DBMS
Full Length Test-3

Question-1

The relation R1 contains 500 tuples and the relation R2 contains 200 tuples. What is the maximum number of tuples possible in the natural join of R1 and R2 (R1 natural join R2)

A. 200

B. 10000

C. 700

D. 500

Question-2

Consider the following functional dependencies in a database. Date_of_Birth->Age
Age->Eligibility
Name->Roll_number
Roll_number->Name
Course_number->Course_name
Course_number->Instructor
(Roll_number, Course_number)->Grade
The relation (Roll_number, Name, Date_of_birth, Age) is
A. in none of the
B. in third normal form but not in BCNF
C. in BCNF
D. in second normal form but not in third normal form

Question-3

A table has fields F1, F2, F3, F4, and F5, with the following functional dependencies:

F1->F3

F2->F4

(F1,F2)->F5 in terms of normalization, this table is in

A. 2NF

B. 1NF

C. None of the mentioned

D. 3NF

Question-4

Let R(A,B,C,D,E,P,G) be a relational schema in which the following FDs are known to hold:

AB->CD

DE->P

C->E

P->C

B->G

The relation schema R is

A. in 3NF, but not in BCNF

B. in BCNF

C. in 2NF, but not in 3NF

D. not in 2NF

Question-5

Students(sid,student_name,class_name,math_marks,dbms_marks,toc_marks,total_marks)

Consider the query:

SELECT student_name FROM students WHERE class_name=(SELECT class_name FROM students WHERE math_marks=100);

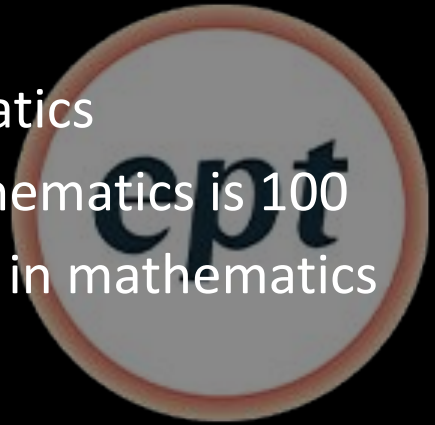
What will be the output?

A. The names of all students of all classes in which at least one student has 100 marks in mathematics .

B. The list of names of students with 100 marks in mathematics

C. The names and class of all students whose marks in mathematics is 100

D. The names of all students in all classes having 100 marks in mathematics



Question-6

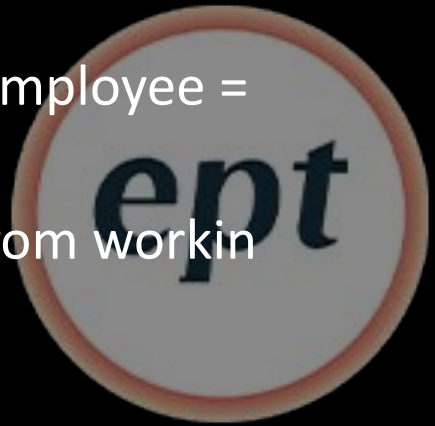
Consider the relation workin (employee, department) in which (employee, department) is the primary key, and the relation paid (employee, salary) where employee is the primary key. Assume no null values and no foreign keys or integrity constraints. Given the following four queries:

Query1: select employee from workin where employee in (select employee from paid)

Query2: select employee from paid where employee in (select employee from workin)

Query3: select E.employee from workin E, paid P where E.employee = P.employee

Query4: select employee from paid where exists (select * from workin where workin.employee = paid.employee)



Which one of the following statements is correct?

A. All queries return identical row sets for any database

B. Query2 and Query4 return identical row sets for all databases but there exist databases for which Query1 and Query2 return different row sets.

C. There exist databases for which Query3 returns strictly fewer rows than Query2.

D. There exist databases for which Query4 will encounter an integrity violation at runtime.

Question-7

You executed the following SQL statements in the given order:

CREATE TABLE orders (order_id NUMBER(3) PRIMARY KEY, order_date DATE, customer_idnumber(3));

INSERT INTO orders VALUES (100,'10-mar-2007’,222);

ALTER TABLE orders MODIFY order_date NOT NULL;

UPDATE orders SET customer_id=333;

DELETE FROM order;

The DELETE statement results in the following error:

ERROR at line 1: table or view does not exist

What would be the outcome?

A. All the statements before the DELETE statement would be implicitly committed within the session.

B. All the statements up to the ALTER TABLE statement would be committed and the outcome of the UPDATE statement is retained uncommitted within the session .

C. All the statements up to the ALTER TABLE statement would be committed and the outcome of UPDATE statement would be rolled back.

D. All the statements before the DELETE statement would be rolled back

Question-8

Match the following:

List – I

1.Determinants

2.Candidate key

3.Non – redundancy

4.Functional dependency

List – II

A. No attribute can be added

B. Uniquely identified a row

C. A constraint between two attribute

D. Group of attributes on the left hand side of arrow of function dependency. Codes:

	A	B	C	D
A.	3	4	1	2
B.	2	3	1	4
C.	1	2	3	4
D.	4	3	2	1

Question-9

Let Sup_city(Sid,Status,city) be a relational schema in which the following functional dependencies are known to hold: Sid→city and city→Status The relational schema Sup_city is

A. in 3NF, but not in BCNF

B. in BCNF

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

D. not in 2NF

Question-10

Consider the schema R(A,B,C,D) and the functional dependencies A⟶B and C⟶D. If the decomposition is made as R1(A,B) and R2(C,D) , then which of the following is TRUE?

A. Does not perform dependency and cannot perform lossless join

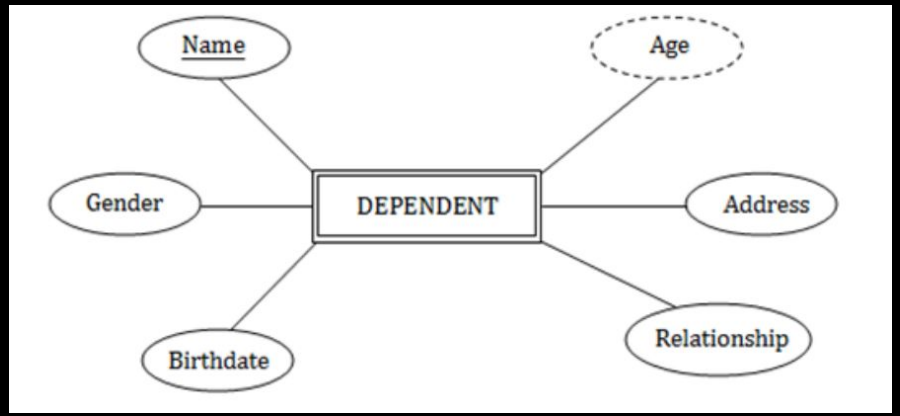
B. Does not preserve dependency but perform lossless join

C. Preserves dependency and performs lossless join

D. Preserves dependency but cannot perform lossless join

Question-11

The following diagram represents the dependent entity from an ERD.



Select the characteristics which are not represented by the above diagram.

