

CMPE353-CMSE351

FINAL EXAM

**MULTIPLE CHOICE REVIEW QUESTIONS
(WITH ANSWERS)**

REL ALGEBRA (15p)

Q1. Which of the following is a basic operator in relational algebra?

- a) Set intersection
- b) Natural join
- c) Assignment
- d) None of the above

Q2. For select operation in relational algebra, the _____ appear in the subscript of the sigma operator, and the _____ argument appears in the parentheses after the sigma.

- a) Predicates, relation
- b) Relation, Predicates
- c) Operation, Predicates
- d) Relation, Operation

Q3. Consider two relations, R and S. The relational algebra operation which includes tuples from R but not S is:

- a) Set union
- b) Set intersection
- c) Set difference
- d) Inner join

Q4. The relational algebra operation which selects some of the columns from a table but neglects the other columns is:

- a) Select
- b) Project
- c) Set union
- d) Outer join

Q5. Which of the following SQL clauses corresponds to the project operation in relational algebra?

- a) From
- b) Select
- c) Where
- d) Group by

Q6. Given the following relational instances of R and S:

R

A	B
1	1
1	2
2	1
2	3
1	3
2	4

S

B
1
2
3

If the relational algebra expression $R \text{ op } S$ generates the table

A
1

Then, op stands for:

- a) Set intersection
- b) Set difference
- c) Projection
- d) Division

Q7) Given the following relational instances of R and S:

R

A	B
3	3
6	4
2	3
3	5
3	6

S

B	C	D
5	1	6
3	3	5
4	3	1

Assuming each record has the schema (A, B, C, D), which of the following records will be in the result for $R \bowtie S$?

(a) (3, 3, 1, 6)

(b) (6, 4, 4, 1)

(c) (2, 3, 3, 5)

(d) (3, 5, 3, 1)

Q8. Using the relational instances of R and S in **Q7 above**;

Which of the following records will be in the result of $\pi_{C, D}(S)$?

(a) (5, 1)

(b) (4, 3)

(c) (3, 3)

(d) (3, 5)

Q9. Using the relational instances of R and S in **Q7 above**;

Which of the following records will be in the result of $\pi_B(R) - \pi_B(S)$?

(a) (6)

(b) (4)

(c) (1)

(d) (5)

Q10.

Assume that a relation $R(A, B)$ has n unique records, and a relation $S(B, C)$ has m unique records. When you compute the natural join between R and S you get r records as the result. Which of the following assumptions are correct in terms of (n, m, r)?

(a) (5, 4, 25)

(b) (2, 3, 8)

(c) (3, 3, 10)

(d) (2, 3, 6)

Relational Database Design (12 p)

Q11) Consider the following instance of a relational schema $R=(A,B,C)$:

A	B	C
1	2	3
2	2	2
1	2	2
4	2	3

Which of the following functional dependencies given below are satisfied for this instance of the schema R?

- (i) $A \rightarrow B$ (ii) $CA \rightarrow B$ (iii) $AB \rightarrow C$ (iv) $A \rightarrow A$
- a) (i) and (iii) only b) (ii) only **c) (i), (ii) and (iv) only** d) (iv) only

Q12) Consider the schema $R=(A,B,C,E,F,G,H)$ with the set of functional dependencies $F=\{A \rightarrow BC, C \rightarrow FG, E \rightarrow HG, G \rightarrow A\}$. Which of the following are true?

- (i) $A^+ = ABCFG$ (ii) $A \rightarrow E$ is in F^+ (iii) A is a candidate key for R (iv) $A \rightarrow BF$ is in F^+
- a) (i) only **b) (i) and (iv) only** c) (ii) and (iv) only d) (i) and (iii) only

Q13) Consider the schema $R=(A,E,F)$ with the set of functional dependencies $F=\{A \rightarrow F, E \rightarrow A\}$. Which of the following are true?

- (i) R is already in BCNF
(ii) R is already in 3NF
(iii) R can be decomposed into $R_1=(A,F)$ and $R_2=(A,E)$ using BCNF decomposition algorithm
(iv) The decomposition of R into $R_1=(A,F)$ and $R_2=(A,E)$ is dependency preserving
- a) (ii) only b) (i) and (iii) only c) (ii) and (iii) only **d) (iii) and (iv) only**

Q14) Given the relational schema $R(A,B,C,D)$ and the set of functional dependencies $F=\{A \rightarrow B, C \rightarrow D\}$; the decomposition $R_1=(A,B)$ and $R_2=(C,D)$ is lossless join.

- a) True b) False

E-R Diagrams

Q15) An entity set that does not have sufficient attributes to form a primary key is known as

a) _____

- a) Strong entity set
b) Variant set
c) Weak entity set
d) Dependent entity set

Q16) In E-R diagram representation, a weak entity set is represented as

- a) Underline
b) Double line
c) Double diamond
d) Double rectangle

Q17) Properties that describe the characteristics of entities are called:

- A. entities.
B. attributes.
C. identifiers.
D. relationships.

Q18) In which of the following is a single-entity instance of one type is related to a single-entity instance of another type?

- A. One-to-One Relationship
B. One-to-Many Relationship
C. Many-to-Many Relationship
D. Composite Relationship

Q19) A ternary relationship contains 2 entities and an association between them.

