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If the SQL queries (a) and (b) above, return 10 rows and 7 rows in the result set respectively, then what is one possible number of rows returned by the SQL query (c) ? (A) 3 (B) 7 (C) 10 (D) 21

Answer: C

8. The STUDENT information in a university is stored in the relation STUDENT (Name, Sex, Marks, DEPT_Name)

Consider the following SQL Query `SELECT DEPT_Name from STUDENT where SEX='M' group by DEPT_Name having avg (Marks)>(SELECT avg (Marks) from STUDENT)`. It returns the Name of the Department for which:

- (A) The Average marks of Male students is more than the average marks of students in the same Department
- (B) The average marks of male students is more than the average marks of the students in the University
- (C) The average marks of male students is more than the average marks of male students in the University
- (D) The average marks of students is more than the average marks of male students in the University

Answer: B

9. Select the 'False' statement from the following statements about Normal Forms:

- (A) Lossless preserving decomposition into 3NF is always possible
- (B) Lossless preserving decomposition into BCNF is always possible
- (C) Any relation with two attributes is in BCNF
- (D) BCNF is stronger than 3NF

Answer: B

10. The Relation

Vendor Order (V_no, V_ord_no, V_name, Qty_sup, unit_price)

is in 2NF because :

- (A) Non key attribute V_name is dependent on V_no which is part of composite key
- (B) Non key attribute V_name is dependent on Qty_sup
- (C) key attribute Qty_sup is dependent on primary_key unit price
- (D) key attribute V_ord_no is dependent on primary_key unit price

Answer: A

11. The relation schemas R_1 and R_2 form a Lossless join decomposition of R if and only if:

- (a) $R_1 \cap R_2 \rightarrow (R_1 - R_2)$
- (b) $R_1 \rightarrow R_2$

(c) $R_1 \cap R_2 \rightarrow (R_2 - R_1)$

(d) $R_2 \rightarrow R_1 \cap R_2$

(A) (a) and (b) happens

(B) (a) and (d) happens

(C) (a) and (c) happens

(D) (b) and (c) happens

Answer: C

7. Let E_1 and E_2 be two entities in E-R diagram with simple single valued attributes. R_1 and R_2 are two relationships between E_1 and E_2 where R_1 is one-many and R_2 is many-many. R_1 and R_2 do not have any attributes of their own. How many minimum number of tables are required to represent this situation in the Relational Model?

(A) 4 (B) 3

(C) 2 (D) 1

Answer: B

7. Location transparency allows :

I. Users to treat the data as if it is done at one location.

II. Programmers to treat the data as if it is at one location.

III. Managers to treat the data as if it is at one location.

Which one of the following is correct ?

(A) I, II and III

(B) I and II only

(C) II and III only

(D) II only

Answer: A

8. Which of the following is correct ?

I. Two phase locking is an optimistic protocol.

II. Two phase locking is pessimistic protocol

III. Time stamping is an optimistic protocol.

IV. Time stamping is pessimistic protocol.

(A) I and III

(B) II and IV

(C) I and IV

(D) II and III

Answer: D

9. rules used to limit the volume of log information that has to be handled and processed in the event of system failure involving the loss of volatile information.

(A) Write-ahead log (B) Check-pointing

(C) Log buffer

(D) Thomas

Answer: B

10. Let $R = ABCDE$ is a relational scheme with functional dependency set $F = \{A \rightarrow B, B \rightarrow C, AC \rightarrow D\}$. The attribute closures of A and E are

- (A) ABCD, \emptyset (B) ABCD, E
(C) \emptyset , \emptyset (D) ABC, E

Answer: B

11. Consider the following statements :

- I. Re-construction operation used in mixed fragmentation satisfies commutative rule.
II. Re-construction operation used in vertical fragmentation satisfies commutative rule
Which of the following is correct ?

- (A) I
(B) II
(C) Both are correct
(D) None of the statements are correct.

Answer: D

12. Which of the following is false ?

- (A) Every binary relation is never be in BCNF.
(B) Every BCNF relation is in 3NF.
(C) 1 NF, 2 NF, 3 NF and BCNF are based on functional dependencies.
(D) Multivalued Dependency (MVD) is a special case of Join Dependency (JD).