A. Address is a multivalued attribute

B. Gender is an atomic attribute

C. Name is a key attribute .

D. Birthdate is the derived attribute

Question-12

Consider the following relational schema:

Suppliers (sid:integer, sname:string, saddress:string) Parts (pid:integer, pname:string, pcolor:string) Catalog (sid:integer, pid:integer, pcost:real)

What is the result of the following query?

(SELECT Catalog.pid from Suppliers, Catalog WHERE Suppliers.sid = Catalog.sid)

MINUS

(SELECT Catalog.pid from Suppliers, Catalog WHERE Suppliers.sname <> 'Sachin' and Suppliers.sid = Catalog.sid)

A. Pid of parts available in catalog supplied by Sachin

B. Pid of parts supplied by all except Sachin

C. Pid of parts supplied only by Sachin

D. Pid of parts available in catalog supplied by all except Sachin

Question-13

There are five records in a database.

Name	Age	Occupation	Category
Shiva	29	Professor	A
Abdul	26	Engineer	A
Dev	28	Teacher	B
Anil	27	Business	D
Anand	25	Doctor	C

There is an index file associated with this and it contains the values 4, 3, 5, 1 and 2. Which one of the fields is the index built from?

A. Age

B. Name

C. Occupation

D. Category

Question-14

Relation R with an associated set of functional dependencies, F, is decomposed into BCNF. The redundancy (arising out of functional dependencies) in the resulting set of relations is

A. Zero

B. More than zero but less than that of an equivalent 3NF decomposition

C. Proportional to the size of F+

D. Indeterminate

Question-15

Consider R and S be relational schemes such that R={a,b,c} and S={c}. Now consider the following queries on the database:

I. $\pi_{(R-S)}(r) - \pi_{(R-S)}(\pi_{(R-S)}(r) \times s - \pi_{(R-S,S)}(r))$

II. $\{t \mid t \in \pi_{(R-S)}(r) \wedge \forall u \in r(\exists v \in s(u = v[s] \wedge t = v[R-S]))\}$

III. $\{t \mid t \in \pi_{(R-S)}(r) \wedge \forall v \in r(\exists u \in s(u = v[s] \wedge t = v[R-S]))\}$

IV. SELECT R.a,R.b FROM R,S WHERE R.c=S.c

Which of the above queries are equivalent?

A. I and II

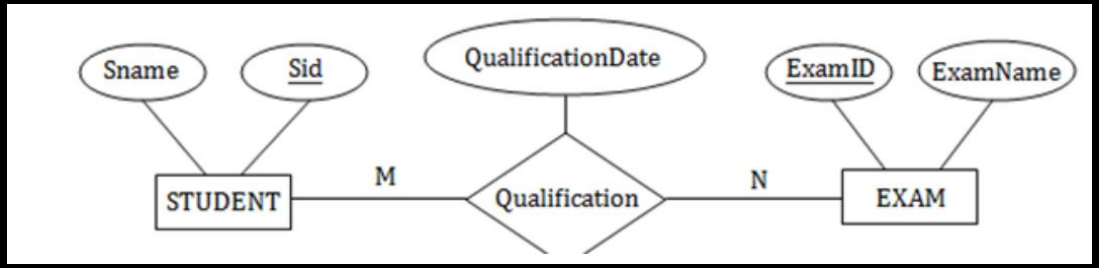
B. I and III

C. II and IV

D. III and IV

Question-16

Consider the following entity-relationship diagram.



Which of the following possible relations will not hold if the above ERD is mapped into a relational model?

A. QUALIFICATION(Sid,ExamID,QualificationDate)

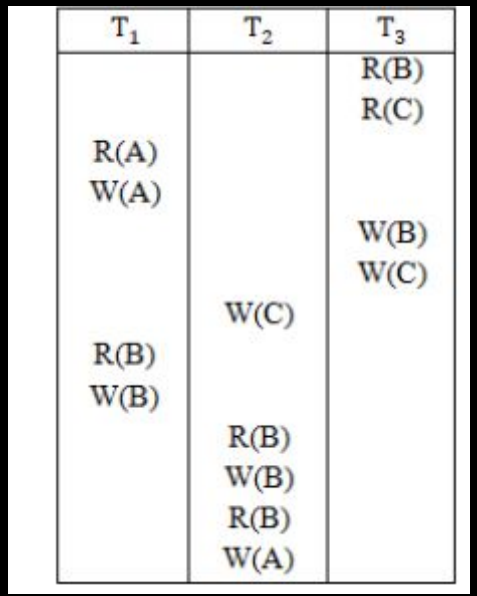
B. EXAM(ExamID,ExamName)

C. EXAM(ExamID,Sid,ExamName)

D. STUDENT(Sid,Sname)

Question-17

What is the equivalent serial schedule for the following transaction?



T_1	T_2	T_3
		R(B)
		R(C)
R(A)		
W(A)		
		W(B)
		W(C)
	W(C)	
R(B)		
W(B)		
	R(B)	
	W(B)	
	R(B)	
	W(A)	

A. T1-T2-T3
B. T2-T1-T3
C. T3-T1-T2
D. T1-T3-T2

Question-18

For a database relation R (a,b,c,d) where the domains of a,b,c and d only include atomic values, only the following functional dependency and those that can be inferred from them hold:a □ c , b □ d The relation is in:

A. 1NF but not in 2NF

B. 2NF but not in3NF

C. 3NF

D. None of the above

Question-19

See the below two statements and choose from the following option which is correct.

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

Statement 2 : PQ $\rightarrow$ R, S $\rightarrow$ T, T $\rightarrow$ R is a minimal cover for the set of FDs PQ $\rightarrow$ R, S $\rightarrow$ T, PQ $\rightarrow$ T, T $\rightarrow$ R

A. Statement 1 & Statement 2 - False,

B. Statement 1 - True, Statement 2 - False,

C. Statement 1 & 2 - True

D. None of this

Question-20

Consider a relation R={M, N, O,P, Q, R, S, T} with the following set of dependencies:

MN-> Q

M->RQ

N-> R

R-> ST

Next consider the following set of decompositions for the relation schema R:

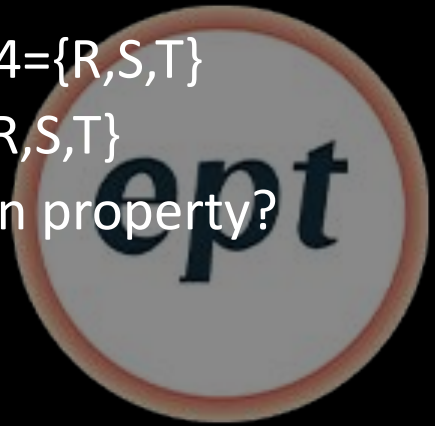
D1= {R1,R2,R3,R4}: R1={M,N,O,P}, R2={M,P,Q}, R3= {N,R}, R4={R,S,T}

D2= {R1,R2,R3,R4}: R1={M,N,O}, R2= {P,Q}, R3= {N,R}, R4= {R,S,T}

Which of the above decomposition(1) has/ have lossless join property?

