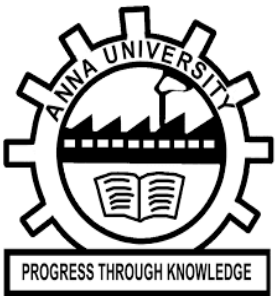

MADRAS INSTITUTE OF TECHNOLOGY
ANNA UNIVERSITY
ASSOCIATION OF COMPUTER TECHNOLOGISTS

DB DWELLERS

RULES:

- On the answer sheet team member should stick their team **QR** and write their unique participant id below it.
- Don’t leave the app during the test.
- Time limit – **45 minutes.**
- Keep your mobile in airplane mode.
- Questions marked as (*) have bonus marks.

1.Match the following

1) DCL	-	a) Delete
2) DDL	-	b) Rollback
3) DQL	-	c) Grant
4) DML	-	d) Select
5) TCL	-	e) Drop

	1)	2)	3)	4)	5)
A)	c	d	a	e	b
B)	b	a	e	d	c
C)	c	e	d	a	b
D)	b	d	a	e	c

2. **The maximum number of superkeys for the relation schema R(E,F,G,H) with E as the key is**

A. 2

B. 3

C. 6

D. 8

3. **Let x, y, z, a, b, c be the attributes of an entity set E. If {x}, {x,y}, {a,b}, {a,b,c}, {x,y,z} are superkeys then which of the following are the candidate keys?**

A. {x,y} and {a,b}

B. {x} and {a,b}

C. {x,y,z} and {a,b,c}

D. {z} and {c}

4. 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';

5. **Which of the following statements is TRUE?**
D_1 : The decomposition of the schema R(A, B, C) into R_1(A, B) and R_2 (A, C) is always lossless.
D_2 : The decomposition of the schema R(A, B, C, D, E) having AD → B, C → DE, B → AE and AE → C, into R_1 (A, B, D) and R_2 (A, C, D, E) is lossless.

A. Both D_1 and D_2

B. Neither D_1 nor D_2

C. Only D_1

D. Only D_2

6. Consider the following database table:
Create table test(one integer, two integer, primary key(one), unique(two), check(one >= 1 and <= 10), check(two >= 1 and <= 5)).
How many data records/tuples atmost can this table containt?

A. 5

B. 10

C. 15

D. 50

7. Given the following relation instance.

x	y	z
1	4	2
1	5	3
1	6	3
3	2	2

Which of the following functional dependencies are satisfied by the instance?

A. XY -> Z and Z -> Y

B. YZ -> X and Y -> Z

C. YZ -> X and X -> Z

D. XZ -> Y and Y -> X

8. 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

9. **If you have n transactions then how many different serial schedules are possible?**

A. 2^n

B. n!

C. n^2

D. (n+1)!

10. Which of the following is dense index?

A. Primary index

B. Clusters index

C. Secondary index

D. Secondary non key index

11. **Dates must be specified in the format**

A. mm/dd/yy

B. yyyy/mm/dd

C. dd/mm/yy

D. yy/dd/mm

12. Which of the following statements are TRUE about an SQL query?

P : An SQL query can contain a HAVING clause even if it does not have a GROUP BY clause

Q : An SQL query can contain a HAVING clause only if it has a GROUP BY clause

R : All attributes used in the GROUP BY clause must appear in the SELECT clause

S : Not all attributes used in the GROUP BY clause need to appear in the SELECT clause

A. P and R

B. P and S

C. Q and R

D. Q and S

13. Relation R has eight attributes ABCDEFGH.

Fields of R contain only atomic values. F = {CH -> G, A -> BC, B -> CFH, E -> A, F -> EG} is a set of functional dependencies (FDs) that hold for R.