Answer: A

31. Any decision tree that sorts n elements has height

- (A) $\log(n)$ (B) $\log(\log n)$
(C) $\log(n/\log n)$ (D) $\log(n^2)$

Answer: C

22. Consider the following relational schemas for a library database :

Book (Title, Author, Catalog_no, Publisher, Year, Price)

Collection (Title, Author, Catalog_no)

with the following functional dependencies :

- I. Title, Author \rightarrow Catalog_no
II. Catalog_no \rightarrow Title, Author, Publisher, Year
III. Publisher, Title, Year \rightarrow Price

Assume (Author, Title) is the key for both schemas. Which one of the following is true?

- (A) Both Book and Collection are in BCNF.
(B) Both Book and Collection are in 3NF.
(C) Book is in 2NF and Collection in 3NF.
(D) Both Book and Collection are in 2NF.

Answer: C

23. Specialization Lattice stands for

- (A) An entity type can participate as a subclass in only one specialization.
(B) An entity type can participate as a subclass in more than one specialization.
(C) An entity type that can participate in one specialization.
(D) An entity type that can participate in one generalization.

Answer: B

24. Match the following :

List – I

- a. Timeout ordering protocol
- b. Deadlock prevention
- c. Deadlock detection
- d. Deadlock recovery

List – II

- i. Wait for graph
- ii. Roll back
- iii. Wait-die scheme
- iv. Thomas Write Rule

Codes :

- a b c d
- (A) iv iii i ii
 - (B) iii ii iv i
 - (C) ii i iv iii
 - (D) iii i iv iii

Answer: A

26. Which one of the following is not a Client-Server application?

- (A) Internet chat
- (B) Web browser
- (C) E-mail
- (D) Ping

Answer: B

20. Which one of the following is not a definition of error?

- (A) It refers to the discrepancy between a computed, observed or measured value and the true, specified or theoretically correct value.
- (B) It refers to the actual output of a software and the correct output.
- (C) It refers to a condition that causes a system to fail.
- (D) It refers to human action that results in software containing a defect or fault.

Answer: C

25. Consider the schema $R = \{S, T, U, V\}$ and the dependencies $S \twoheadrightarrow T$, $T \twoheadrightarrow U$, $U \twoheadrightarrow V$ and $V \twoheadrightarrow S$. If $R = (R_1 \text{ and } R_2)$ be a decomposition such that $R_1 \twoheadrightarrow R_2 = \twoheadrightarrow$ then the decomposition is

- (A) not in 2NF
- (B) in 2NF but not in 3NF
- (C) in 3NF but not in 2NF
- (D) in both 2NF and 3NF

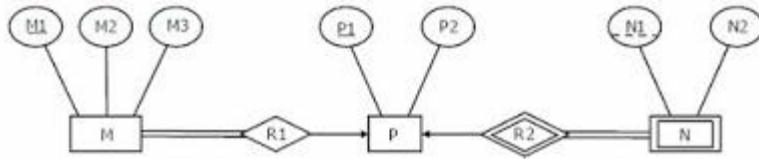
Answer: D

27. Which of the following concurrency protocol ensures both conflict serializability and freedom from deadlock :

- I. 2-phase locking
 - II. Time phase ordering
- (A) Both I & II
 - (B) II only
 - (C) I only
 - (D) Neither I nor II

Answer: B

55. Consider the following ER diagram:



The minimum number of tables required to represent M, N, P, R₁, R₂ is

- (A) 2
- (B) 3
- (C) 4
- (D) 5

Answer: A

Explanation:

Since R₁ is many to one and participation of M is total, M and R₁ can be combined to form the table {M1, M2, M3, P1}. N is a weak entity set, so it can be combined with P.

56. Consider the following schemas:

Branch = (Branch-name, Assets, Branch-city)

Customer = (Customer-name, Bank-name, Customer-city)

Borrow = (Branch-name, loan-number, customer account-number)

Deposit = (Branch-name, Account-number, Customer-name, Balance)

Using relational Algebra, the query that finds customers who have balance more than 10,000 is

.....