A. Only D1 B. Only D2

C. Both D1 and D2 D. Neither D1 nor D2



Question-21

Relation R is decomposed using a set of functional dependency F, and relation S is decomposed using another set of functional dependencies G. One decomposition is definitely BCNF, the other is definitely 3NF, but is not known to make a guaranteed identification. Which of the following tests should be used for the decomposition? (Assume that closure of F and G are available)

A. Dependency preservation

B. BCNF definition

C. Both (A) and (B)

D. 3NF definition

Question-22

The relation schema: student_performance (name, course_number, roll_number, grade) has the following functional dependencies:

name, course_number-> grade

roll_number, course_number->grade

name->roll_number

roll_number->name

The highest normal form of this relation schema is:

A. 2NF

B. 3NF

C. BCNF

D. 4NF

Question-23

Consider the 2 relation schema: R1= (A, B, C, D, E) and R2= (A, B, C, D, E). Statement 1 is the FD of R1 and statement 2 is the FD of R2.

1. A-> B, AB-> C, D-> AC, D-> E

2. A-> BC, D-> AE

Which of the following statements is true?

A. FD of R1 is equivalent to FD of R2

B. FD of R1 and R2 not equivalent

C. We cannot compare FD of R1 and R2

D. None of the abov

Question-24

Suppose a phone book contain 500 pages and each page can contain upto 500 records.Suppose we want to search for a particular name in a phone book. Give a worst case bound on number of pages that must be looked to perform a search using an index for the name of the first entry of each page.

A. 1

B. 2

C. 9

D. 500

Question-25

Let R(a, b, c) and S (d, e, f) be two relations in which dis the foreign key of S that refers to the primary key of R. Consider the following four operations R and S

1. Insert into R
2. Insert into S
3. Delete from R
4. Delete from S

Which of the following is true about the referential integrity constraint above?

A. None of 1, 2, 3 or 4 can cause its violation

B. All of 1, 2, 3 and 4 can cause its violation

C. Both 1 and 4 can cause its violation

D. Both 2 and 3 can cause its violation

Question-26

Consider the 2 transactions T1 and T2 and four schedules S1, S2, S3 and S4 of T1 and T2 are given below:

T1: R1[X] W1[X] W1[Y]

T2: R2[X] R2[Y] W2[Y]

S1: R1[X] R2[X] R2[Y] W1[X] W1[Y] W2[Y]

S2: R1[X] R2[X] R2[Y] W1[X] W2[Y] W1[Y]

S3: R1[X] W1[X] R2[X] W1[Y] R2[Y] W2[Y]

S4: R2[X] R2[Y] R1[X] W1[X] W1[Y] W2[Y]

Which of the following schedules are conflict serializable?

A. S1 and S2
B. S2 and S3
C. S3 only
D. S4 only

Question-27

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

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

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

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

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

Question-28

Consider the statements
S1: "Delete" is used to delete the table from database.
S2: "Truncate table" is used to delete all the data but not table.
S3: "Drop table" is used to delete the data as well as table
Which of the above statement(s) is/are true?
A. S1 and S2
B. S2 and S3
C. S1 and S3
D. S1, S2 and S3

Question-29

Consider the following transactions with data items P and Q initialized to ‘0’
T1: read (P);
Read (Q);
if P=0, then Q= Q+1
write (Q);
T2: read (Q)
Read (P)
if Q=0, then P= P+1;
write (P);
Any non-serial interleaving of T1 and T2 for concurrent execution leads to:
A. a serializable schedule
B. a schedule that is not conflict serializable
C. a conflict serializable schedule
D. a schedule for which precedence graph cannot be drawn.

Question-30

A database table 71 has 4000 records and occupies 50 disk blocks. Another table 72 has 300 records and occupies 20 disk blocks. These two tables have to be joined as per a specified join condition that needs to be evaluated for every pair of records from these two tables. The memory buffer space available can hold exactly one block of records for T1 and one block of records for 72 simultaneously at any point in time. No index is available on either table. If Nested- loop join algorithm is employed to perform the Join, with the most appropriate choice of table to be used in outer loop, the number of block accesses required for reading the data are _____

Question-31

Consider the following relational schema:

Students (sid: integer, sname: string, address: string)

Courses (cid: integer, cname: string, instructor_name: string)

Enroll (sid: integer, cid: integer, grade: string)

Note: The key fields are underlined and domain of each field is listed after the field name.

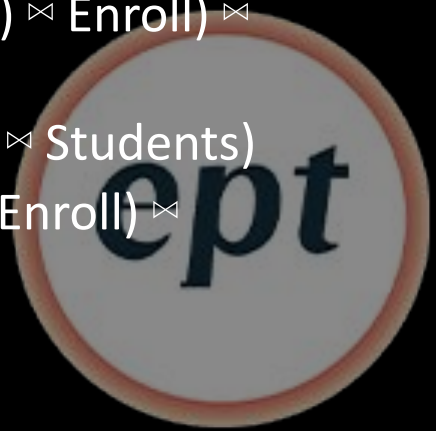
What is the “efficient” relational algebra expression that gives “Names of Students who enrolled in some courses instructed by Snape” ?

A. πsname (πsname (σinstructor_name =’Snape’ (πcid (Courses) ⋈ Enroll) ⋈ Students)

B. πsname (πsid (σinstructor_name =’Snape’ (Courses ⋈ Enroll)) ⋈ Students)

C. πsname (πsid (πcid (σinstructor_name =’Snape’ (Courses)) ⋈ Enroll) ⋈ Students)

D. None of the above



Question-32

2PL generates serializability, but it does not prevent deadlocks. 2PL has 2 phases: growing and shrinking. Which of the following rules are used to govern the 2PL protocol?

A.2 transactions cannot have conflicting locks

B. No unlock operation can precede a lock operation in the same transaction

C. No data are affected until all locks are obtained i.e., until the transaction is in its locked point.

D. All of these

Question-33

Consider the relations R(A,B) and S(B,C) and the following four relational algebra queries over R and S:

I. $\pi_{A,B}(R \bowtie S)$

II. $R \bowtie \pi_{B}(S)$

III. $R \cap (\pi_{A}(R) \times \pi_{B}(S))$

IV. $\pi_{A,R.B}(R \times S)$ where R.B refers to the column B in table R. One can determine that:

A. I, III and IV are the same query.

B. II, III and IV are the same query.

C. I, II and IV are the same query.

D. I, II and III are the same query

Question-34

Consider the following schedule:

S1: R1 (A); R1(C); R2 (B); W2 (B); R3 (B); R1 (A); R3(C); W3(C); W1 (A)

S2: R2 (A); R1(C); R2 (B); R3 (B); W2 (B); R1 (A); R3(C); W3(C); W1 (A)

Which of the above schedules is conflict serializable?

A. S1 only

B. S2 only

C. Both S1 and S2 only

D. Neither S1 nor S2

Question-35

Let StudInfo(studId, name, sex, address) and CourseInfo(courseId, Instructorname, sex) and enroll(studId, courseId) be three relational schemes where the primary keys are shown underlined. What does the following relational algebra expression represent?(Assume at least one course is instructed by a female instructor). ((Enroll)÷(πcourseId (σsex='female' (courseInfo))))

A. CourseId's of all courses leading by female instructor

B. CourseId's of all courses leading by male instructor

C. StudentId's of all students who took courses lead by female instructor

D. None of these

Question-36

Suppose a relation R1(A,B,C) and R2(X,Y,Z) are two relation schemas. Let r1 and r2 be the corresponding relation instances. C is a foreign key that refers to X in r2 . If data in r1 and r2 satisfy referential integrity constraints then which of the following is always false?

