



Kunal Jha

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 Computer Science Engineering(CS)

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## TOPICWISE : DATABASES-1(GATE - 2020) - REPORTS

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**Q. 1**
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Consider the following statements given below:

 $S_1$  : If every attribute is prime attribute in a relation R, then relation R will always be in BCNF.

 $S_2$  : If relation R is in 3NF and every candidate key is simple then R will be in BCNF.

Which of the above statement is correct?

 A Only  $S_1$ 
 B Only  $S_2$ 

Your answer is Correct

**Solution :**

(b)

 $S_1$  : If every attribute is prime then it does not necessary that LHS is a key.

 Ex: R(ABCD), {AB  $\rightarrow$  D, C  $\rightarrow$  A, D  $\rightarrow$  C}

 $S_2$  : If relation R is in 3NF and every candidate key is simple then R will be in BCNF.

 C Both  $S_1$  and  $S_2$ 
 D None of these



**Q. 2**
[▶ Solution Video](#)
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Which of the following is true?

 $S_1 : \pi_{x_1 x_2 \dots x_n} (\sigma_A(R)) \equiv \sigma_A(\pi_{x_1 x_2 \dots x_n}(R))$ 
 $S_2 : \sigma_{c_1 \wedge c_2 \wedge \dots \wedge c_n}(R) \equiv \sigma_{c_1}(\sigma_{c_2}(\dots \sigma_{c_n}(R)))$ 
 A  $S_1$  only

 B  $S_2$  only

Correct Option

**Solution :**

(b)

 $S_1$  : Selection and projection is not commutative.

 $S_2$  : A consecutive relation condition can be broken up into a cascade of individual relation operation.

 So  $S_2$  is true.

 C  $S_1$  and  $S_2$ 

Your answer is Wrong

 D Neither  $S_1$  nor  $S_2$ 

**Q. 3**
[▶ Solution Video](#)
[Have any Doubt ?](#)


Consider the following relation with given functional dependencies:

 $P(R, S, T, U, V)$ 
 $F = [RS \rightarrow T, RS \rightarrow U, U \rightarrow R, ST \rightarrow U, ST \rightarrow V]$ 

What is the highest normal form of the above relation P?

 A 2NF

 B 3NF

Correct Option

**Solution :**

(b)

 $P(R, S, T, U, V)$ 
 $F = [RS \rightarrow T, RS \rightarrow U, U \rightarrow R, ST \rightarrow U, ST \rightarrow V]$ 

 Closure of  $(RS)^*$  = {R, S, T, U, V}

 Closure of  $(SU)^*$  = {S, U, R, T, V}

 Closure of  $(ST)^*$  = {S, T, U, R, V}

{RS, SU, ST} is the key of P

 In functional dependency  $U \rightarrow R$ , U is not the superkey so relation is not in BCNF but in 3NF.

 C BCNF

## QUESTION ANALYTICS



Q. 4

[Solution Video](#)[Have any Doubt ?](#)

Assume a table P has only one candidate key then which of the following is always true about P?

- A P is in both 3NF and BCNF
- B P is in 3NF but may not be in BCNF
- C P is in 2NF but may not be 3NF

- D None of these

Correct Option

**Solution :**

(d)

Relation P has one candidate key R(A, B, C, D)

$$A \rightarrow C, B \rightarrow D \quad (AB)^* = ABC$$

Key (AB)

P is not in 2NF because of partial dependency and not in 3NF and BCNF so option (d) is correct.

## QUESTION ANALYTICS



Q. 5

[Solution Video](#)[Have any Doubt ?](#)

In relational algebra intersection ( $\cap$ ) is not a basic relational operator, to make it basic operator only relational operator should we have are

- A  $U, -$

Your answer is Wrong

- B  $X, \sigma, \pi$

- C  $X, U$

Correct Option

**Solution :**

(c)

$$(A \cap B) = A - (A - B)$$

$$(A \cap B) = \pi_{PQ}(\sigma_{A_P = B_Q}(A \times B))$$

But (intersection) ( $\cap$ ) can not be derived using X, U only.

- D  $X, \pi, -$

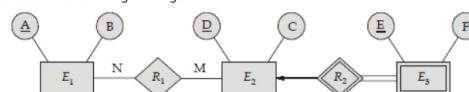
## QUESTION ANALYTICS



Q. 6

[Solution Video](#)[Have any Doubt ?](#)

Consider the following ER diagram:



The number of minimum RDBMS tables required for the above ER diagram is \_\_\_\_\_.

- 4

Your answer is Correct

**Solution :**

4

Total 4 tables required when we decomposed ER diagram to RDBMS tables.

 $E_1(A, B)$  $E_2(D, C)$  $E_3(D, E, F)$  $R_1(A, D)$ 

## QUESTION ANALYTICS



Q. 7

[Solution Video](#)[Have any Doubt ?](#)

Consider a relation with 4 attribute then number of maximum possible candidate key \_\_\_\_\_.

- 6

Correct Option

**Solution :**

6

Candidate key is maximum if every two attribute candidate key

$$= {}^4C_2 = 6$$

If each attribute is candidate key then maximum possible = 4

If every three attribute is candidate key then maximum possible

$$= {}^4C_3 = 4$$

Your Answer is 15

QUESTION ANALYTICS



Q. 8

Solution Video

Have any Doubt ?



Consider the following relation with given function dependencies:

R(A, B, C, D, E, F)

{A → BC, CD → E, E → C, D → AEF, ABF → BD, DF → BC}

What is the number of candidate key for relation R \_\_\_\_\_.

2

Correct Option

Solution :

2

R(A, B, C, D, E, F)

$$(AH)^* = ABCDEF$$

$$(D)^* = ABCDEF$$

Only two candidate key for relation R.

Your Answer is 16

QUESTION ANALYTICS



Q. 9

Solution Video

Have any Doubt ?



Consider a database with 2250 records, a block can hold 13 pointer, database uses dense B\* tree for indexing the minimum number of levels of index required is \_\_\_\_\_.

4

Correct Option

Solution :

4

In B\* tree only leaf node contain record.

Order of B\* tree = 13

Maximum number of keys in one block = 13 - 1 = 12

Total 2250 record

$$1^{\text{st}} \text{ level} = \left\lceil \frac{2250}{12} \right\rceil = 188 \text{ node}$$

$$2^{\text{nd}} \text{ level} = \left\lceil \frac{188}{13} \right\rceil = 15 \text{ node}$$

$$3^{\text{rd}} \text{ level} = \left\lceil \frac{15}{13} \right\rceil = 2 \text{ node}$$

$$4^{\text{th}} \text{ level} = 1 \text{ node}$$

Total 4 levels required.

QUESTION ANALYTICS



Q. 10

Solution Video

Have any Doubt ?