- (A) $\pi_{\text{customer-name}}(\sigma_{\text{balance} > 10000}(\text{Deposit}))$
- (B) $\sigma_{\text{customer-name}}(\sigma_{\text{balance} > 10000}(\text{Deposit}))$
- (C) $\pi_{\text{customer-name}}(\sigma_{\text{balance} > 10000}(\text{Borrow}))$
- (D) $\sigma_{\text{customer-name}}(\sigma_{\text{balance} > 10000}(\text{Borrow}))$

Answer: A

57. Find the false statement:

- (A) The relationship construct known as the weak relationship type was defined by Dey, Storey & Barron (1999).
- (B) A weak relationship occurs when two relationship types are linked by either Event-Precedent sequence or Condition-Precedent sequence
- (C) Conceptual model is not accurate representation of "Universe of interest".
- (D) Ternary, Quaternary and Quintary relationships are shown through a series of application scenario's and vignette's

Answer: C

58. Consider the table

Student(stuid, name, course, marks). Which one of the following two queries is correct to find the highest marks student in course 5?

Q.1. Select S.stuid

From student S

Where not exists

(select * from student e where e course='5' and e marks \geq s marks)

Q.2. Select S.stuid

From student S

Where s.marks > any (select distinct marks from student S where s.couse = 5)

- (A) Q.1
- (B) Q.2

- (C) Both Q.1 and Q.2
- (D) Neither Q.1 nor Q.2

Answer: B

47. Consider the following schemas :

Branch_Schema = (branch_name, assets, city)

Customer_Schema = (customer_name, street, city)

Deposit_Schema = (branch_name, account_number, customer_name, balance)

Borrow_Schema = (branch_name, loan_number, customer_name, amount)

Which of the following tuple relational calculus finds all customers who have loan amount more than Rs 12,000?

- (A) $\{t(\text{customer_name}) \mid t \in \text{borrow}[?] \ t[\text{amount}] > 12000\}$
- (B) $\{t \mid t(\text{customer_name}) \mid t \in \text{borrow}[?] \ t[\text{amount}] > 12000\}$
- (C) $\{t \mid [?] \in \text{borrow} (t(\text{customer_name}) = s(\text{customer_name})) [?] [\text{amount}] > 12000\}$
- (D) $\{t \mid [?] \in \text{borrow} (t(\text{customer_name}) [?] s[\text{amount}] > 12000\}$

Answer: C

48. Match the following :

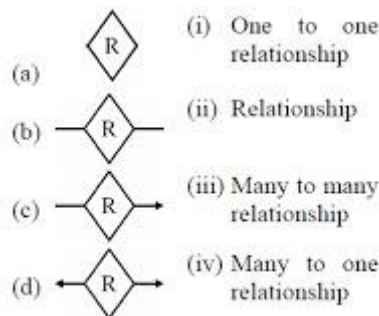
- (a) Create (i) The E-R Model
- (b) Select (ii) Relationship Model
- (c) Rectangle (iii) DDL
- (d) Record (iv) DML

Codes :

- (a) (b) (c) (d)
- (A) (iii) (iv) (i) (ii)
- (B) (iv) (iii) (ii) (i)
- (C) (iv) (iii) (i) (ii)
- (D) (iii) (iv) (ii) (i)

Answer: A

49. Match the following :



Codes :

- (a) (b) (c) (d)
- (A) (iii) (iv) (ii) (i)
- (B) (iv) (iii) (ii) (i)
- (C) (ii) (iii) (iv) (i)
- (D) (iii) (iv) (i) (ii)

Answer: C

25. The SQL expression

Select distinct T, branch_name from branch T, branch S where T.assets>S.assets and S.branch_city="Mumbai" finds the names of

- (A) All branches that have greater assets than some branch located in Mumbai.
- (B) All branches that have greater assets than all branches in Mumbai.
- (C) The branch that has greatest asset in Mumbai.
- (D) Any branch that has greater assets than any branch in Mumbai.

Answer: A

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.
- (A) Logical Integrity
 - (B) Referential Integrity
 - (C) Domain Integrity
 - (D) Data Integrity

Answer: B

56. If a relation with a Schema R is decomposed into two relations R_1 and R_2 such that $(R_1 \bowtie R_2) = R$ then which one of the following is to be satisfied for a lossless joint decomposition (\rightarrow indicates functional dependency)
- (A) $(R_1 \cap R_2) \rightarrow R_1$ or $R_1 \cap R_2 \rightarrow R_2$
 - (B) $R_1 \cap R_2 \rightarrow R_1$
 - (C) $R_1 \cap R_2 \rightarrow R_2$
 - (D) $R_1 \cap R_2 \rightarrow R_1$ and $R_1 \cap R_2 \rightarrow R_2$

Answer: A

Explanation:

Let R be a relation schema.