A. $\pi C(r1) - \pi X(r2) = \phi$

B. $\pi X(r2) - \pi C(r1) = \phi$

C. $\pi C(r1) - \pi X(r2) \neq \phi$

D. $\pi X(r2) - \pi C(r1) \neq \phi$

Question-37

Consider the following schedule:

S: r2 (A), r1 (B), w2 (A), r2 (B), r3 (A), w1 (B), w3 (A), w2 (B)

How many minimum number of moves (where a move consisting of changing the position of one of the operations) are required to convert S into a conflict serializable schedule?

A. 1
B. 2
C. 3
D. 4

Question-38

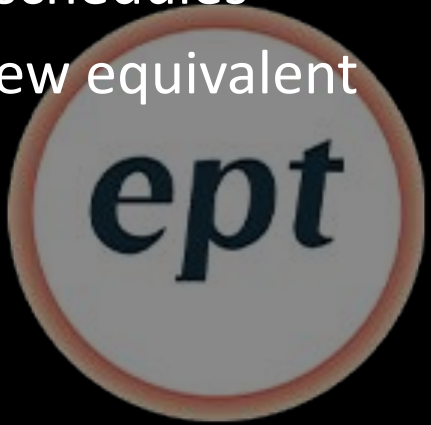
Consider 2 schedules S1 and S2 with same set of transactions and precedence graph of S1 is same as precedence graph of S2. Which of the following statement is True?

A. Both S1 and S2 are conflict equal and conflict serializable schedule

B. Both S1 and S2 are conflict equal but may not conflict serializable schedule

C. Both S1 and S2 are conflict equal but may not equal schedules

D. Both S1 and S2 are conflict equal and but may not view equivalent



Question-39

Which of the following schedules are recoverable?

S1: r1(x), r2(z), r1(z), r3(x), r3(y), w1(x), C1, w3(y), C3, r2(y), w2(y), w2(z), C2

S2: r1(x), r2(z), r1(z), r3(x), r3(y), w1(x), w3(y), r2(y), w2(z), w2(y), C1, C2, C3

S3: r1(x), r2(z), r3(x), r1(z), r2(y), r3(y), w1(x), C1, w2(z), w3(y), w2(y), C3, C2

A. Only S1

B. Only S1, S3

C. Only S2, S3

D. All S1, S2, S3

Question-40

Suppose a schedule with 2 transactions T1 and T2:

T1	T2
Read(A) Write(A)	
	Read(A) Commit
Read(A) Abort	

The above schedule is:

A. Cascadeless schedule

B. Recoverable schedule

C. Irrecoverable schedule

D. None of these

Question-41

For the following relational tables,

Grocery(Grocery_ID, Name, Category,Exp_date,Mfg_date)

Sale_Grocery(SaleID,Grocery_ID)

Sale(SaleID, Price)

What is the total money made by selling “Tomato_Sauce” by December 2017? Choose correct SQL query from below for above question :

A. a) SELECT Sum(Sale.Price) FROM Sale INNER JOIN Sale_Grocery ON Sale.SaleID = Sale_Grocery.SaleID WHERE ((Exp_date < '2017-31-12') AND Grocery.Name = ‘Tomato_Sauce’)

B. SELECT Sum(Sale.Price) FROM Sale LEFT JOIN Sale_Grocery ON Sale.SaleID = Sale_Grocery.SaleID WHERE ((Exp_date < '2017-31-12') AND Grocery.Name = ‘Tomato_Sauce’);

C. SELECT Sum(Sale.Price) FROM Sale FULL JOIN Sale_Grocery ON Sale.SaleID = Sale_Grocery.SaleID WHERE ((Exp_date < '2017-31-12') AND Grocery.Name = ‘Tomato_Sauce’);

D. None of these

Question-42

Which of the following statements are true about recoverable and cascadeless schedules?

(P) All cascadeless schedules are also recoverable

(Q) All recoverable schedules are also cascadeless schedules

(R) All strict schedules are cascadeless and recoverable

(S) All cascadeless and recoverable schedules are strict schedule

A. P and R are correct

B. P and S are correct

C. P, R and S are correct

D. P, Q and S are correct

Question-43

Which of the following is True about the given schedule ‘S’?

A. It is conflict serializable

B. It is view serializable but not conflict serializable

C. It is conflict serializable but not view serializable

D. It is not serializable

T1	T2
R(A) A=A+100	
	R(A) A=A*2 W(A)
W(A)	
	R(B) B= B/2 W(B)
R(B) B= B-100 W(B)	

Question-44

Consider the set of relations shown below and the SQL query that follows.

Students: (Roll_number, Name, Date_of_birth)

Courses: (Course number, Course_name, Instructor)

Grades: (Roll_number, Course_number, Grade)

The Grade values in Grades tables are A,B,C,D whereas D is considered as Fail.

select distinct Name

from Students, Courses, Grades where Students. Roll_number = Grades.Roll_number and Courses.Instructor = Verma and Courses.Course_number = Grades.Course_number and Grades.grade <> D Which of the following sets is computed by the above query?

A. Name of all passed students in at the minimum one of the courses taught by Verma

B. Names of students who have failed in all courses taught by Verma

C. Name of all passed students in all of the courses taught by Verma

D. Names of students who have failed in at least one of the courses taught by Verma

Question-45

There are 2 relations: gate2016 (exam_date, exam_center, branch_id) and candidate (rollno, name, bid, refno, choice_of_date). In a candidate relation, bid is the foreign key which refers to the key of gate2016. Suppose an insertion into candidate relation and deletion from gate2016 relation is done, then which of the following statement is true?

A. Insertion into candidate relation can cause inconsistency

B. Deletion from gate2016 relation can cause inconsistency

C. Both operations can cause inconsistency of data

D. None of them can cause inconsistency of data

Question-46

Consider the two tables in a relational database with columns and rows as follows:

Table: **Student**

Roll_no	Name	Dept_id
1	Suresh	1
2	Mahesh	1
3	Ramesh	2
4	Paresh	3

Table: **Department**

Dept_id	Dept_Name
1	A
2	B
3	C

Roll_no is the PK of student_table

Dept_id is the PK of Department table

Student.Dept_id is a FK refers Department.Dept_id

What will happen if we try to execute the following 2 SQL statements?

(i) Update Student set Dept_id= NULL where Roll_no=1;

(ii) Update Department set Dept_id= NULL where Dept_id=1;

A. Both (i) and (ii) will fail
B. (i) will fail but (ii) will succeed
C. (i) will succeed but (ii) will fail
D. Both (i) and (ii) will succee

Question-47

Consider the following relation: R (A1, A2, ….An) and every (n-2) attributes of R forms a candidate key. How many super keys are there in R?

A. ${}^{n}C_{n-2} * 2^{2}$

B. ${}^{n}C_{n-2} + n+1$

C. ${}^{n}C_{n-2} + 3$

D. ${}^{n}C_{n-2}$

Question-48

Consider the following relation.

Emp(Eid, Ename, Salary, Deptno, Sex)

Which of the following query results in, the department in which the average salary of male employees is more than average salary of employees in the same department.

