|  | **Final Exam** |  |
| --- | --- | --- |
| **Department:** Mathematics Date: 28/8/2021 | **Program Name:** Computer Science/ Physics and Computer Sciences **Level: 2** | **Course Title:** Database Systems **Code No.:** 204 س |

## ANSWER ALL THE FOLLOWING QUESTIONS:

### Question 1: Define the following terms                                    (20 Marks)

- A. Database
- B. DBMS
- C. Referential integrity constraint
- D. SQL

### Question 2: State true or false and correct the wrong statement        (40 Marks)

1. Metadata is a complete definition or description of the database structure and constraints stored in the catalog.

2. In a column contains duplicate values; to list all different values only, then we use the UNIQUE SQL clause.

3. Null represents a value for an attribute that is currently unknown or is not applicable for this tuple.

4. Domain is the set of allowable values for one or more attributes.

5. A simple attribute value is derivable from the value of a related attribute(s), not necessarily in the same entity.

6. To apply the intersection operation, the involved relations do not have to be union compatible.

7. In the FD $A \rightarrow B$; B is the determinant of A, and A is the dependent.

8. The relational algebra expression $\pi L(R)$ has cardinality equal to the cardinality of L

9. Functional dependency describes the relationship between tuples in a relation

10. In a relation R; Super key is an attribute(s) that matches the candidate key of some other relation S.

11. The select operation's function in relational algebra is identical to the SELECT clause in SQL.

12. Tuple is a characteristic or trait of an entity type that describes the entity.

13. If a relation R has repeating group; then R is at least in the 3NF.

14. The FK attributes as PK attributes are allowed to be NULL.

15. $\pi List1 (\pi List2 (...(\pi Listn(R))...) ) = \pi List1(R)$

16. Backup and recovery services are improved using the database approach.

17. In the ERD; the oval represent relationship between two entities.

18. A subclass can be a subclass in only one class

19. In order to design database; the normalization model is used in the top down approach, but ER can be used as a bottom up standalone database design technique.

20. The attributes in FK may have values other than the domain(s) of the primary key attributes PK

## Question 3: Choose the correct answers: (40 Marks)

1. ......... has the constraint that every subclass participates as a subclass in only one class/subclass relationship; that is, each subclass has only one parent.

   A. Specialization lattice   B. Strict hierarchy.        C. Generalization   D. Inheritance

2. ........... is the software that manages and controls access to the database.

   A. DBMS   B. Database Application          C. Meta-data          D. Database

3. ........ is the process of maximizing the differences between members of an entity by identifying their distinguishing characteristics.

   A. Generalization                B. Union              C. Inheritance   D. Specialization

4. The ......clause is used to combine rows from two tables based on a related column between them.

   A. MATCH                B. LIKE                C. JOIN                        D. PATTERN

5. If there are multiple values at the intersection of certain rows and columns in a relation; then the relation is in the .....

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

6. A .........is a class that has no subclasses of its own.

    A. shared subclass      B. leaf node      D. Partial subclass      D. General superclass

7. pS(B1, B2, B3)(R); The previous expression is used to .......... attributes B1,B2, B3 in table R.

    A. join              B. rename             C. project             D. select

8. .......... entity type is an entity type that is existence-dependent on some other entity type.

    A. Strong             B. Weak             C. Owner             D. Composite

9. ......... system restores the database to a previous consistent state following a hardware or software failure.

    A. Integrity             B. Security             C. Concurrency control             D. Recovery

10. Which one of the following SQL statements is correct?

    A. UPDATE table_name SET attribute1 = 'new_value1', attribute2= 'new_value2' WHERE attribute1 = 'old_value1';

    B. UPDATE table_name SET attribute1= 'new_value1' AND attribute2= 'new_value2' WHERE attribute1 = 'old_value1';

    C. UPDATE attribute1, attribute2 SET 'new_value1', 'new_value2' WHERE attribute 1 = 'old_value1';

    D. UPDATE attribute1, attribute2 SET 'new_value1' AND 'new_value2' WHERE attribute 1 = 'old_value1';

11. ..........is an entity type that includes one or more distinct subgroupings of its occurrences, which require to be represented in a data model.

    A. Subclass          B. Member          C. Superclass          D. Regular

12. The .............. of a relation is the number of tuples it contains.

    A. degree          B. schema          C. Selectivity factor          D. cardinality

13. The .......... operation is a filter that keeps only those tuples that satisfy a qualifying condition.

    A. union          B. project          C. select          D. join

14. ......... key is the candidate key that is selected to identify tuples uniquely within the relation.

A. Foreign          B. Super          C. Primary          D. Composite

15. A subclass can be a subclass in more than one class/subclass relationship; this is referred to as

..........

A. Specialization lattice     B. Strict hierarchy     C. Generalization D. Inheritance

16. Which one of the following is an aggregate function in SQL?

A. LEN          B. JOIN          C. AVG          D. LIM

17. Which statement represents the following query "find all staff names with a salary greater than 5000"?

    A. SELECT name WHERE salary > 5000;

    B. SELECT name FROM staff WHERE salary > 5000;

    C. SELECT salary > 5000 FROM staff;

    D. SELECT * FROM staff;

18. ...........is unaware of the DBMS. He accesses the database through specially written application programs that attempt to make the operations as simple as possible.

A. Data Administrator (DA)                        B. Database Administrator (DBA)

C. Database Designers                              D. End-Users

19. ............ system prevents unauthorized users accessing the database.

    A. Integrity          B. Security          C. Concurrency control     D. Recovery

20. ......... key is the candidate key that is selected to identify tuples uniquely within the relation.

    A. Foreign          B. Super          C. Primary          D. Composite

## Question 4:                                          (20 Marks):

A. What is the difference between 1NF and UNF relations?

B. Discuss the limitations of the file based approach.

C. List three functions of the DBMS

D. What is the difference between Data Administrator and Database Administrator?

Best wishes.                                   Dr. Amira El-Zeiny