How many candidate keys does the relation R have?(*)

A. 3
B. 4
C. 5
D. 6

14. **The set of attributes X will be fully functionally dependent on the set of attributes Y if the following conditions are satisfied.**

A. X is functionally dependent on Y

B. X is not functionally dependent on any subset of Y

C. Both (a) and (b)

D. None of these

15. Given the following two statements:

S1: Every table with two single-valued attributes is in 1NF, 2NF, 3NF and BCNF.

S2: AB->C, D->E, E->C is a minimal cover for the set of functional dependencies AB->C, D->E, AB->E, E->C.(*)

Which one of the following is CORRECT?

A. S1 is TRUE and S2 is FALSE.

B. Both S1 and S2 are TRUE.

C. S1 is FALSE and S2 is TRUE.

D. Both S1 and S2 are FALSE.

16. Consider a relation book (title, price) which contains the titles and prices of different books. Assuming that no two books have the same price, what does the following SQL query list ?

"Select title from book as B where (select count (*) from book as T where T.price > B.price) < 7"

A. Titles of the six most expensive books.

B. Title of the sixth most expensive books.

C. Titles of the seven most expensive books.

D. Title of the seventh most expensive books.

17. Consider the following Employee table(*)

ID	salary	DeptName
1	10000	EC
2	40000	EC
3	30000	CS
4	40000	ME
5	50000	ME
6	60000	ME
7	70000	CS

How many rows are there in the result of following query?

```
"SELECT E.ID
FROM  Employee E
WHERE  EXISTS  (SELECT E2.salary
        FROM Employee E2
        WHERE E2.DeptName = 'CS'
        AND   E.salary > E2.salary)"
```

A. 0

B. 4

C. 5

D. 6

18. Aggregate functions can be used in the select list or the _____ clause of the select statement or subquery. They cannot be used in a _____clause.

A. Where, having

B. Having, where

C. Group by, having

D. Group by, where

19. Consider a schema R(A,B,C,D) and functional dependencies AB->CD and D->A .Then the decomposition of R into R1(AD) and R2(BCD) is

A. dependency preserving and lossless join

B. lossless join but not dependency preserving

C. dependency preserving but not lossless join

D. not dependency preserving and not lossless join

20. **All aggregate functions except_____ignore null values in their input collection.**

A. Count(attribute)
B. Count(*)
C. Avg()
D. Sum()

21. Which of the following is NOT a superkey in a relational schema with attributes V, W, X, Y, Z and primary key V Y ?

A. V X Y Z

B. V W X Z

C. V W X Y

D. V W X Y Z

22. Match the normal forms with the dependencies they remove

1)2NF - a)multi-valued dependency

2)3NF - b)partial dependency

3)4NF - c) join dependency

4)5NF - d)transitive dependency

	1)	2)	3)	4)
A)	d)	b)	c)	a)
B)	b)	d)	a)	c)
C)	b)	d)	c)	a)
D)	d)	b)	a)	c)

23. Which normal form is considered adequate for normal relational database design?

A. 2NF

B. 5NF

C. 4NF

D. 3NF

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

A. ABCD, φ

B. ABCD, E

C. Φ, φ

D. ABC, E

25. Which of the following FD can't be implied from FD set: {A->B, A->BC, C->D} ?

A. A->C

B. B->D

C. BC->D

D. All of the above

26. We can test for the non-existence of the tuples in a subquery by using

_____construct

A. Not exist

B. Not exists

C. Notexists

D. NotExist

27. Consider the entities 'hotel room', and 'person' with a many to many relationship 'lodging' as shown below:

If we wish to store information about the rent payment to be made by person (s) occupying different hotel rooms, then this information should appear as an attribute of

A. Person

B. Hotel Room

C. Lodging

D. None of these

28. 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

29.The employee information in a company 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);"

It returns the names of the department in which

A. the average salary is more than the average salary in the company

B. the average salary of male employees is more than the average salary of all male employees in the company

C. the average salary of male employees is more than the average salary of employees in the same department

D. the average salary of male employees is more than the average salary in the company

30. In E-R diagram generalisation is represented by

A. Ellipse
B. Dashed ellipse
C. Rectangle
D. Triangle

31. **Which option is true about the SQL query given below?**

"Select firstName,lastName
From Employee
WHERE lastName BETWEEN 'A%' AND 'D%"

A. It will display all the employees having last names starting with the alphabets 'A' till 'D' inclusive of A and exclusive of D.