[Q1] Select Deptno

From Employee

Where Sex = ‘M’

group by Deptno

havingAvg(Salary) > (SelectAvg(Salary) From Employee)

[Q2] SELECT R1.Deptno no, Avg (SALARY)

From (SELECT deptno, AVG (SALARY) AVGSAL1 FROM Employee

Where Sex = ‘M’

group by Deptno) R1.

(SELECT Deptno, AVG(SALARY) AVGSAL2

FROM Employee Group by Dept no) R2

Where AVGSAL1 > AVGSAL2 and

R1. Deptno= R2. Deptno

Which of the following query is correct for given specification?

A. Q1 is only correct

B. Q2 is only correct

C. Both Q1 and Q2 are correct

D. None of these

Question-49

In a database file, the search key field is 9 bytes long the block size is 512 bytes, a record pointer is 6 bytes and block pointer is 7 bytes. The largest possible order of a non leaf node in B+ tree implementing this file structure (order defines maximum number of keys present}

A. 23

B. 31

C. 32

D. 42

Question-50

Take one example where log sequence of 2 transactions on bank account details are follows:

Initial balance $\rightarrow$ 20,000

Transfer 5,000 to a mortgage payment Apply 10% discount interest.

T1=Start

T1=B_{old} =20000,new=15000

T1=M_{old} =0,new=5000

T1=commit

T2=Start

T2=B_{old} =15000,new=16500

T2=commit

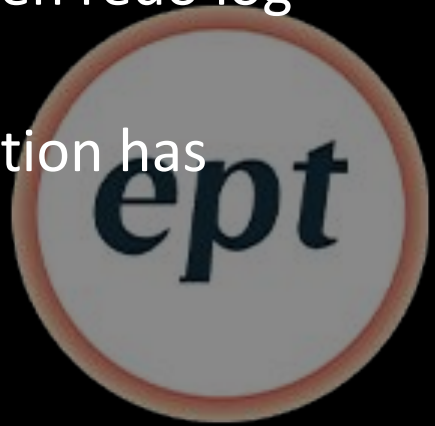
If before log record of is written the database system crashed then when the system restarted. Choose true statement from the below options of recovery procedure

A. We can apply redo & undo operations in random order because they are idemponent.

B. We must redo log record 6 to set B to 16,500

C. We must undo log record 6 to set B to 15,000 and then redo log records 2 & 3.

D. We need not redo log records 2 & 3 because transaction has committed.



Question-51

There are two integer columns A and B in a table T. The record (A=1, B=1) was inserted into the table. Let MaxA and MaxB are respective maximum values of A and B among all records in the table at any point in time. Using MaxA and MaxB, new records are inserted in the table 128 times with A and B values being MaxA+1, 2*MaxB+1 respectively. It may be noted that each time after the insertion, values of MaxA and MAxB change. What will be the output of the following SQL query after the steps mentioned above are carried out? SELECT B FROM T WHERE A=7;

A. 129

B. 255

C. 127

D. 257

Question-52

Which join refers to join records from the Right table that have no matching key in the left table are included in the result set:

A. Left outer join

B. Right outer join

C. Full outer join

D. Half outer join

Question-53

SELECT stu_name FROM Student WHERE name IN(SELECT class_name FROM Student WHERE marks=100); What will be the output?

A. the names of all students of all classes in which atleast one student has 100 marks in mathematics

B. the names of all students in all classes having 100 marks in mathematics

C. the list of names of students with 100 marks in mathematics

D. the names and class of all students whose marks in mathematics is 100

Question-54

A relation empdtl is defined with attribute empcode(unique), name, street, city, state and pincode. For any pincode, there is only one city and state. Also for any given street, city and state there is just one pincode. In normalization, empdtl is a relation in:

A. 1NF

B. 2NF and hence also in 1NF

C. 3NF and hence also in 2NF and 1NF

D. BCNF and hence also in 3NF, 2NF and 1NF

Question-55

Consider the transactions T_1, T_2, and T, and the schedules S, and S_2 given below.

T: (X); (Z); wi(X); wi(Z)

T_2: 12(Y); r2(Z); w2Z)

T_3: 13(Y); r3(X); w3(Y)

S_1: (X); r3 (Y); r3(X); r2(Y); r2(Z); w3(Y);

w2(Z); (Z); w1(X); w(Z)

S_2: (X); r3(Y); 2(Y); r3(X); w2(Z); r(Z); r2(Z);

w3(Y); w1(X); w1(Z)

Which one of the following statements about the schedules is true?

A. Only S_1, is conflict-serializable.

B. Only S_2 is conflict-serializable.

C. Both S_1, and S_2 are conflict-serializable.

D. Neither S_1, nor S_2 is conflict-serializable

Question-56

Consider the following schedule:

l1(A) R1(A) , u1(A) , l2(A) W2(A) , u2(A) l1(A) . W1(A), u1(A)

Identify the schedule?

A. Schedule satisfies 2PL and conflict serializable

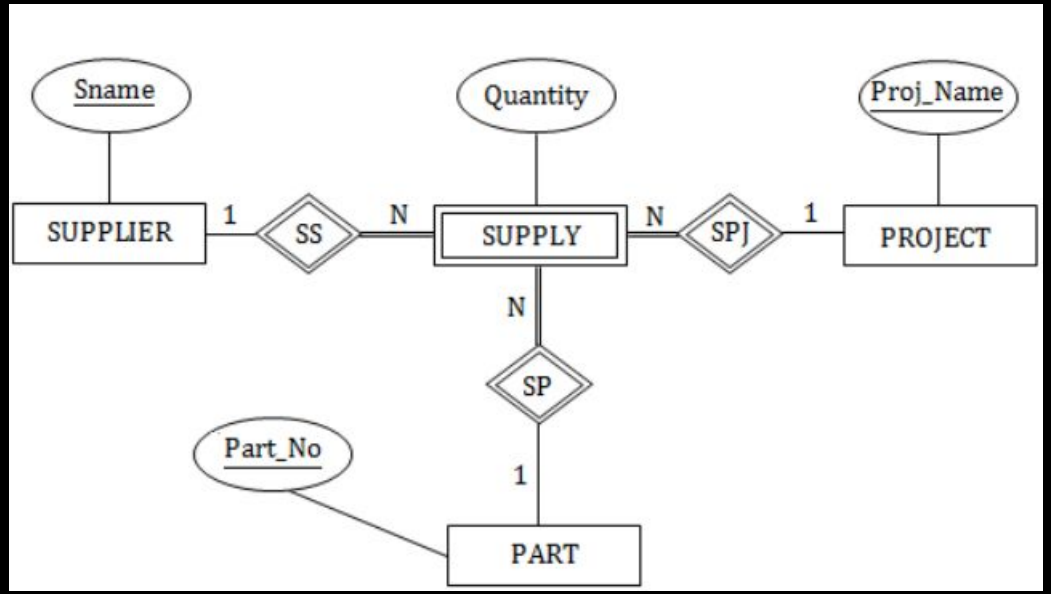
B. Satisfies 2PL and non-conflict serializable

C. Not satisfies 2PL and conflict serializable

D. Not satisfies 2PL and not conflict serializable

Question-57

Consider the following ER diagram How many minimum numbers of tables are needed to represent the ERD?