Given the following instance of a relation:

X	Y	Z
2	8	4
2	10	6
2	12	6
6	4	4

Which of the following FDs are satisfied by the relation?

A XY → Z, Z → Y

B YZ → X, Y → Z

Your answer is Correct

Solution :

(b)

Y and Z uniquely determine X and Y uniquely determine Z.

The hence YZ → X and Y → Z are the only FD's satisfied by the given relation.

C YZ → X, X → Z

D XZ → Y, Y → X





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Q. 11

Solution Video

Have any Doubt ?



Consider the following query on the given relation P(X, Y) Q(Y, Z)

$Q_1: \pi_{X, Z}(P \bowtie S)$

$Q_2: \text{Select } X, Z \text{ FROM } P, Q \text{ where } P.Y = Q.Y$

If the tuples return by  $Q_1$  is  $q_1$  and  $Q_2$  is  $q_2$  which of the following is always correct?

A  $q_1 = q_2$

Your answer is **Wrong**

B  $q_1 \geq q_2$

C  $q_1 \leq q_2$

Correct Option

**Solution :**

(c)

$Q_1$  is relational algebra query so it remove duplicate if relation contain duplicate tuples but not by  $Q_2$ .

So if relation contain duplicate tuples  $Q_2$  give more tuples as result. Relationship between  $q_1$  and  $q_2$ :

$$q_1 \leq q_2$$

D None of these

QUESTION ANALYTICS



Q. 12

Solution Video

Have any Doubt ?



Consider the following relation with given functional dependencies.

$R(A, B, C)$

$FD = \{A \rightarrow BC, B \rightarrow C, A \rightarrow B, AB \rightarrow C\}$

Which of the following is canonical cover of relation R?

A  $\{A \rightarrow B, B \rightarrow C, C \rightarrow A\}$

Your answer is **Wrong**

B  $\{A \rightarrow BC, B \rightarrow C\}$

Correct Option

**Solution :**

(c)

$R(A, B, C)$

$FD = \{A \rightarrow BC, B \rightarrow C, A \rightarrow B, AB \rightarrow C\}$

By decomposition rule

$\{A \rightarrow B, A \rightarrow C, B \rightarrow C, AB \rightarrow C\}$

$B \rightarrow C, A \rightarrow C$  is redundant so remove it  $\{A \rightarrow B, AB \rightarrow C\}$

In  $AB \rightarrow C$ , A is extraneous attribute.

So canonical cover is  $\{A \rightarrow B, B \rightarrow C\}$ .

D None of these

QUESTION ANALYTICS



Q. 13

Solution Video

Have any Doubt ?



Consider a relation  $P(a, b)$  which contain  $p$  tuples ( $p > 0$ ) and relation  $Q(b, c)$  contain  $q$  tuples ( $q > 0$ ), makes no assumption about keys, what is the maximum and minimum number of tuples in the expression " $P \cup Q$ "?

A  $\max = p + q, \min = \max(p, q)$

Your answer is **Correct**

**Solution :**

(a)

$P \cup Q$

Maximum =  $p + q$  if both relation is disjoint then maximum possible tuple is  $p + q$ .

Minimum =  $\max(p, q)$  if one relation is result of another.

B  $\max = p \times q, \min = \max(p, q)$

C  $\max = p + q, \min = \min(p, q)$

D  $\max = p \times q, \min = \min(p, q)$

QUESTION ANALYTICS

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Q. 14

Solution Video

Have any Doubt?

Bookmark

Consider the following relation with given functional dependencies:

$X(P, Q, R, S, T)$  FD's =  $\{P \rightarrow QR, RS \rightarrow T, Q \rightarrow S, T \rightarrow P\}$

If  $X$  is decomposed then decomposition of relation  $X$  into  $X_1(PQR)$  and  $X_2(PST)$  is

A Lossless join but not dependency preserving

Your answer is Correct

Solution :

(a) Relation  $X(P, Q, R, S, T)$   
 $X_1(PQR)$  and  $X_2(PST)$

$P$  is the common attribute and key for  $X_1$  so decomposition is lossless join.  
But is not dependency preserving because  $Q \rightarrow S, RS \rightarrow T$  is not covered.

B Lossless join and dependency preserving

C Lossy join but dependency preserving

D Lossy join and not dependency preserving

QUESTION ANALYTICS

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Q. 15

Solution Video

Have any Doubt?

Bookmark

Consider a database where the block size is 512 B, search key field is 7 bytes and record pointer is 10 bytes long, block pointer is 5 B, database uses  $B^*$  tree for indexing, then order of non leaf node in  $B^*$  tree \_\_\_\_\_.

43

Your answer is Correct43

Solution :

43

Let order of  $B^*$  tree is  $P$  for internal node.  
 $P \times \text{block pointer size} + (P - 1) \text{ search key field} \leq \text{Block size}$

$$P \times 5 + (P - 1) \times 7 \leq 512$$
$$5P + 7P - 7 \leq 512$$
$$12P \leq 519$$
$$P \leq \left\lfloor \frac{519}{12} \right\rfloor$$
$$P = 43$$

QUESTION ANALYTICS

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Q. 16

Solution Video

Have any Doubt?

Bookmark

Consider the following instance of relation:

A	
W	X
10	10
15	10

B	
Y	Z
10	15
20	25
20	20

Number of tuples returned by the following relational algebra query:

$\pi_{WZ}(A \times B) - \rho_W \leftarrow \times(\pi_{XZ}(A \bowtie_{X=Y} B))$

5

Your answer is Correct5

Solution :

AB	
W	Z
10	15
10	25
10	20
15	15
15	25
15	20

-

XZ	
W	Z
10	15
20	20
15	15
15	25
15	20

Total 5 tuples will be returned.

QUESTION ANALYTICS

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Consider the relation R( $a, b, c$ ) and S( $c, d, e$ ) where  $c$  is primary key of R and  $d$  is the primary key of S. Relation R contain 1000 tuples and relation S contain 1500 tuples, what will be the maximum number of tuples possible in  $R \bowtie S$  \_\_\_\_\_.

1500

Your answer is **Correct** 1500

**Solution :**

1500

The common attribute in both relation R and S is  $c$ , R contain 1000 different values of  $c$ , these 1000 values can be associated with 1500 values of  $c$  in S.

So maximum tuples possible in  $R \bowtie S$  is 1500.

QUESTION ANALYTICS

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## TOPICWISE : DATABASES-2 (GATE - 2020) - REPORTS

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ALL(17)    CORRECT(7)    INCORRECT(9)    SKIPPED(1)

Q. 1

Solution Video

Have any Doubt ?



Which of the following is correct?

**A** Relational algebra is procedural and relational calculus is a non procedural language.

Correct Option

**Solution :**

(a)  
 Relational algebra is procedural language and relational calculus is a non procedural language.