B. It will throw an error as BETWEEN can only be used for Numbers and not strings.

C. It will display all the employees having last names starting from 'A' and

ending with 'D'.

D. It will display all the employees having last names in the range of starting alphabets as 'A' and 'D' excluding the names starting with 'A' and 'D'.

32. Relation R has eight attributes ABCDEFGH. Fields of R contain only atomic values.

F = {CH -> G, A -> BC, B -> CFH, E -> A, F -> EG} is a set of functional dependencies (FDs) that hold for R. Consider the FDs. The relation R is

A. in 1NF, but not in 2NF.

B. in 2NF, but not in 3NF.

C. in 3NF, but not in BCNF.

D. in BCNF

33. Which of the following scenarios may lead to an irrecoverable error in a database system?

A. A transaction writes a data item after it is read by an uncommitted transaction

B. A transaction reads a data item after it is read by an uncommitted transaction

C. A transaction reads a data item after it is written by a committed transaction

D. A transaction reads a data item after it is written by an uncommitted transaction

34. 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)

A. S_1

B. S_2

C. S_3

D. S_4

35. Consider the following schedule S of transactions T1, T2, T3, T4:

T1	T2	T3	T4
	READ(X)		
		WRITE(X)	
		COMMIT	
WRITE(X)			
COMMIT			
	WRITE(Y)		
	READ(Z)		
	COMMIT		
			READ(X)
			READ(Y)
			COMMIT

Which one of the following statements is CORRECT?(*)

A. S is conflict-serializable but not recoverable

B. S is not conflict-serializable but is recoverable

C. S is both conflict-serializable and recoverable

D. S is neither conflict-serializable nor is it recoverable

36. **The relation scheme Student Performance (name, courseNo, rollNo, grade) has the following functional dependencies:**

name, courseNo → grade

rollNo, courseNo → grade

name → rollNo

rollNo → name

The highest normal form of this relation scheme is

A. 2 NF

B. 3 NF

C. BCNF

D. 4NF

37. How many tables may be included with a join?

A. One
B. Two
C. Three
D. All of the mentioned

38. What will be the output of following SQL query ?
SELECT * FROM EMPLOYEE E
WHERE 2 = (SELECT COUNT(DISTINCT E1.SALARY)
FROM EMPLOYEE E1
WHERE E1.SALARY>E.SALARY)

A. Second highest salary

B. Two distinct salary of employees

C. Third highest salary

D. Employee with second highest salary

39. Database table by name Loan_Records is given below.

Borrower	Bank_Manager	Loan_Amount
Ramesh	Sunderajan	10000.00
Suresh	Ramgopal	5000.00
Mahesh	Sunderajan	7000.00

What is the output of the following SQL query?

"SELECT Count(*)
FROM ((SELECT Borrower, Bank_Manager
FROM Loan_Records) AS S
NATURAL JOIN (SELECT Bank_Manager, Loan_Amount
FROM Loan_Records) AS T);"

A. 3

B. 9

C. 5

D. 6

40. Consider the following relation:
Cinema (theater, address, capacity)
Which of the following options will be needed at the end of the SQL query *"SELECT P1. Address FROM Cinema P1……..*

Such that it always finds the addresses of theaters with maximum capacity?

A. WHERE P1. Capacity> = All (select P2. Capacity from Cinema P2)

B. WHERE P1. Capacity> = Any (select P2. Capacity from Cinema P2)

C. WHERE P1. Capacity > All (select max(P2. Capacity) from Cinema P2)

D. WHERE P1. Capacity > Any (select max (P2. Capacity) from Cinema P2)