A. 5

B. 7

C. 4

D.6

Question-58

Consider the following relational schemas:

Employee(eno,ename,loc)

Dept(eno,dno,dname)

Where the primary keys are shown underlined. The number of tuples in the Employee and Dept tables are 100 and 10 respectively. What are the maximum and minimum number of tuplesthat can be present in(Employee⊕Dept), where ⊕ denotes natural join?

A. 100, 10

B. 1000, 100

C. 1000, 10

D. 10, 10

Question-59

Consider the relational schema R(ABC) with the following tuples

A	B	C
2	5	3
2	6	4
2	7	4
4	3	3

Which one of the following is TRUE about the schema R?

A. The schema is in 3NF but not in BCNF

B. The schema is in 2NF but not in 3NF

C. The schema is not in 2NF

D. The schema is in BCNF

Question-60

Consider the following set of functional dependency on the scheme (A, B,C)

A->BC, B->C, A-> B, AB->C

The canonical cover for this set is:

A. A->BC and B-> C

B. A->BC and AB-> C

C. A->BC and A->B

D. A-> B and B-> C

Question-61

Consider the schema R=(S, T, U, V) and dependency be S->T, T->U, U-> V, V-> S. Let R=(R1 and R2) be a decomposition such that R1∩R2.

The decomposition is:

A. Not in 2NF

B. In 2NF but not in 3NF

C. In 3NF but not in 2NF

D. In both 2NF and 3 NF

Question-62

Which of the following concurrency control protocols does not ensure both conflict serialization and freedom from deadlock?

I. 2-phase locking

II. Time-stamp ordering

A. Neither I nor

B. Both I and II

C. I only

D. II only

Question-63

Which of the following is true about 2-phase locking protocol?

S1 : Lock upgradation and degradation are allowed only in shrinking phase.

S2:2-phase locking allows lock degradation in shrinking phase.

A. Only S1,

B. Only S2

C. Both S1 and S2

D. Neither S1 nor S2

Question-64

Consider the following two statements S1 and S2: S1: A relation R is in 3NF if every non-prime attribute of R is fully functionally dependent on every key of R. S2: Every relation in BCNF is also in 3NF. Which of the following is CORRECT?

A. Both S1 and S2 are true

B. S1 is false and S2 is true

C. Both S1 and S2 are false

D. S1 is true and S2 is false

Question-65

Consider the following schedule S of transactions T1 and T2.

T1	T2
Read (X)	
X = X + 3	
	Read (X)
	Temp = 0.5 * X
	Write (X)
	Read (Y)
Write (X)	
Read (Y)	
Y = Y − 3	
Write (Y)	
	Y = Y + Temp
	Write(Y)

Which of the following is TRUE about the schedule S?

A. S is serializable only as T1, T2

B. S is serializable both as T1, T2 and T2, T1

C. S is serializable only as T2, T1

D. S is not serializable either as T1 or as T2

SOLUTION

Solution-1

Answer: A

Explanation: From the given set of functional dependencies, it can be observed that B is a candidate key of R1. So all 500 values of B must be unique in R1. There is no functional dependency given for R2. To get the maximum number of tuples in output, there can be two possibilities for R2.

1) All 200 values of B in R2 are same and there is an entry in R1 that matches with this value. In this case, we get 200 tuples in output.

2) All 200 values of B in R2 are different and these values are present in R1 also. In this case also, we get 200 tuples.

Solution-2

Answer: A

Explanation: For the given relation only some of the above FDs are applicable. The applicable FDs are given below:

Date_of_Birth->Age

Name->Roll_number

Roll_number->Name

Finding the closure set of attributes we get the candidate keys:(Roll_number,Date_of_Birth), and (Name,Date_of_Birth) .On selecting any one of the candidate key we can see that the FD Date_of_Birth->Age is a partial dependency. Hence the relation is in 1NF.

Solution-3

Answer: B

Explanation: Since the primary key is not given we have to derive the primary key of the table. Using the closure set of attributes we get the primary key as (F1,F2). From functional dependencies, “F1->F3, F2->F4”, we can see that there is partial functional dependency therefore it is not in 2NF. Hence the table is in 1NF.

Solution-4

Answer: D

Explanation: From the closure set of attributes we can see that the key for the relation is AB. The FD B->G is a partial dependency; hence it is not in 2NF.

Solution-5

Answer: A

Explanation: The inner query retrieves the name of the class in which at least has 100 marks in mathematics. The outer query will output the name of all students of the classes retrieved by the inner query.

Solution-6

Answer: A
Explanation: The output of Query2, Query3 and Query4 will be identical. Query1 may produce duplicate rows. But rowset produced by all of them will be same.

Table working employee department

abc c1

xyz c1

abc c2

pqr c1

Table paid employee salary

abc 20000

xyz 10000

rst 10000

Output of Query 1

abc

abc

xyz

Output of Query 2

abc

xyz

Output of Query 3

abc

xyz

Output of Query 4

abc

xyz

Solution-7

Answer B

Explanation: Committing a transaction refers to making the changes to record in the database.

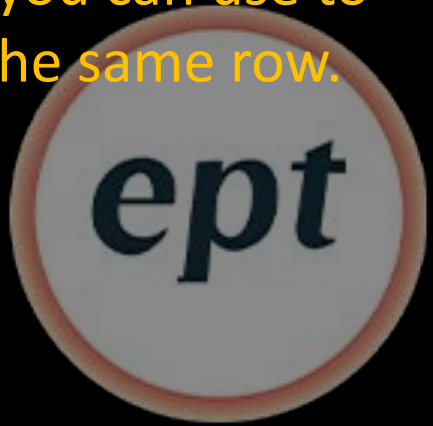
Solution-8

Answer B

Explanation: A candidate key is a column, or set of columns, in a table that can uniquely identify and database record without referring to any other data.

A functional dependency is a relationship that exists when one attribute uniquely determine another attribute.

A determinant in a database table is any attribute that you can use to determine the values assigned to other attribute(s) in the same row.



Solution-9

Answer C

Explanation:

Sup_city(Sid,Status,city)

FDs: Sid→city

city→Status

〖(Sid)〗^+=Sid,city,Status

C.K = Sid

Therefore, Relation Sup_city has only simple key, then it's in 2NF. But there is a transitive dependency.

Solution-10

Answer:D

Explanation: R(A, B, C, D) with functional dependency A->B and C->D. Decomposition inti R1(A, B) with FD: A->B and R2(C, D) with FD: C->D. Since dependency is preserved but decompostion relation are not lossless, since R1 ∩ R2 = Φ

Solution-11

Answer: C

Explanation: Ellipse with underlined attribute is known as a key attribute.

Solution-12

Answer: D

Explanation:
The first query will result in all those pid which are being supplied. The second query will result in pid for all parts, which are being supplied by any supplier other than supplier whose name is sachin. By performaing a difference operation on the two queries, the result will be the pid of parts supplied only by sachin.

Solution-13

Answer: C

Explanation: Indexing will be an occupation field because occupation field lexicographically sorted will be 4, 3, 5, 1, 2.

Solution-14

Answer: B

Explanation: Redundancy in BCNF is low when compared to 3NF. For more details on BCNF.