**B** Both relational algebra and relational calculus is procedural language.

Your answer is Wrong

**C** Relational algebra is non procedural and relational calculus is procedural language.

**D** None of these

### QUESTION ANALYTICS



Q. 2

Solution Video

Have any Doubt ?



Consider the following schema:

Sailors ( sid, sname, rating)

Boats ( bid, bname)

Reserves ( sid, bid, day)

"Find the names of sailors who have reserved boat 210".

Which of the following tuple relation calculus query gives the correct result.

**A**  $\{A \mid \exists S \in \text{Sailors} \forall R \in \text{Reserves} (R.sid = S.sid \wedge R.bid = 210 \wedge A.sname = S.sname)\}$

**B**  $\{A \mid \exists S \in \text{Sailors} \exists R \in \text{Reserves} (R.sid = S.sid \wedge R.bid = 210 \wedge A.sname = S.sname)\}$

Correct Option

**Solution :**

(b)  
 $\{A \mid \exists S \in \text{Sailors} \exists R \in \text{Reserves} (R.sid = S.sid \wedge R.bid = 210 \wedge A.sname = S.sname)\}$  gives the name of sailors who have reserved boat 210.

**C**  $\{A \mid \forall S \in \text{Sailors} \forall R \in \text{Reserves} (R.sid = S.sid \wedge R.bid = 210 \wedge A.sname = S.sname)\}$

Your answer is Wrong

**D** None of these

### QUESTION ANALYTICS



Q. 3

Solution Video

Have any Doubt ?



Which of the following is true about two phase locking protocol?

**A** It may not ensure conflict serializability.

**B** Cascading rollback is possible.

Your answer is Correct

**Solution :**

(b)  
 (a) Two phase locking protocol always ensure conflict serializability.  
 (b) Cascading rollback is possible in 2PL protocol.  
 (c) Starvation may be possible for 2PL.

**C** Starvation is not possible.

**D** None of these

### QUESTION ANALYTICS



Q. 4

Solution Video

Have any Doubt ?



Consider the following schedule which involves three transaction:

$r_1(x), r_2(y), r_3(y), w_1(x), w_3(x), r_2(z), w_1(x)$

Assume that time stamp for the three transaction is (5, 2, 4).  
Which of the following statement is true about the above schedule?

- A The schedule is allowed under both basic time stamp and Thomas Write rule.
- B The schedule is allowed under basic time stamp but not Thomas Write rule.
- C The schedule is allowed under Thomas Write rule but not basic time stamp.
- D The schedule is not allowed under both basic time stamp and Thomas Write rule.

Your answer is Wrong

- D The schedule is not allowed under both basic time stamp and Thomas Write rule.

Correct Option

**Solution :**

(d)  
Schedule is not allowed under both basic time stamp and Thomas Write rule.

 QUESTION ANALYTICS



Q. 5

Solution Video

Have any Doubt ?



Consider the following statements:

$S_1$  : SQL's aggregation Sum, Avg, Count can not be expressed in relational algebra.

$S_2$  : Select clause with distinct in SQL is same as project in relational algebra.

$S_3$  : In SQL the arithmetic operator (+, -, \*, /) all return null if one of the their arguments is null.

Which of the above statement is correct?

- A  $S_1$  and  $S_2$  only

- B  $S_1$  and  $S_3$  only

- C  $S_1$ ,  $S_2$  and  $S_3$

Your answer is Correct

**Solution :**

(c)

$S_1$  : SQL's aggregation can not be expressed in relational algebra.

$S_2$  : Select clause is same as project in relation algebra.

$S_3$  : Arithmetic operation is return null if one of the value is null.

All  $S_1$ ,  $S_2$  and  $S_3$  are correct.

- D  $S_2$  and  $S_3$  only

 QUESTION ANALYTICS



Q. 6

Solution Video

Have any Doubt ?



Consider the following transaction:

$T_1 : R_1(x), R_1(y), R_1(z), W_1(y)$

$T_2 : R_2(y), R_2(x), R_2(z), W_2(x)$

$S_1$  : Every non serial schedule between  $T_1$  and  $T_2$  are conflict serializable.

$S_2$  : Some non serial schedule between  $T_1$  and  $T_2$  is allowed using 2PL protocol.

Number of statements which is/are not correct \_\_\_\_\_.

 2

Correct Option

**Solution :**

2



Non serial schedule between  $T_1$  and  $T_2$  will not a conflict serializable schedule.

$S_2$ :	$T_1$	$T_2$
	Shared lock $S(x), S(y), S(z)$ $R_1(x)$	Shared lock $S(y), S(x), S(z)$ $R_1(y)$
	$R_1(y)$	$R_1(x)$
	$R_1(z)$	$R_1(z)$
	Exclusive lock not allowed on (y)	Exclusive lock not allowed on (x)

Not allowed under 2PL protocol.

 QUESTION ANALYTICS



Q. 7

Solution Video

Have any Doubt ?



Consider the following relations:

P	Id	Name	Age
	1	Amitra	22

Q

Id	Name	Age
1	Gaurav	29

	Name	Age
2	Dheeraj	55
3	Suresh	50

1	Megha	35
2	Akshay	25
2	Saad	21

```

SELECT Q.Id
FROM Q
WHERE NOT EXISTS (SELECT P.Id
                   FROM P
                   WHERE P.Name = 'Akshay' and Q.id = P.id)
The result of above SQL query contains _____ number of tuples.

```

4

Your answer is Correct

Solution :

4  
NOT EXISTS (empty) returns true.

Q. 8

Solution Video

Have any Doubt ?

Consider two relations enrolled and course as shown below:

Enrolled		
Std	Cid	Fees
S1	C1	10
S1	C2	20
S2	C3	30
S3	C4	40

Course		
Cid	Cname	Dept
C1	ALGO	CS
C2	DS	CS
C3	TOC	CS
C4	THERMO	ME

$\pi_{\text{Std}, \text{Cid}}(\text{Enrolled}) / \pi_{\text{Cid}}(\sigma_{\text{Dept} = 'EE'}(\text{Course}))$ .

If above relational algebra query executes over above data base table, then how many tuples are there in the result of query?

3

Correct Option

Solution :

3  
 $|\pi_{\text{Cid}}(\sigma_{\text{Dept} = 'EE'}(\text{Course}))| = 0$ .  
 $\pi_{\text{Std}, \text{Cid}}(\text{Enrolled}) / \pi_{\text{Cid}}$  (empty tuples in Dept)  
All the distinct Sid will be in the result.

0

Your Answer is 0

QUESTION ANALYTICS

Q. 9

Solution Video

Have any Doubt ?

The number of schedule which is/are conflict serializable \_\_\_\_\_.

