	Final Exam	
Department: Mathematics **Date: 9/3/2021**	**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 Complete the Following Sentences (30 Marks)

1. If there are multiple values at the intersection of certain rows and columns in a relation; this relation is in the ……. normal form.
2. In the ……. JOIN on two relations R and S; the common attributes have the same names in R and S.
3. …….. means that the shared subclass directly inherits attributes and relationships from multiple classes.
4. The relational algebra expression πc (σa=v(R)) has cardinality ……. The cardinality of R.
5. For a relation R; degree is the number of ……..., while cardinality is the number of ……...
6. …… is the set of allowable values for one or more attributes.
7. The result of the LEFT OUTER JOIN is a relation with cardinality …… the cardinality of the NUTURAL JOIN's result
8. If a relation has a single-attribute primary key; it is automatically in at least ……. normal form.
9. A row in a database relation can also be called a ……
10. the ……. Key is used to represent relationships between two tables.
11. …….. is the software that manages and controls access to the database.
12. ……. is the process of maximizing the differences between members of an entity by identifying their distinguishing characteristics.
13. …….. is an attribute, or set of attributes, within one relation that matches the candidate key of some other relation
14. Aggregate functions can be used only in the SELECT list and in the ……...clause.

Question 2: State true or false and correct the wrong statement (30 Marks)

1. ρS(B1, B2, B3)(R); The previous expression is used to select attributes B1,B2, B3 from the table R
2. Null represents a value for an attribute that is currently unknown or is not applicable for this tuple.
3. The relational algebra expression πL(R) has cardinality equal to the cardinality of L
4. To apply the cross product operation, the involved relations do not have to be union compatible.
5. Conceptual schemas correspond to different views of the data.
6. πL,M (R ⋈ a=b S) == σ a=b (πL,M (R x S)).
7. If a relation R has no transitive dependency; then R is at least in the 3NF.

8. leaf node is a class that has no subclasses of its own.
9. Backup and recovery services are improved using the database approach.
10. SQL includes both data definition language and data maintenance language.
11. A subclass can be a subclass in only one class
12. 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.
13. In the ERD; the oval represent relationship between two entities.
14. The attributes in FK may have values other than the domain(s) of the primary key attributes PK
15. If the cardinality of R ,S is 40, 30, then the cardinality of R ∩ S is 70

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

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

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

2. **The ……clause is used to combine rows from two or more tables based on a related column between them.**

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

3. **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';

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

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

5. **A common approach to remove repeating groups from unnormalized tables is…….**

   A. Classification B. Flattening C. Grouping D. Specialization

6. **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;

7. **The command to eliminate the customer table from the database is:**
   A. DROP TABLE CUSTOMER; B. DELETE TABLE CUSTOMER
   B. REMOVE TABLE CUSTOMER; D. UPDATE TABLE CUSTOMER;
8. **The ……. operation is a filter that keeps only those tuples that satisfy a qualifying condition.**
   A. Cartesian Product B. SELECT C. Intersection D. PROJECT
9. **In the opposite table; all the following FDs may hold except:**
   A. B → C
   B. C → B
   C. A → B
   D. {A, B} → C

A	B	C	D
a1	b1	c1	d1
a1	b2	c2	d2
a2	b2	c2	d3
a3	b3	c4	d3

10. **If every nonprime attribute in R is …… functionally dependent on the primary key of R; then the relation R is in 2NF.**
    A. Fully B. transitively C. not D. partially
11. **……. schemas Contains the definitions of stored records.**
    A. Conceptual B. External C. Internal D. Sub
12. **…….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)
    B. Database Designers D. End-Users
13. **…… system prevents unauthorized users accessing the database.**
    A. Integrity B. Security C. Concurrency control D. Recovery
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. **…….is an entity type that is a distinct subgrouping of occurrences of an entity type, which require to be represented in a data model.**
    A. Subclass B. Member C. Superclass D. Regular
16. **…….is a class that has no subclasses of its own.**
    A. A shared subclass B. A leaf node C. Partial subclass D. General superclass
17. **A ……. attribute represents a value that is derivable from the value of a related attribute or set of attributes, not necessarily in the same entity.**
    A. Composite B. derived C. simple D. single

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

A. SELECT Username, Password WHERE Username = 'user1'

B. SELECT Username, Password FROM Users

C. SELECT Username, Password FROM Username = 'user1'

D. SELECT Username AND Password FROM Users

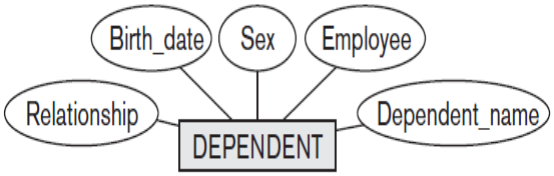
19. In a table, a column contains duplicate value, if you want to list all different values only, then which SQL clause is used?

A. UNIQUE B. NOT NULL C. DISTINCT D. EXIST

20. The opposite figure is a part of ERD; the DEPENDENT is considered as …….

A. a tuple B. an attribute

B. an entity D. a record



Question 4: (20 Marks):

A. What is the difference between entity integrity and referential integrity constraints?

B. Discuss the limitations of the file based approach.

C. List three functions of the DBMS

D. List and explain by example the three types of relationships in the relational database model

End of Exam

Best wishes. *Dr. Amira El-Zeiny*