- a) True
- b) **False**

Q20) In an E-R diagram, generalization is represented by a:

- (A) Ellipse (B) Dashed ellipse (C) Rectangle (D) **Triangle**

Q21) In the Relational Database Management Systems terminology a row is also called a:

A. Tuple.

B. Relation.

C. Attribute.

D. Entity.

Q22) Consider the following text which describes an enterprise involving employees, departments and projects:

“A department controls several projects and employs many employees. Every department has a unique number. The name of the department its size in square meters and location is stored. Each project has a name and a unique number and is controlled by a department. Several employees work in every project. Every employee works for one department but may work on several projects. The number of hours an employee works on a project is recorded. The name, unique identity card number, address, salary, gender, and birth date for each employee is stored. The name of an employee is stored in terms of his/her first name, middle initial (MI), and last name.”

The cardinality of the relationship between the employees and projects entities is:

- a) one to one
- b) one to many from project to employee whose many side is total participation
- c) one to many from employee to project whose many side is partial participation
- d) many to many**

Q23) same text as above

The cardinality of the relationship between the projects and the departments entities is:

- a) one to one
- b) one to many from department to project whose many side is total participation
- c) one to many from department to project whose many side is partial participation
- d) there is no relationships between projects and departments.

Q24) same text as above:

When the E-R diagram is converted to tables using a minimal number of tables, the employee table has the following columns:

- a) id_no, name, birth_date, address, salary, gender, dept_no
- b) id_no, first_name, middle_initial, last_name birth_date, address, salary, gender
- c) id_no, name, birth_date, address, salary, gender
- d) id_no, first_name, middle_initial, last_name birth_date, address, salary, gender, dept_no

Q25) When converting the E-R diagram to tables such that minimum number of tables will be used, the relationship between two entities whose cardinality is one to many, with partial participation on the many side is included as a table whose primary key is the union of the two primary keys of the participating entities.

- a) True
- b) False

SQL

Q26) Which of the following SQL clauses is used to delete rows from a database table?

- a) Drop b) remove c) select d) delete

Q27) If ASC or DESC is not specified after a SQL ORDER BY clause, the following is used by default;

- a) ascending order
b) descending order
c) there is no default value
d) random order

Q28) Which of the following is true for the SQL AS clause?

- a) It is used to change the name of a column in the result set or to assign a name to a derived column
b) It is used with the JOIN clause only
c) It defines a search condition
d) All of the above

Q29) Which of the following is true for the ALTER TABLE clause in SQL?

- a) It can be used to modify a table definition by altering, adding, or deleting table columns and/or constraints
b) It can be used to insert data into database table
c) It can be used delete data from database table
d) All of the above

Q30) In SQL a view is :

- a) a special stored procedure executed when certain event occurs
b) a virtual table which results from executing a pre-compiled query
c) a database diagram
d) none of the above

Q31) The phrase “greater than at least one” is represented in SQL by:

- a) < all
- b) < some
- c) > all
- d) > some

Q32) In SQL, the syntax for creating a view is:

- a) CREATE VIEW AS SELECT
- b) CREATE VIEW AS UPDATE
- c) CREATE VIEW AS DELETE
- d) All of the above

Q33) In SQL we use the _____ construct to test for the nonexistence of tuples in a subquery:

- a) unique
- b) not exists
- c) exists
- d) not unique

Q34) In SQL, the type of join used when you wish to include rows from two tables that do not have matching values is:

- a) inner join
- b) natural join
- c) outer join
- d) all of the above

Q35) DML stands for:

- a) Different Mode Level
- b) Data Model Language
- c) Data Mode Level
- d) Data Manipulation Language

Q36) In SQL, how can you return all the records from a table named "Students" sorted descending by "Age"?

- a) SELECT * FROM Students SORT BY Age DESC
- b) SELECT * FROM Students ORDER BY Age
- c) SELECT * FROM Students SORT Age DESC
- d) SELECT * FROM Students ORDER BY Age DESC

Q37) In SQL to change "John" into "Mark" in the "LastName" column in the Students table we use:

- a) UPDATE Students SET LastName='John' INTO LastName='Mark'
- b) MODIFY Students SET LastName='Mark' WHERE LastName='John'
- c) MODIFY Students SET LastName='John' INTO LastName='Mark'
- d) UPDATE Students SET LastName='Mark' WHERE LastName='John'

Q38) In SQL to find the names of the students with their ages whose last name is neither Green nor Brown in the students table we use:

- a) SELECT name, age FROM students WHERE lastname NOT IN ('Green', 'Brown')
- b) SELECT name, age FROM students WHERE lastname NOT BETWEEN ('Green', 'Brown')
- c) SELECT name, age FROM students WHERE lastname IN ('Green', 'Brown')
- d) SELECT name, age FROM students WHERE lastname BETWEEN ('Green', 'Brown')

Q39) In SQL to find the name of those cities in the weather table whose condition is either sunny or cloudy but the temperature must be greater than 25 we use:

- a) SELECT city FROM weather WHERE condition = 'sunny' AND condition = 'cloudy' OR temperature > 25
- b) SELECT city FROM weather WHERE condition = 'sunny' OR condition = 'cloudy' OR temperature > 25
- c) SELECT city FROM weather WHERE condition = 'sunny' OR condition = 'cloudy' AND temperature > 25
- d) SELECT city FROM weather WHERE condition = 'sunny' AND condition = 'cloudy' AND temperature > 25

Q40) In SQL, to find all rows which have a temperature greater than that of 'Ankara', in a table named weather, we use:

- a) `SELECT * FROM weather WHERE temperature > (SELECT temperature FROM weather WHERE city = 'Ankara')`
- b) `SELECT * FROM weather WHERE temperature > (SELECT * FROM weather WHERE city = 'Ankara')`
- c) `SELECT * FROM weather WHERE temperature > (SELECT city FROM weather WHERE city = 'Ankara')`
- d) `SELECT * FROM weather WHERE temperature > 'Ankara'`