$S_1 : W_2(x), W_1(x), R_3(x), W_2(y), R_3(y), R_3(z), R_2(x)$

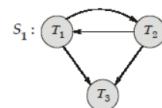
$S_2 : R_3(z), W_2(x), W_2(y), R_1(x), R_3(x), R_2(x), R_3(y), W_1(z)$

1

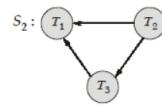
Correct Option

Solution :

1



Precedence graph contain cycle so not conflict serializable.



It contain no cycle so conflict serializable.

0

Your Answer is 2

QUESTION ANALYTICS

Q. 10

Solution Video

Have any Doubt ?

Consider the following relations and give SQL query:

Employee (eid, ename, age)

Project (pid, pname)

Works (eid, pid)

Select eid FROM Employee e WHERE age > 20

AND NOT EXISTS (Select pid FROM Project p

Where pname = "data science" AND

NOT EXISTS (Select pid FROM Works w  
Where w.eid = e.eid AND  
w.pid = p.pid))

Which of the following is correct?

**A** It retrieves employee eid whose age more than 20 and work for some project name data science.

Correct Option

**B** It retrieves employee eid whose age more than 20 and work for every project name data science.  
**Solution :**  
(b)  
It retrieves employee eid whose age more than 20 and work for every project name data science.

**C** It retrieves employee eid whose age less than 20 and work for any project name data science

**D** None of these

Your answer is **Wrong**

 QUESTION ANALYTICS

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Q. 11

Solution Video

Have any Doubt ?



Consider the following schedule which involves three transaction:

$S : r_1(X), w_2(X), c_2, w_1(X), w_3(X), c_3, c_1$

Which of the following is true about the above schedule?

A Schedule is serializable schedule and strict recoverable.

B Schedule is serializable schedule and not strict recoverable.

Your answer is Correct

Solution :

(b)

$T_1$	$T_2$	$T_3$
$r_1(X)$		
	$w_2(X)$ Commit	
$w_1(X)$		$w_3(X)$ Commit
Commit		

Schedule is view serializable  $T_1 \rightarrow T_2 \rightarrow T_3$ .

The schedule is not strict because  $T_1$  writer on (X) before  $T_3$  so commit operation should occur before  $w_3(X)$  operation.

C Schedule is non serializable schedule and recoverable.

D None of these

QUESTION ANALYTICS



Q. 12

Solution Video

Have any Doubt ?



Consider the following schema:

Part (pid, pname)

Supplier (sid, sname, address)

Catalog (sid, pid, price)

What is the output of the following SQL query?

Select p.pid FROM parts P, where

4 < (Select Count (\*) From Catalog C Where  
 $C.pid = P.pid$ )

A Pid's of parts that are supplied by atleast four suppliers.

B Pid's of parts that are supplied by atleast five suppliers.

Your answer is Correct

Solution :

(b)

SQL query return the pid's of parts that are supplied by atleast five suppliers.

Inner query returns the count value and outer query checks that the count is greater than 4 or not. If it is greater the tuple will be printed.

C Pid's of parts that are supplied by atmost five suppliers.

D None of these

QUESTION ANALYTICS



Q. 13

Solution Video

Have any Doubt ?



Consider the following schemas and given a relational algebra query:

Student (rollno, name, age, address)

Library (id, rollno, date)

$\pi_{roll\_no}(\sigma_{student.roll\_no = library.roll\_no}(Student \times Library))$

A  $\{t.roll\_no \mid \exists Student(t) \vee Library(d) \wedge t.roll\_no = d.roll\_no\}$

B  $\{t.roll\_no \mid \exists Student(t) \wedge Library(d) \vee t.roll\_no = d.roll\_no\}$

C  $\{t.roll\_no \mid Student(t) \wedge \exists Library(d) \wedge t.roll\_no = d.roll\_no\}$

Your answer is Correct

**Solution :**

(c)  
 $\{t \text{roll\_no} | \text{Student}(t) \wedge \exists \text{ Library}(d) \wedge t.\text{roll\_no} = d.\text{roll\_no}\}$   
 return all the tuples where roll\_no of student matches with the roll\_no present in library which is equivalent to the given relational algebra query.

- D None of these

QUESTION ANALYTICS



Q. 14

Solution Video

Have any Doubt ?



Consider the following relation schema and SQL query:

Project (pno, pname, budget, city)

Select pname FROM Project Where

NOT (budget > = ANY (Select  
budget FROM Project  
Where city = "Delhi"))

Which of the following is return by the above SQL query?

- A Name of project whose budget is greater than every project in Delhi.

- B Name of project whose budget is less than every project in Delhi.

Correct Option

**Solution :**

(b)  
 In the SQL query inner query finds all budgets of Delhi, than outer query compare every tuple of project and if the budget greater than or equal to inner query budget otherwise reject and because of NOT SQL query gives the name of projects whose budget is less than every project in Delhi.

- C Name of project whose budget is less than any project in Delhi.

Your answer is Wrong

- D Name of project whose budget is greater than or equal to every project in Delhi.

QUESTION ANALYTICS



Q. 15

Solution Video

Have any Doubt ?



The following key values are inserted into an empty B+ tree where each node have two key values. The sum of keys present at height one (assume root is present at height 0) is  
 (Use left biasing)

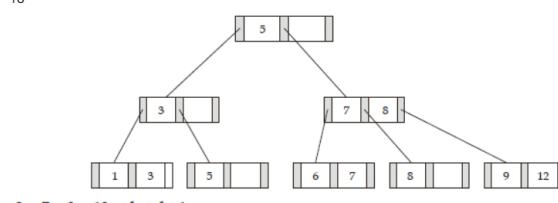
8, 5, 1, 7, 3, 12, 9, 6

18

Correct Option

**Solution :**

18



3 + 7 + 8 = 18 at height 1.

●

Your Answer is 5

QUESTION ANALYTICS



Q. 16

Solution Video

Have any Doubt ?



Consider the following table with attribute a is primary key and b is foreign key referencing a with on delete cascade.

a	b
8	3
10	5
7	3
5	4
3	1
1	7
4	9
12	8

When the tuple (7, 3) is deleted the number of tuples that must be additionally deleted to preserve referential integrity are \_\_\_\_\_.

4

Correct Option

**Solution :**

4

If we delete (7, 3) the (1, 7) will also be deleted, because of 1 is primary so tuple with foreign key 1 is deleted so (3, 1) is also deleted because of (3, 1) tuple (8, 3) (12, 8) is also deleted. So total 4 tuple deleted additionally.

 QUESTION ANALYTICS

Q. 17

Solution Video

Have any Doubt ?



Consider the following instance of relations:

Enroll

sid	cid
2	6
2	7
4	6
4	7
5	8

Student

sid	age
2	15
3	15
4	18
5	18
6	20

Select  $T_2 \cdot sid, count(*)$ FROM Enroll  $T_1$ , Student  $T_2$ Where  $T_2 \cdot age \geq ALL$  (select age FROM Student where age > 25)GROUP BY  $T_2 \cdot sid$ 

How many records in result of SQL query \_\_\_\_\_.