Solution-15

Answer: C

Explanation: II and IV are equivalent.

Solution-16

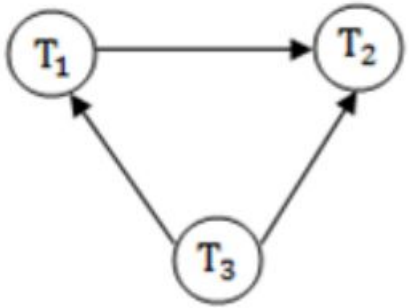
Answer: C

Explanation: Looking at the ERD it can be observed that for entity type EXAM, only the attributes ExamID and ExamName are enough. There is no need of Sid.

Solution-17

Answer: C

Preparing the dependency graph, we get



By observing the dependency graph, it can be concluded that T_3, should be executed before T_1 and T_2. Since T_3 has a dependency edge over both T_1 and T_2. Similarly, T_1 must be executed before T_2. Since T_1 has a dependency edge over T_2. So, the correct order is $T_3 - T_1 - T_2$.

Solution-18

Answer A

Explanation: Since, it is already mentioned that a, b, c, d are atomic values, so by definition of 1NF, it can be inferred that it is already in 1NF. But as->

a ->c

b-> d, the candidate key is -> {ab}

So, all the non-key attributes only partially depend on the prime attributes of the candidate key(a and b). So, it is not in 2NF.

Solution-19

Answer **B**

Explanation: Every two attribute relation - BCNF. Statement 1 True

FD = {PQ $\rightarrow$ R, S $\rightarrow$ T, PQ $\rightarrow$ T, T $\rightarrow$ R}

PQ $\rightarrow$ R, S $\rightarrow$ T, T $\rightarrow$ R is not a minimal cover. PQ cannot determine T. Statement 2 False.

Solution-20

Answer A

Solution-21

Answer B

- If closures of F and G are available, then by BCNF definition we can identify the decomposition.

Solution-22

Answer:B

Explanation;

The candidate keys are {name, course_number} and {course_number, roll_number} Dependency 3 and 4 are transitive but they are prime, so we will break this relation upto 3NF.

Solution-23

Answer A

R1: A->B

AB-> C

D-> AC

D-> E

Candidate key for R1 is AD closure of FD is : {A-> B, AB-> C, A-> C, D->AC, D-> A, D-> C, D->E}

R2: A-> BC

D-> AE

Candidate key for R2 is AD and closure of FD is: {A->B, A->C, A->BC, D->A, D->C, D->E, D->AC}

Solution-24

Answer B

If the book were organized as a heap file in a linear search so worst case bound is 500. By using binary search the worst case bound is $[\log_2 500]=9$ using the fact that the book is ordered by names with an index for the name of the first entry on each page we get worst case bound is 2 because the index has 500 pages, so entire index files in one page 1 access to the index and 1 to the data.

Solution-25

Answer D

Explanation:

Referential integrity constraint

In relational model, two relation are related to each other over the basis of attributes. Every value of referencing attribute must be null or be available in the referenced attribute.

R(a, b, c) and S(d, e, f)

here d is the foreign key of S that refers to the primary key of R.

1. Insert into R will not cause any voilation.

2. Insert into S may cause violation because for each entry in 'S' it must be in 'R. 3. Delete from Rmay cause violation because

for the deleted entry in R there may be referenced entry in the relation S.

4. Delete from Swill not cause any violation.

Hence (d) is the correct option.

Solution-26

Answer .B

Explanation: In all other schedules, one transaction overwrites the value of if written by another.

Solution-27

Answer D

Explanation:

(a) read and write (allowed)

(b) read after read (allowed)

(c) read after committed write (allowed)

(d) read after uncommitted write (not allowed)

Solution-28

Answer .B

"Delete" is used to delete the data specified in the where clause. If where cause is absent then it will delete all the data from the table.
"Truncate table" is used to delete all the data but not able

“Drop table” is used to delete the data as well as the table

Solution-29

Answer .C

Explanation: The statements can be transformed is:

T1	T2
R(P) R(Q)	
	R(Q) R(P)
W(Q)	
	W(P)

T1->T2

So, it is not conflict serializable

Solution-30

Answer(15020)

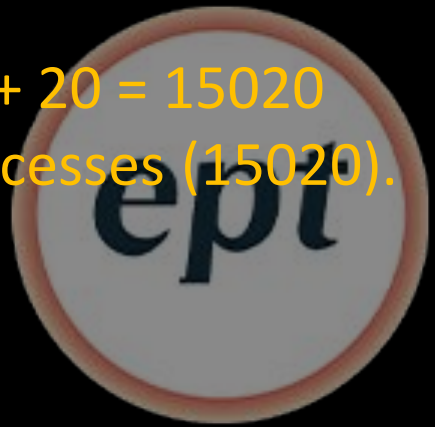
Nested Loop algorithm will involve n,x b_{12}+ b, block transfers. n, records in relation r, b, blocks in

relation n, records in relation s, b, blocks In

relation s Either 71 can be R or 72. If Ris T1 then total number of block access is

4000 x 20+ 50-80050

If R is 72 then total number of block access. is 300 x 50+ 20 = 15020
Better one is the second case, total number of block accesses (15020).



Solution-31

Answer: C

Explanation: We first find the cid's of Courses that Snape has instructed and then we compute the natural join of this with Enroll from this we project Sid which gives ids of the students who enrolled in courses taught by Snape, then we take the natural join of this with student which gives us the names students enrolled for courses instructed by Snape.

So, the correct answers are option (b) and (c)

Since they asked for efficient relational algebra expression, option (c) is correct, since we first find all the course ids of courses taught by Snape.

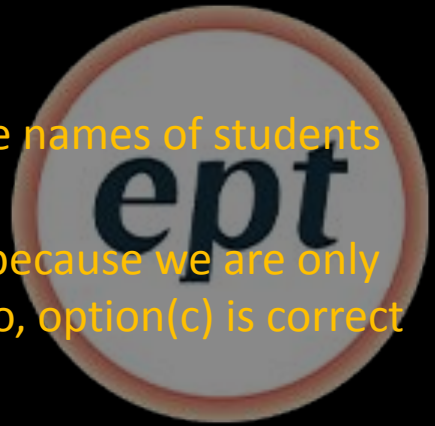
πcid (σinstructor_name ='Snape' (Courses))

The resultant of the above expression is joined with Enroll and get the ids of students enrolled for the courses taught by Snape.

πsid (πcid (σinstructor_name ='Snape' (Courses)) ⋈ Enroll)

The resultant of the above expression is joined with Students and get the names of students who were enrolled in the courses taught by Snape.

But in option (b), we first join Courses with Enroll, which is not efficient because we are only interested in courses taught by Snape but not all the other instructors. So, option(c) is correct answer.



Solution-32

Answer: D

Explanation:

All are the properties of 2PL protocol

Solution-33

Answer: D

Explanation: Lets consider relations R, S

R= {(10,1),(20,2)} and S={(2,30),(3,40)}

I) R⋈S= {(20, 2,30)}. So π A, B R⋈S = {(20,2)}

II) π B (S) ={(2),(3)}. So R⋈π B (S) = {(20,2)}

III) π A (R) X π B (S) ={10,20} X {2,3} ={(10,2),(10,3),(20,2),(20,3)} R ∩ π A (R) X π B (S)={(20,2)}

IV) R X S = {(10,1,2,30),(10,1,3,40),(20,2,2,30),(20,2,3,40)} π A, R.B R X S ={(10,2),(10,3),(20,2),(20,3)}

Thus, I,II,III are same.