Let F be a set of functional dependencies on R.

Let R_1 and R_2 form a decomposition of R.

The decomposition is a **lossless-join decomposition** of R if at least one of the following functional dependencies are in F^+

1. $R_1 \cap R_2 \rightarrow R_1$
2. $R_1 \cap R_2 \rightarrow R_2$

59. Which level of Abstraction describes how data are stored in the data base?
- (A) Physical level
 - (B) View level
 - (C) Abstraction level
 - (D) Logical level

Answer: A

47. Analysis of large database to retrieve information is called
- (A) OLTP
 - (B) OLAP
 - (C) OLDP
 - (D) OLPP

Answer: B

7. The "PROJECT" operator of a relational algebra creates a new table that has always
- (A) More columns than columns in original table
 - (B) More rows than original table
 - (C) Same number of rows as the original table

(D) Same number of columns as the original table

Answer: C

Explanation:

If the user is interested in selecting the values of a few attributes, rather than selecting all attributes of the table, then one should go for **PROJECT** operation. **PROJECT** eliminates columns while **SELECT** eliminates rows.

8. The employee information of an Organization is stored in the relation:

Employee (name, sex, salary, deptname)

Consider the following SQL query

```
Select deptname from Employee Where sex = 'M' group by deptname having avg (salary) >
{select avg (salary) from Employee }
```

Output of the given query corresponds to

(A) Average salary of employee more than average salary of the organization.

(B) Average salary less than average salary of the organization.

(C) Average salary of employee equal to average salary of the organization.

(D) Average salary of male employees in a department is more than average salary of the organization.

Answer: D

9. For a database relation R(a, b, c, d) where the domains of a, b, c, d include only the atomic values. The functional dependency $a \rightarrow c, b \rightarrow d$ holds in the following relation

(A) In 1NF not in 2NF

(B) In 2NF not in 3NF

(C) In 3NF

(D) In 1NF

Answer: A

47. Match the following:

List - I

a. Foreign keys

b. Private key

c. Event control action model

d. Data security

List - II

i. Domain constraint

ii. Referential integrity

iii. Encryption

iv. Trigger

Codes:

- a b c d
(A) iii ii i iv
(B) ii i iv iii
(C) iii iv i ii
(D) i ii iii iv

Answer: B

60. Match the following:

List – I

- a. Secondary Index
b. Non-procedural Query
c. Closure of set of Attributes
d. Natural JOIN

List - II

- i. Functional Dependency
ii. B-tree
iii. Relational Algebraic Operation
iv. Domain Calculus

Codes:

- a b c d
(A) i ii iv iii
(B) ii i iv iii
(C) i iii iv ii
(D) ii iv i iii

Answer: D

70. Referential integrity is directly related to

- (A) Relation key
(B) Foreign key
(C) Primary key
(D) Candidate key

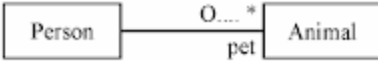
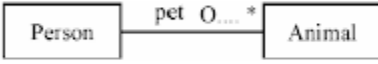
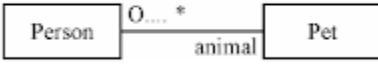
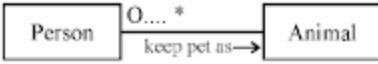
Answer: B

63. Third normal form is based on the concept of

- (A) Closure Dependency
(B) Transitive Dependency
(C) Normal Dependency
(D) Functional Dependency

Answer: B

38. How to express that some person keeps animals as pets ?

- (A)  (B)  (C)  (D) 

Answer: A

9. The problem that occurs when one transaction updates a database item and then the transaction fails for some reason is
- (A) Temporary Select Problem
 - (B) Temporary Modify Problem
 - (C) Dirty Read Problem
 - (D) None