5

Your answer is Correct

Solution :

5

Select  $T_2 \cdot sid, count(*)$   
 FROM Enroll  $T_1$ , Student  $T_2$   
 Where  $T_2 \cdot age \geq ALL$  (select age FROM Student where age > 25) GROUP BY  $T_2 \cdot sid$ ;  
 ↓  
 empty

empty relation is always true in ALL  
 Thus unique sid in student table i.e. 5.



QUESTION ANALYTICS





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**Q. 1**
[Solution Video](#)
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Consider a relation R with only one candidate key, which of the following is always true?

**A** R is in both 3NF and BCNF

 Your answer is **Wrong**

**B** R is in 2NF but not in 3NF

**C** R is in 3NF but not in BCNF

**D** None of these

Correct Option

**Solution :**

 (d)  
 Consider R(A, B, C, D)

 $A \rightarrow C, B \rightarrow D$ 

Key AB but it is not in 2NF shall a, b, c is not correct.


**Q. 2**
[Solution Video](#)
[Have any Doubt ?](#)


Which of the following is complete set of relational algebra operations?

**A**  $\{\pi, \sigma, \cup, -, \times\}$

 Your answer is **Correct**
**Solution :**

(a)

 There are 5 basic operations in relational algebra  $\{\sigma, \pi, \cup, -, \times\}$  %,  $\cap$  can be derived from these 5 relational algebra operator.

**B**  $\{\sigma, \pi, \cap, -, \times\}$

**C**  $\{\pi, \sigma, \cup, \%, \times\}$

**D**  $\{\pi, \sigma, \cup, -, \%\}$


**Q. 3**
[Solution Video](#)
[Have any Doubt ?](#)


Consider the following schedule

 $S : R_1(x), R_2(x), R_3(y), W_2(x), R_4(z), R_3(y), R_1(y), R_2(y), W_1(z), W_4(x)$ 

The above schedule is serializable as

**A**  $T_1, T_2, T_3, T_4$

**B**  $T_2, T_1, T_4, T_3$

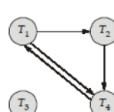
**C**  $T_1, T_3, T_2, T_4$

**D** Not serializable

 Your answer is **Correct**
**Solution :**

(d)

Precedence graph of schedule S



Not conflict serializable also not view serializable.



Q. 4

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider the following statements:

- I. A prime attribute of a relation schema R is an attribute that appears in all candidate key of R.
  - II. If every candidate key of a relation is simple, then it will always be in 3NF.
- Which of the above statement(s) is/are correct?

 A I only B II only C Both I and II D None of theseYour answer is **Correct****Solution :**

(d)

- I. A prime attribute of a relation schema R is an attribute that appears in some candidate key of R.
- II. If every candidate key of a relation is simple, then it will always be in 2NF but not always be in 3NF because transitive dependency may be present.



Q. 5

[▶ Solution Video](#)[Have any Doubt ?](#)

Which of the following is primary distinction between B and B<sup>+</sup> tree indices?

 A B<sup>+</sup> tree eliminates the redundant storage of search key value. B B tree eliminates the redundant storage of search key value.Your answer is **Correct****Solution :**

(b)

B tree eliminates the redundant storage of search key because in B tree every node have similar structure.  
Non leaf node also contain record pointer.

 C Deletion in a B tree is more complicated. D None of these

Q. 6

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider the following database with a four possible candidates key.

P	Q	R	S
a <sub>1</sub>	b <sub>1</sub>	c <sub>1</sub>	d <sub>1</sub>
a <sub>2</sub>	b <sub>3</sub>	c <sub>3</sub>	d <sub>1</sub>
a <sub>1</sub>	b <sub>2</sub>	c <sub>1</sub>	d <sub>2</sub>

- I. {B, C}
- II. {B}
- III. {A, D}
- IV. {C, D}

Which of the above can not be the candidate key for give table?

 A I and IV only B I only

Correct Option

**Solution :**

(b)

Attribute B has distinct tuples so B is candidate key and {B, C} is superkey.  
(A, D), (C, D) is key for given database.

 C I and III only D III onlyYour answer is **Wrong**

Q. 7

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider the following relations:

Coaching (cname, city)

Travel (name, city)

Select T<sub>1</sub>.name from Travel T<sub>1</sub> where

Not Exists (Select M.city FROM Coaching

M where M cname = "madeeasy"

Except Select T<sub>2</sub>.city from Travel T<sub>2</sub>Where T<sub>1</sub>.name = T<sub>2</sub>.name)

The above query finds the name of a person

THE ABOVE QUERY FINDS THE NAME OF A PERSONS

A Who have not travelled in any city where madeeasy is located.

B Who have travelled in all city where madeeasy is located.

Correct Option

Solution :

(b) SQL query computes the name who have travelled in all city where madeeasy is located

C Who have travelled in atleast one city where madeeasy is located.

D Who have not travelled in all city where madeeasy is located.

QUESTION ANALYTICS



Q. 8

Solution Video

Have any Doubt ?



If every non-key attribute is functionally dependent on the primary key, then the relation will always be in?

A 1NF

B 2NF

Your answer is Wrong

C 3NF

Correct Option

Solution :

(c)

If non-key attribute functionally dependent on the primary key then the relation will always be in the 3NF. However it may not in the BCNF because there might be the prime attribute functionally dependent on some attribute other than primary key.

D BCNF

QUESTION ANALYTICS



Q. 9

Solution Video

Have any Doubt ?



Which of the following is false about weak entity set?

A A weak entity set has no primary keys unless attributes of the strong entity set on which it depends are included.

B Weak entities can be deleted automatically when their strong entity is deleted.

C Tuples in a weak entity set are not participated according to their relationship with tuples in a strong entity set.

Correct Option

Solution :

(c)

A weak entity set has no primary key unless attributes of the strong entity set on which it depends are included. Tuples in a weak entity set are partitioned according to their relationship with tuples in a strong entity set. So option (c) is false statement.

D None of these

QUESTION ANALYTICS



Q. 10

Solution Video

Have any Doubt ?



Consider a relation R(A, B, C) with functional dependencies {A → B, B → C, C → B} which of the following is correct about relation R.

I. Dependency preserving decomposition is always possible for R.

II. Lossless decomposition is always possible for R.

A I only

B II only

Correct Option

Solution :

(b)

Lossless decomposition is always possible for R.

Dependency preserving decomposition is not always possible for R.

R<sub>1</sub> (A, C)      R<sub>2</sub> (A, B)

B → C, C → B is not preserved.

C Both I and II

D Neither I nor II

Your answer is Wrong





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**Q. 11**
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Consider a relation R(A, B, C, D) with functional dependencies {A → D, B → D, D → BC} minimum number of tables required to decompose relation R into BCNF \_\_\_\_\_.

