Unit 5 Relational Database Design

1.	In the _____ normal form, a composite attribute is converted to individual attributes.
A.	First
B.	Second
C.	Third
D.	Fourth

Answer» A. First

2.	Tables in second normal form (2NF):
A.	Eliminate all hidden dependencies
B.	Eliminate the possibility of a insertion anomalies
C.	Have a composite key
D.	Have all non key fields depend on the whole primary key

Answer» A. Eliminate all hidden dependencies

3.	Which-one ofthe following statements about normal forms is FALSE?
A.	BCNF is stricter than 3 NF
B.	Lossless, dependency -preserving decomposition into 3 NF is always possible
C.	Loss less, dependency – preserving decomposition into BCNF is always possible
D.	Any relation with two attributes is BCNF

Answer» C. Loss less, dependency – preserving decomposition into BCNF is always possible

4. Functional Dependencies are the types of constraints that are based on_____

A. Key

B. Key revisited

C. Superset key

D. None of the mentioned

Answer» A. Key

5. Which is a bottom-up approach to database design that design by examining the relationship between attributes:

A. Functional dependency

B. Database modeling

C. Normalization

D. Decomposition

Answer» C. Normalization

6. Which forms simplifies and ensures that there are minimal data aggregates and repetitive groups:

A. 1NF

B. 2NF

C. 3NF

D. All of the mentioned

Answer» C. 3NF

7. Which forms has a relation that possesses data about an individual entity:

A. 2NF

B. 3NF

C. 4NF

D. 5NF

Answer» C. 4NF

8.	Which forms are based on the concept of functional dependency:
A.	1NF
B.	2NF
C.	3NF
D.	4NF

Answer» C. 3NF

9.	Empdt1(empcode, name, street, city, state, pincode). For any pincode, there is only one city and state. Also, for given street, city and state, there is just one pincode. In normalization terms, empdt1 is a relation in
A.	1 NF only
B.	2 NF and hence also in 1 NF
C.	3NF and hence also in 2NF and 1NF
D.	BCNF and hence also in 3NF, 2NF and 1NF

Answer» B. 2 NF and hence also in 1 NF

10.	We can use the following three rules to find logically implied functional dependencies. This collection of rules is called
A.	Axioms
B.	Armstrong's axioms
C.	Armstrong
D.	Closure

Answer» B. Armstrong's axioms

11.	Which of the following is not Armstrong's Axiom?
A.	Reflexivity rule
B.	Transitivity rule
C.	Pseudotransitivity rule
D.	Augmentation rule

Answer» C. Pseudotransitivity rule

12.	The relation employee(ID,name,street,Credit,street,city,salary) is decomposed into employee1 (ID, name) employee2 (name, street, city, salary) This type of decomposition is called
A.	Lossless decomposition
B.	Lossless-join decomposition
C.	All of the mentioned
D.	None of the mentioned
Answer» D. None of the mentioned	

13.	Inst_dept (ID, name, salary, dept name, building, budget) is decomposed into instructor (ID, name, dept name, salary) department (dept name, building, budget) This comes under
A.	Lossy-join decomposition
B.	Lossy decomposition
C.	Lossless-join decomposition
D.	Both Lossy and Lossy-join decomposition
Answer» D. Both Lossy and Lossy-join decomposition	

14.	There are two functional dependencies with the same set of attributes on the left side of the arrow: A->BC A->B This can be combined as
A.	A->BC
B.	A->B
C.	B->C
D.	None of the mentioned
Answer» A. A->BC	

15.	Consider a relation R(A,B,C,D,E) with the following functional dependencies: ABC -> DE and D -> AB The number of superkeys of R is:
A.	2
B.	7
C.	10
D.	12
Answer» C. 10	

16.	Which, if any, of the two queries above will correctly (in SQL2) get the desired set of employee ID's?
A.	Both I and II
B.	I only
C.	II only
D.	Neither I nor I
Answer» A. Both I and II	