Answer: C

18. Consider a schema $R(A, B, C, D)$ and functional dependencies $A \rightarrow B$ and $C \rightarrow D$. Then the decomposition $R_1(A, B)$ and $R_2(C, D)$ is
- (A) Dependency preserving but not lossless join
 - (B) Dependency preserving and lossless join
 - (C) Lossless Join but not dependency preserving
 - (D) Lossless Join

Answer: A

44. Which diagram provides a formal graphic notation for modelling objects, classes and their relationships to one another?
- (A) Object diagram
 - (B) Class diagram
 - (C) Instance diagram
 - (D) Analysis diagram

Answer: A

8. Which level of Abstraction describes what data are stored in the Database?
- (A) Physical level
 - (B) View level
 - (C) Abstraction level
 - (D) Logical level

Answer: D

4. What is Granularity?
- (A) The size of database
 - (B) The size of data item
 - (C) The size of record
 - (D) The size of file

Answer: B

63. Consider the following three tables R, S and T. In this question, all the join operations are natural joins (\bowtie). (π) is the projection operation of a relation :

R		S		T	
A	B	B	C	A	C
1	2	6	2	7	1
3	2	2	4	1	2
5	6	8	1	9	3
7	8	8	3	5	4
9	8	2	5	3	5

Possible answer tables for this question are also given as below :

A	B	C
1	2	4
1	2	5
3	2	4
3	2	5
5	6	2
7	8	1
7	8	3
9	8	1
9	8	3

(a)

A	B	C
1	2	2
3	2	5
5	6	4
7	8	1
9	8	3

(b)

A	B	C
1	6	2
3	2	5
5	2	4
7	8	1
9	8	3

(c)

A	B	C
3	2	5
7	8	1
9	8	3

(d)

What is the resulting table of $\pi_{A,B}(R \bowtie T) \bowtie \pi_{B,C}(S \bowtie T)$?

- (A) (a) (B) (b)
 (C) (c) (D) (d)

Answer: A

7. Consider the following four schedules due to three transactions (indicated by the subscript) using read and write on a data item X, denoted by r(X) and w(X) respectively. Which one of them is conflict serializable?

S₁ : r₁(X); r₂(X); w₁(X); r₃(X); w₂(X)
 S₂ : r₂(X); r₁(X); w₂(X); r₃(X); w₁(X)
 S₃ : r₃(X); r₂(X); r₁(X); w₂(X); w₁(X)
 S₄ : r₂(X); w₂(X); r₃(X); r₁(X); w₁(X)

- (1) S₁
 (2) S₂
 (3) S₃
 (4) S₄

Answer: 4

8. Suppose a database schedule S involves transactions T₁, T₂,,T_n. Consider the precedence graph of S with vertices representing the transactions and edges representing the conflicts. If S is serializable, which one of the following orderings of the vertices of the precedence graph is guaranteed to yield a serial schedule?

- (1) Topological order
- (2) Depth - first order
- (3) Breadth - first order
- (4) Ascending order of transaction indices

Answer: 1

9. If every non-key attribute is functionally dependent on the primary key, then the relation is in

.....

- (1) First normal form
- (2) Second normal form
- (3) Third normal form
- (4) Fourth normal form

Answer: 3

10. Consider a relation R (A, B, C, D, E, F, G, H), where each attribute is atomic, and following functional dependencies exist.

$CH \rightarrow G$

$A \rightarrow BC$

$B \rightarrow CFH$

$E \rightarrow A$

$F \rightarrow EG$

The relation R is

- (1) in 1NF but not in 2NF
- (2) in 2NF but not in 3NF
- (3) in 3NF but not in BCNF
- (4) in BCNF

Answer: 1

33. Which of the following permanent database that has an entry for each terminal symbol ?

- (A) Literal table
- (B) Identifier table
- (C) Terminal table
- (D) Source table

Answer: C

12. In the indexed scheme of blocks to a file, the maximum possible size of the file depends on:

- (A) The number of blocks used for index, and the size of index
- (B) Size of Blocks and size of Address
- (C) Size of Index
- (D) Size of Block

Answer: A

48. Analysis of large database to retrieve information is called:

- (A) OLTP
- (B) OLAP
- (C) OLDP
- (D) TLPP

Answer: B