**2**

[Correct Option](#)
**Solution :**

2

 $R(A, B, C, D)$   
 $\{A \rightarrow D, B \rightarrow D, D \rightarrow BC\}$ 

Candidate key A

 $R_1 \text{ (AD)}$   
 $A \rightarrow D$   
 $R_2 \text{ (BCD)}$   
 $B \rightarrow D$   
 $D \rightarrow BC$ 

 Both relation  $R_1$  and  $R_2$  are dependency preserving with lossless decomposition so in BCNF.

Total 2 tables required.

Your Answer is 3


**Q. 12**
[▶ Solution Video](#)
[Have any Doubt ?](#)


Consider the relation  $R_1(A, B, \underline{C})$  and  $R_2(\underline{C}, D, E)$  the relation  $R_1$  contain 2500 tuples and  $R_2$  contains 3500 tuples the maximum size of  $R_1 \bowtie R_2$  is \_\_\_\_\_.

**3500**

 Your answer is **Correct3500**
**Solution :**

3500

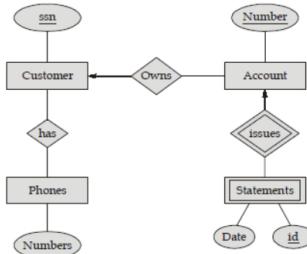
 The common attribute between the two relations is C which is primary key of  $R_1$  and acting as a foreign key in  $R_2$ .

 $R_1$  has 2500 tuples so there will be 2500 different values of  $R_1$ ,  $R_2$  has 3500 tuples so 2500 tuples of  $R_1$  would be associated with 3500 tuples of  $R_2$ .



**Q. 13**
[▶ Solution Video](#)
[Have any Doubt ?](#)


Consider the following ER Model:



Minimum number of tables present in minimized ER model \_\_\_\_\_.

**3**

[Correct Option](#)
**Solution :**

3

 $Cust\_has(ssn, number)$   
 $Account(number, ssn)$   
 $Statements(number, id)$   
 Total 3 tables required.

Your Answer is 5



Q. 14

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider the following relation R(A, B, C, D, E) with given FD's  
 $\{AB \rightarrow C, BC \rightarrow D, CD \rightarrow A, AD \rightarrow B\}$   
Number of superkeys in relation R \_\_\_\_\_.

9

Correct Option

**Solution :**

9

R(A, B, C, D, E)  
FD's {AB → C, BC → D, CD → A, AD → B}  
Candidate key (ABE, BCE, CDE, ADE)  
Superkey  
ABE (ABCE, ABDE, ABCDE)  
BCE (ABCE, BCDE)  
CDE (ACDE, BCDE)  
ADE (ABDE, ACDE)

Total 13 superkeys and ABCE, BCDE, ABDE, ACDE are repeated so total 9 superkeys.



Your Answer is 18

QUESTION ANALYTICS



Q. 15

[▶ Solution Video](#)[Have any Doubt ?](#)

In a database the search key field is 8 bytes long, record pointer is 5 bytes long and block pointer is 9 bytes. Block size is 512 bytes, order of a non leaf node in B\* tree \_\_\_\_\_.

30

Correct Option

**Solution :**

30

Internal node in B\* tree contains block pointer and search key.  
Assume  $n$  is the order of B\* tree  
 $9n + (n - 1)8 \leq 512$   
 $9n + 8n - 8 \leq 512$   
 $17n \leq 512 + 8$   
 $17n \leq 520$   
 $n \leq 30.58$



Your Answer is 31

QUESTION ANALYTICS



Q. 16

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider the following statement:

S<sub>1</sub> : Table locking provider the highest degree of concurrency in a relational database.

S<sub>2</sub> : Isolation is not a part of ACID properties of database transaction.

The number of true statements \_\_\_\_\_.

0

Your answer is Correct

**Solution :**

0

Row locking provides the highest degree of concurrency in a relational database.  
Isolation is part of ACID properties of database transaction.  
So both statement is not true.

QUESTION ANALYTICS



Q. 17

[▶ Solution Video](#)[Have any Doubt ?](#)

Match List-I with List-II and select the correct answer using the codes given below:

**List-I****List-II**

- |   |                       |
|---|-----------------------|
| A. $W_1(x), W_2(x), C_2, W_1(x), C_1$         | 1. Cascade less       |
| B. $r_1(x), W_2(y), C_2, r_1(y), W_1(y), C_1$ | 2. Recoverable        |
| C. $r_1(x), W_2(y), r_1(y), C_2, C_1$         | 3. Non recoverable    |
| D. $r_1(x), W_2(y), r_1(y), C_1, C_2$         | 4. Strict recoverable |

**Codes:**

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

**A** a**B** b

C c

Your answer is Correct

**Solution :**

- (c)  
 $W_1(x), W_2(x), C_2, W_1(x), C_1$  Cascade less schedule  
 $r_1(x), W_2(y), C_2, r_1(y), W_1(y), C_1$  Strict recoverable schedule  
 $r_1(x), W_2(y), r_1(y), C_2, C_1$  It is recoverable schedule  
 $r_1(x), W_2(y), r_1(y), C_1, C_2$  It is non recoverable

D d

QUESTION ANALYTICS



Q. 18

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider the following relational schema:

Student (sid, sname, CGPA)Department (dsid, name, branch)

- Query 1: Select avg (CGPA) from Student  
 where sid in (Select dsid from Department where branch = 'CS')  
 Query 2: Select avg (CGPA) from Student S,  
 Department D where S.sid = D.dsid and branch = 'CS'

Which of the following query finds the average CGPA of CS student

A Only query 1

Correct Option

**Solution :**

- (a)  
 Query 1 gives the correct result.  
 Query 2 is incorrect, duplicates appears if a student apply to CS in more than one cases.

B Only query 2

C Both query 1 and query 2

Your answer is Wrong

D None of these

QUESTION ANALYTICS



Q. 19

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider the relation R(A, B) and S(B, C) and given relational algebra queries:

- I.  $R \bowtie_{\pi_B(S)}$   
 II.  $\pi_{A,B}(R \bowtie_{\pi_B(S)} S)$   
 III.  $R \cap (\pi_A(R) \times \pi_B(S))$   
 IV.  $\pi_{A, B, C}(R \times S)$  where  $R \cdot B$  refers to the column B in table R

Which of the following is true about the above query?