17.	Suppose now that R(A,B:) and S(A,B:) are two relations with r and s tuples, respectively (again, not necessarily distinct). If m is the number of (not necessarily distinct) tuples in the result of the SQL query: R intersect S; Then which of the following is the most restrictive, correct condition on the value of m?
A.	m = min(r,s)
B.	0 <= m <= r + s
C.	min(r,s) <= m <= max(r,s)
D.	0 <= m <= min(r,s)
Answer» D. 0 <= m <= min(r,s)	

18.	Which of the following is not a key?
A.	A
B.	E
C.	B, C
D.	D
Answer» C. B, C	

19.	If a relation is in BCNF, then it is also in
A.	1 NF
B.	2 NF
C.	3 NF
D.	All of the above
Answer» D. All of the above	

20.	What action does ⋈ operator perform in relational algebra
A.	Output specified attributes from all rows of the input relation and remove duplicate tuples from the output
B.	Outputs pairs of rows from the two input relations that have the same value on all attributes that have the same name
C.	Output all pairs of rows from the two input relations (regardless of whether or not they have the same values on common attributes)
D.	Return rows of the input relation that satisfy the predicate
Answer» A. Output specified attributes from all rows of the input relation and remove duplicate tuples from the output	

21.	Statement 1: A tuple is a row in a relation Statement 2: Existence of multiple foreign keys in a same relation is possible
A.	Both the statements are true
B.	Statement 1 is correct but Statement 2 is false
C.	Statement 1 is false but Statement 2 is correct

21.	Statement 1: A tuple is a row in a relation Statement 2: Existence of multiple foreign keys in a same relation is possible
D.	Both the statements are false

Answer» A. Both the statements are true

22.	The____condition allows a general predicate over the relations being joined.
A.	On
B.	Using
C.	Set
D.	Where

Answer» A. On

23.	Which of the join operations do not preserve non matched tuples?
A.	Left outer join
B.	Right outer join
C.	Inner join
D.	Natural join

Answer» B. Right outer join

24.	The normal form which satisfies multivalued dependencies and which is in BCNF is
A.	4 NF
B.	3 NF
C.	2 NF
D.	All of the mentioned

Answer» A. 4 NF

25.	Which of the following is a tuple-generating dependencies?
A.	Functional dependency

25.	Which of the following is a tuple-generating dependencies?
B.	Equality-generating dependencies
C.	Multivalued dependencies
D.	Non-functional dependency
Answer» B. Equality-generating dependencies	

26.	The main task carried out in the _____ is to remove repeating attributes to separate tables.
A.	First Normal Form
B.	Second Normal Form
C.	Third Normal Form
D.	Fourth Normal Form
Answer» A. First Normal Form	

27.	Which forms has a relation that possesses data about an individual entity?
A.	2NF
B.	3NF
C.	4NF
D.	5NF
Answer» B. 3NF	

28.	Which of the following has each related entity set has its own schema and there is an additional schema for the relationship set?
A.	A many-to-many relationship set
B.	A multivalued attribute of an entity set
C.	A one-to-many relationship set
D.	None of the mentioned

28. Which of the following has each related entity set has its own schema and there is an additional schema for the relationship set?

Answer» A. A many-to-many relationship set

29. Fifth Normal form is concerned with

A. Functional dependency

B. Multivalued dependency

C. Join dependency

D. Domain-key

Answer» B. Multivalued dependency

30. n which of the following, a separate schema is created consisting of that attribute and the primary key of the entity set.

A. A many-to-many relationship set

B. A multivalued attribute of an entity set

C. A one-to-many relationship set

D. None of the mentioned

Answer» B. A multivalued attribute of an entity set

31. In 2NF

A. No functional dependencies (FDs) exist

B. No multivalued dependencies (MVDs) exist

C. No partial FDs exist

D. No partial MVDs exist

Answer» B. No multivalued dependencies (MVDs) exist

32. A functional dependency is a relationship between or among

A. Entities
B. Rows
C. Attributes
D. Tables

View Answer
Ans : C

Explanation: A functional dependency is a relationship between or among Attributes

33. Consider a relation R(A, B, C, D) with the following functional dependencies:
A -> (B, C, D), (A, D) -> (B, C) and (C, D) -> (A, B). Identify the candidate key(s).