A I, III, IV gives the same result

B I, II, III gives the same result

Correct Option

**Solution :**

(b)

R		S	
A	B	B	C
6	2	5	16
8	5	7	20

I.  $R \bowtie_{\pi_B(S)} S$ 

B
5
6

$$R \bowtie_{\pi_B(S)} S = \begin{array}{|c|} \hline A & B \\ \hline 8 & 5 \\ \hline \end{array}$$

II.  $R \bowtie_{\pi_B(S)} S = \begin{array}{|c|c|c|} \hline A & B & C \\ \hline 8 & 5 & 16 \\ \hline \end{array}$ 

$$\pi_{A,B} = \begin{array}{|c|c|} \hline A & B \\ \hline 8 & 5 \\ \hline \end{array}$$

III.  $\pi_A(R) \times \pi_B(S) = \begin{array}{|c|c|} \hline A & B \\ \hline 6 & 5 \\ \hline 6 & 7 \\ \hline 8 & 5 \\ \hline 8 & 7 \\ \hline \end{array}$ 

$$R \cap (\pi_A(R) \times \pi_B(S)) = \begin{array}{|c|c|} \hline A & B \\ \hline 8 & 5 \\ \hline \end{array}$$

I, II, III give same result but not IV.

**C** II, III, IV gives the same result

**D** I, II, IV gives the same result

 QUESTION ANALYTICS



**Q. 20**

Solution Video

Have any Doubt ?



Consider a schema R(A, B, C, D) and following functional dependencies.

$$A \rightarrow B \quad C \rightarrow D$$

$$B \rightarrow C \quad D \rightarrow B$$

Decomposition of R into  $R_1(A, B)$ ,  $R_2(B, C)$  and  $R_3(B, D)$  is

**A** Lossless join and dependency preserving.

Correct Option

**Solution :**

(a)

Relation decomposition

$R_1(A, B)$	$R_2(B, C)$	$R_3(B, D)$
$A \rightarrow B$	$B \rightarrow C$	$B \rightarrow D$
$C \rightarrow B$		$D \rightarrow B$

Through  $\{C \rightarrow B, B \rightarrow D\}$   $C \rightarrow D$  is also preserved.

So lossless join and dependency preserving.

**B** Lossless join but not dependency preserving.

Your answer is Wrong

**C** Dependency preserving but not lossless join.

**D** Not dependency preserving and not lossless join.

 QUESTION ANALYTICS



Item 11-20 of 33 « previous 1 2 3 4 next »



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**Q. 21**
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Which of the following is true for transaction processing?

- I. Two phase locking is used to prevent unauthorised users to access to a database record.
- II. Transaction is a program unit where execution preserve the consistency of the database.
- III. A record of all transaction and the corresponding changes to the database is recorded a log.

 A I and II only

 B II only

 C II and III only

 Your answer is **Correct**
**Solution :**

(c)

Transaction is a program unit where execution preserve the consistency of the database.  
 Two phase locking prevent deadlock.  
 A record of all transaction and the corresponding changes to the database is recorded a log.

 D I and III only



**Q. 22**
[▶ Solution Video](#)
[Have any Doubt ?](#)


Consider the following relational schema:

 Class (cid, cname, department)

 Student (sid, sname, scid, grade)

scid is a foreign key referring to cid of Class

Which of the following is return by the following query?

Select cname from Class C where not exists (Select sid from Student S where S.scid = C.cid and S.grade &lt; &gt; 'A')

 A Name of all the classes with all their students having 'A' grade.

Correct Option

**Solution :**

(a)

The inner SQL sub query represent all the students having other than A grade and the outer query gives the name of classes with all their student having A grade.

 B Name of all the classes with none of their student have an 'A' grade.

 C Name of all the classes with atleast one of their student having an 'A' grade.

 Your answer is **Wrong**
 D Name of all the classes with at most one of their students having an 'A' grade.



**Q. 23**
[▶ Solution Video](#)
[Have any Doubt ?](#)


Which of the following statements(s) is/are false for relational DBMS?

- I. ER diagrams are useful to logically model concepts.
- II. Views in a database system are important because they help with access control by allowing users to see only a particular subset of the data in the database.
- III. SQL is a procedural language.

 A I and III only

 B II and III only

 C III only

Correct Option

**Solution :**

(c)

I. A conceptual ER model may be used as the foundation for one or more logical data models.  
 III. SQL is not procedural language.  
 II is correct statement.

 D I and II only




## Q. 24

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider the following statements:

- I. All attribute of a relation form a super key.
  - II. Super key is also a candidate key.
  - III. For any SQL query there exists a unique translation into relational algebra.
- Which of the above statement is correct?

**A** I and II only**B** I only

Correct Option

**C** Solution :

(b)

All attribute of a relation form a super key.  
Candidate key is also super key not vice-versa.

For any SQL query there exists one or more than one translation into relational algebra.

**C** I and III only**D** II and III only

Your answer is Wrong



## Q. 25

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider the relation R(A, B, C, D) which of the following relational algebra expression returns the lowest value of B? ( $R_1$  and  $R_2$  are renames of R)

**A**  $\pi_B(R) - \pi_{R_1 B}(R_1 \bowtie_{R_1 B > R_2 B} R_2)$ 

Your answer is Correct

**C** Solution :

(a)

 $\pi_B(R) - \pi_{R_1 B}(R_1 \bowtie_{R_1 B > R_2 B} R_2)$ 

Returns the lowest value at B

(b) and (c) does not return the lowest value of B.

**B**  $\pi_{R_2 B}(R_1 \bowtie_{R_1 B < R_2 B} R_2)$ **C**  $\pi_B(R) - \pi_{R_1 B}(R_1 \bowtie_{R_1 B < R_2 B} R_2)$ **D** None of these

## Q. 26

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider the following schedule due to three transactions (indicated by the subscript) using read and write on data item a, b, c and d.  
 $r_1(a), r_2(c), r_1(c), r_3(c), r_5(b), w_1(a), r_2(a), c_1, w_3(b), c_3, r_2(b), w_2(b), w_2(c), c_2$   
 Which of the following is correct for above schedule?

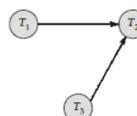
**A** Schedule contain blind write and it is not recoverable**B** Schedule is conflict serializable and contain dirty read

Your answer is Correct

**C** Solution :

(b)

$T_1$	$T_2$	$T_3$
$r(a)$		
$r(c)$	$r(c)$	
		$r(c)$
$w(a)$		$r(b)$
commit	$r(a)$	$w(b)$
	$r(b)$	commit
	$w(b)$	
	$w(c)$	
		commit



Above precedence graph shows schedule is conflict serializable.

Since all the three transactions are writing the values after reading them, hence there is no Blind write in any of the three transactions.

Since transaction  $T_2$  is reading the value of 'a' that is written by an uncommitted transaction  $T_1$ , hence there is a dirty read. Since, there is a dirty read, hence the schedule is cascadeless.

Since, there is no such dependency, such that a transaction reads the data item value written by an uncommitted transaction and commits. Hence, the schedule is recoverable.

**C** Schedule contain blind write and it is recoverable**D** Schedule contain blind write and it is strict recoverable

Q. 27

[▶ Solution Video](#)[Have any Doubt ?](#)

Consider the relation database, where primary keys are underlined

- Student (sname, street, city)
- Score (sname, Branch\_name, marks)
- Branch (Branch\_name)
- Manages (sname, Faculty\_name)

What does the following tuple relational calculus query produce?

$$\{S_1.\text{sname} \mid S_1 \in \text{Score} \wedge \neg \exists S_2 \in \text{Score} (S_1.\text{marks} \leq S_2.\text{marks} \wedge \exists e_1 \in \text{Student} (S_2.\text{sname} = e_1.\text{sname} \wedge e_1.\text{city} = \text{'Delhi'}))\}$$

**A** Name of students whose marks are less than any of the students living in city Delhi.

**B** Name of students whose marks are more than equal to any of the students living in city Delhi.

**C** Name of students whose marks are less than all students living in city Delhi.

**D** Name of students whose marks are more than all students living in city Delhi.

Correct Option

**Solution :**

(d)

Given query produces the name of students whose marks are more than that of student living in city Delhi.

Q. 28

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In basic time-stamp ordering W-time-stamp (Q) denotes the largest time-stamp of any transaction that has executed write (Q) successfully. Suppose that we define W-time-stamp (Q) as the most recent transaction to execute write (Q) successfully. Which of the following statement is true?

**A** Both will give the same result in all cases.

Your answer is Correct

**Solution :**

(a)

It would make no difference because the write protocol is such that the most recent transaction to write an item is also the one with the largest time-stamp to have done so in basic time-stamp ordering.

Hence both the definition will give same result in all the cases.

**B** Both will give the same result in few cases.

**C** Both will give the different result in all cases.

**D** Both will give the different result in few cases.

Q. 29

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Consider the given database tables and following query:

R	A	B
9	3	
13	7	
22	5	

S	C	D
9	6	
22	4	
9	3	

Query I:  $(R \bowtie_{RA=SC} S)$

Query II:  $(R \bowtie_{RA = SC} S)$

Query III:  $(R \bowtie_{RA=SC \wedge RB=SD} S)$

If a number of tuples return by Query I is  $a$  Query II is  $b$  and Query III is 3, value of  $a + b + c = \underline{\hspace{2cm}}$

8

Correct Option

**Solution :**

8

Query I:	A	B	D
	9	3	6
	9	3	3
	22	5	4

tuple = 3 =  $a$

Query II:	A	B	D
	9	3	6
	9	3	3
	22	5	4
	13	7	Null

tuple = 4 =  $b$

Query III:	A	B	C	D
	9	3	9	3

tuple = 1 =  $c$

$a + b + c = 3 + 4 + 1 = 8$

 QUESTION ANALYTICS

Q. 30

Solution Video

Have any Doubt ?



Consider the following table:

A	B	C
a <sub>1</sub>	b <sub>1</sub>	c <sub>1</sub>
a <sub>1</sub>	b <sub>1</sub>	c <sub>2</sub>
a <sub>2</sub>	b <sub>1</sub>	c <sub>1</sub>
a <sub>2</sub>	b <sub>1</sub>	c <sub>3</sub>

Number of non-trivial functional dependencies exists in the above table \_\_\_\_\_.

3

Your answer is Correct3

Solution :

3

The above relation have following functional dependencies.

$$A \rightarrow B$$

$$C \rightarrow B$$

$$AC \rightarrow B$$

Total 3 functional dependencies exists for relation.

 QUESTION ANALYTICSItem 21-30 of 33 « previous 1 2 3 4 next »



Kunal Jha

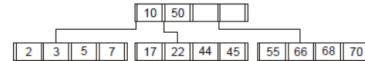
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## SINGLE SUBJECT : DATABASE (GATE - 2020) - REPORTS

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**Q. 31**
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Consider a B-tree in the given figure, where each node has atleast 2 and atmost 4 keys.



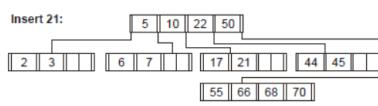
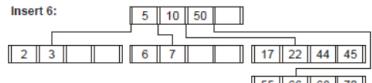
Keys 6 and 21 are inserted into this tree in that order. The number of nodes (disregarding the links) present with exactly same structure given below in the tree after the two insertions is \_\_\_\_\_.


**4**

Your answer is Correct

**Solution :**

4



Hence, all the 4 nodes are present in the tree after the two insertion.

QUESTION ANALYTICS


**Q. 32**
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Consider the two tables in a relational database with columns and rows as follows:

Table : Employee

ID	Name	Pid
1	Vijay	1
2	Pramod	1
3	Rahul	2
4	Kiron	3

Table : Project

Pid	Pname
1	CS
2	ME
3	CE

ID is the primary key of Employee table, Pid is the primary key of the Project table. Employee.Pid is a foreign key refers Project.Pid

 If we try to execute the following two SQL statements.  
 (i) Update Employee set Pid = Null where ID = 1;  
 (ii) Update Project set Pid = Null where Pid = 1;  
 The number of queries that will succeed are \_\_\_\_\_.

**1**

Your answer is Correct

**Solution :**

1

First query will successfully execute and after executing this statement, attribute Pid of Employee table with ID = 1 becomes 'NULL' which is foreign key from Projects's Pid. Second statement will not execute, because primary key cannot be NULL.

QUESTION ANALYTICS


**Q. 33**
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Let R(A, B, C, D, E) be a relation which has 500000 records. Size of each record is 200 B. Size of attribute A is 16 B. Size of pointer is 4 B and size of the block is 2400 B (assume elements are stored in sorted order of key). On the execution of the query,

Select \* from R where A = 'GATE'

The difference of the cost in term of number of block transfer from the disk when multilevel index used and when binary search applied without indexing is \_\_\_\_\_.

**12**

Correct Option

**Solution :**

12

Calculating the blocking factor of the relation,

$$\text{Blocking factor} = \left\lceil \frac{2400}{200} \right\rceil = 12$$

$$\text{Number of blocks in file} = \left\lceil \frac{500000}{12} \right\rceil = 41667$$

$$\text{Blocking factor of index file} = \left\lceil \frac{2400}{20} \right\rceil = 120$$

$$\text{Number of blocks of 1st level index} = \left\lceil \frac{41667}{120} \right\rceil = 348$$

$$\text{Number of blocks of 2nd level index} = \left\lceil \frac{348}{120} \right\rceil = 3$$

Number of blocks of 3rd level index =  $\left\lceil \frac{3}{120} \right\rceil = 1$

Cost of query using index = Height of index + 1 block for file = 3 + 1 = 4

Cost of query using binary search =  $\lceil \log_2 41667 \rceil = 16$

Difference = 16 - 4 = 12

Your Answer is 7

QUESTION ANALYTICS

+

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