A. {A}
B. {A}, {C, D}
C. {A}, {C, D}, {A, D}
D. {C, D}

View Answer
Ans : B

Explanation: {A}, {C, D} the candidate key(s)

33. Which functional dependency types is/are not present in the following dependencies?
Empno -> EName, Salary, Deptno, DName
DeptNo -> DName
EmpNo -> DName

A. Full functional dependency
B. Partial functional dependency
C. Transitive functional dependency
D. Both B and C

View Answer
Ans : B

Explanation: Partial functional dependency types is/are not present in the following dependencies.

34. Which functional dependency types is/are not present in following dependencies?
StaffNo, BranchNo -> StaffName, BranchName, Position, DOB
StaffNo -> StaffName, Position, DOB
BranchNo -> BranchName

A. Full functional dependency
B. Partial functional dependency

C. Transitive functional dependency
D. Both B and C

View Answer

Ans : C

Explanation: Transitive functional dependency types is/are not present in the following dependencies.

35. The database design prevents some data from being stored due to _____.

A. Deletion anomalies
B. Insertion anomalies
C. Update anomalies
D. Selection anomalies

View Answer

Ans : B

Explanation: The database design prevents some data from being stored due to Insertion anomalies.

36. A relation is in 2NF if:

A. All the values of non-key attributes are dependent fully on the candidate key.
B. Any non-key attribute that are dependent on only part of the candidate key should be moved to another relation where the partial key is the actual full key.
C. It must be already in the 1NF.
D. All of the above.

View Answer

Ans : D

Explanation: All the above option are correct.

37. If one attribute is determinant of second, which in turn is determinant of third, then the relation cannot be:

A. Well-structured
B. 1NF
C. 2NF
D. 3NF

View Answer

Ans : D

Explanation: If one attribute is determinant of second, which in turn is determinant of third, then the relation cannot be 3NF.

38. Consider the relation Sale(Date, Customer, Product, Vendor, VendorCity, SalesRep)
{Date, Customer, Product} is the composite candidate key and the following functional dependencies are also given:
Vendor -> VendorCity, Product -> Vendor
What is the highest normal form of the sale relation?

A. 0NF
B. 1NF
C. 2NF
D. 3NF

View Answer
Ans : B

Explanation: The highest normal form of the sale relation is 1NF.

39. Which of the following statement(s) is/are FALSE about OLAP?

A. OLAP involves long running slow transactions that read lot of data
B. OLAP involves frequent insert, update and delete operations
C. OLAP requires data to be in De-Normalized form for optimal processing
D. Both B and C

View Answer
Ans : B

Explanation: OLAP involves frequent insert, update and delete operations statement(s) is/are FALSE about OLAP.

40. Which of the following statement(s) is/are true about OLAP?

A. OLAP involves long running slow transactions that read lot of data
B. OLAP requires complex joins to aggregate data from multiple tables
C. OLAP requires data to be in De-Normalized form for optimal processing
D. Both A and C

View Answer
Ans : D

Explanation: Both A and C statement(s) is/are True about OLAP.

41. Choose the correct processing technique for the given statements.
Identify correlation between salary structure and policies sold made by Insurance agents in an organization.

A. OLTP
B. OLAP

C. OLAM
D. None of the above
View Answer
Ans : A

Explanation: OLTP the correct processing technique for the given statements.

42. Choose the correct processing technique for the given statements.
Update project details of an employee

A. OLTP
B. OLAP
C. OLAM
D. None of the above
View Answer
Ans : B

Explanation: OLAP the correct processing technique for the given statements.

43. Choose the correct processing technique for the given statements.
Identify profit trends for different units of organization over years

A. OLTP
B. OLAP
C. OLAM
D. None of the above
View Answer
Ans : A

Explanation: OLTP the correct processing technique for the given statements.

44. 4NF is designed to cope with :

A. Transitive dependency
B. Join dependency
C. Multi valued dependency
D. None of these
View Answer
Ans : C

Explanation: 4NF is designed to cope with Multi valued dependency

45. 5NF is designed to cope with :

A. Transitive dependency
B. Join dependency
C. Multi valued dependency
D. None of these

View Answer
Ans : B

Explanation: 5NF is designed to cope with Join dependency

46. A BCNF is :

A. loss less join and dependency preserving
B. loss less join but not dependency preserving
C. not loss less join but dependency preserving
D. None of these

View Answer
Ans : B

Explanation: A BCNF is : loss less join but not dependency preserving.

47. Consider the schema R(S,T,U,V) and the dependencies S→T, T→U, U→V, V→S. Let R= {R1,R2} such that R1∩R2=Φ. 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

View Answer
Ans : B

Explanation: Then the decomposition is in 2NF but not in 3NF.

48. Third normal form is based on the concept of _____

A. Closure Dependency
B. Transitive Dependency
C. Normal Dependency
D. Functional Dependency

View Answer
Ans : B

Explanation: Third normal form is based on the concept of Transitive Dependency.

49. Third normal form is inadequate in situations where the relation :

A. has multiple candidate keys
B. has candidate keys that are composite
C. has overlapped candidate keys
D. none of the above

View Answer
Ans : D

Explanation: Third normal form is inadequate in situations where the relation is none of the above relation.

50. R(A,B,C,D) is a relation, Which of the following does not have a lossless join dependency preserving BCNF decomposition

A. A->B, B->CD
B. A->B, B->C,C->D
C. AB->C, C->AD
D. A->BCD

View Answer
Ans : A

Explanation: A->B, B->CD does not have a lossless join dependency preserving BCNF decomposition.

1. Let us assume that a relation R (A, B, C, D, E) with set of functional dependencies F = {A ⟶ BC, C ⟶ D} is decomposed into relations R1 (A, B, C) and R2 (A, D, E). This decomposition is _____.

a) Lossless join decomposition

b) Dependency preserving decomposition

c) Not a dependency preserving decomposition

d) Lossy decomposition

Answer: ***(a) and (c)***

Common attribute between R1 and R2 is A, and, attribute A determines all attributes of R1. Hence, it is a lossless decomposition.

It is not a dependency preserving decomposition because the FD C ⟶ D is lost.

Lossless join decomposition

Decomposition of relation R into R1 and R2 is said to be lossless join decomposition if one of the following holds;

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

Dependency preserving decomposition

If a relation R with set F of functional dependencies is decomposed into relations $R_1, R_2, R_3, \ldots, R_i$ then the closure of set of functional dependencies for these relations should satisfy the following;

- $(F_1 \cup F_2 \cup F_3 \cup \ldots \cup F_i)^+ = F^+$
- ***That is the closure of union of set of functional dependencies of relations $R_1, R_2, \ldots, R_i$ should be equal to the closure of set of functional dependencies F of R. In other words, all the functional dependencies in $(F_1 \cup F_2 \cup F_3 \cup \ldots \cup F_i)^+$ should be in F^+ also.***

2. Let us assume that a relation R (A, B, C, D, E, F, G, H) with set of functional dependencies F = {AB ⟶ E, C ⟶ D, D ⟶ E, FG ⟶ A} is decomposed into relations R1(ABE), R2(CD), R3(FGA) and R4(BCFGH). The decomposition _____.

a) is resulted in all BCNF relations

b) is dependency preserving decomposition

c) is not a dependency preserving decomposition

d) is lossless decomposition

Answer: *(a) and (c)*

R1(ABE), R2(CD), R3(FGA) and R4(BCFGH). Keys are underlined. All relations are in BCNF.

The functional dependency D ⟶ E is lost. Hence, decomposition of R into R1, R2, R3 and R4 is not a dependency preserving decomposition.

3. Consider a relation R(A, B, C, D, E) with the set of functional dependencies F = {A ⟶ B, B ⟶ E, E ⟶ A}. Relation R is in ____.

a) Un-normalized form

b) Third Normal Form

c) Boyce-Codd Normal Form

d) Domain Key Normal Form

Answer: *(b) 3NF*

The candidate keys for R are ACD, BCD, and ECD.

No non-key dependencies found in R.

Hence, relation R is in third normal form.