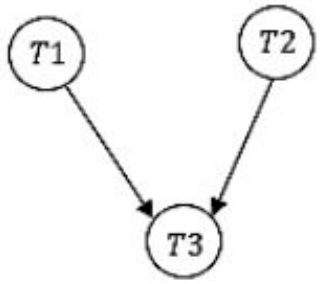
Solution-34

Answer: A

Explanation:

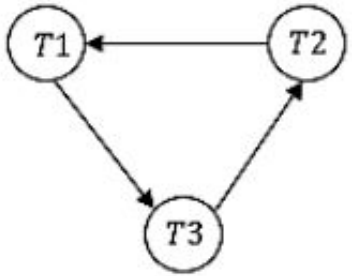
S1:

T1	T2	T3
r(A)		
r(C)		
	r(B)	
	w(B)	
		R(B)
R(A)		
		R(C)
		w(C)
w(A)		



S2:

T1	T2	T3
	$r(A)$	
$r(C)$		
	$r(B)$	
		$r(B)$
	$w(B)$	
$r(A)$		
		$r(C)$
		$w(C)$
$w(A)$		

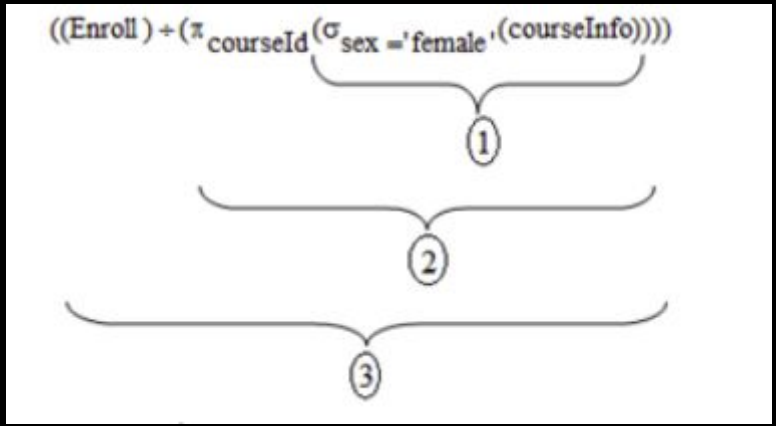


In the above precedence graph cycle is present. Therefore S2 is not conflict serializable

Solution-35

Answer: D

Explanation:



Result of (1) is the relation which contains the courses that are lead by female instructor.

Result of (2) is the relation which contains the courseId's of all courses that are lead by female instructor

Result of (3) is the relation which contains the studId's of all students that have taken all courses lead by female instructor.

Solution-36

Answer: C

Explanation:

a. All the values of C in r1 are also available in X of r2 so πC(r1)-πX(r2)=ϕ is always true.

b. All the values of X in r2 may available in C of r1 so πX(r2)-πC(r1)=ϕ is sometimes true.

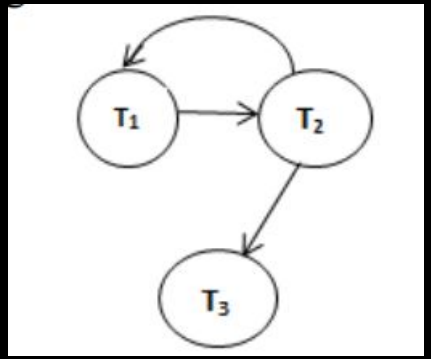
c. All the values of C in r1 are also available in X of r2 so πC(r1)-πX(r2)≠ ϕ is always false.

d. All the values of X in r2 may not be available in C of r1 so πX(r2)-πC(r1)≠ϕ is sometimes true.

Solution-37

Answer: A

Explanation: Precedence graph for the given schedule is:



If W1 (B) is shifted after r1 (B) then the schedule is r2(A), r1(B), w1(B), w2(A), r2(B), r3(A), w3(A), w2(B),then precedence graph becomes

Solution-38

Answer: B

Explanation: Both S1 and S2 are conflict equal but may not conflict serializable schedule. If either of S1 or S2 is serial schedule then S1 and S2 become conflict serializable schedule otherwise not.

Solution-39

Answer B

Explanation: We know that in recoverable, if Ti reads a value written by Tj, then Ti must commit after Tj commits. In S2: w3(y) is first and r2(y) appears second. Hence, C2 should appear after C3.But here C3 is appearing after C2. So, S2 is not recoverable. S1 and S3 are recoverable.

Solution-40

Answer C

As the value of a data is read by transaction who has committed but thereafter the transaction, which changed the value of data got aborted, so it is Irrecoverable schedule.

Solution-41

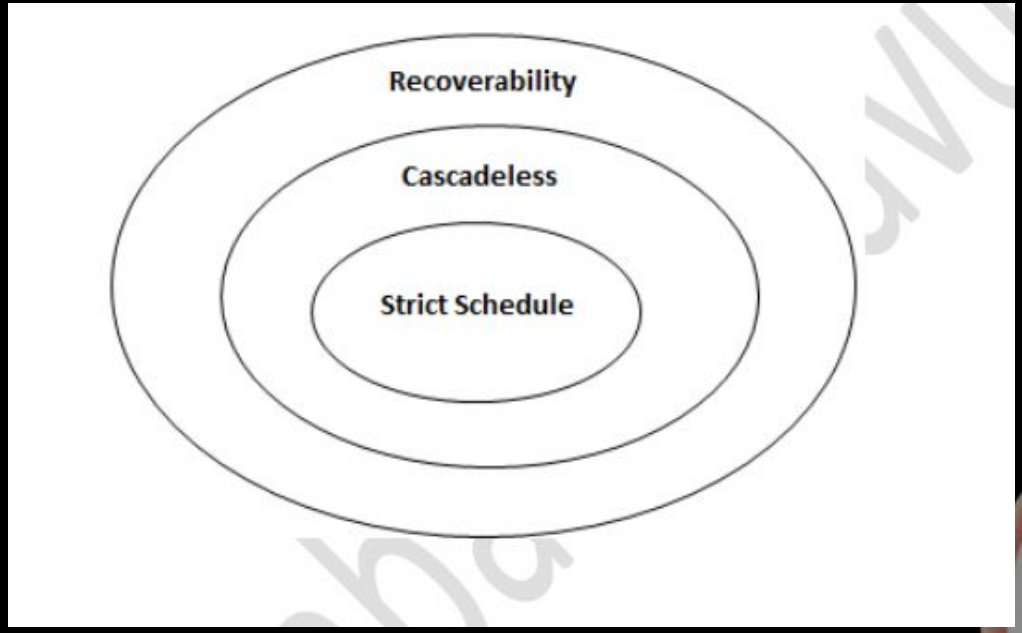
Answer A

Explanation: The required question have requirement of inner join. The INNER JOIN selects all rows from both participating tables as long as there is a match between the columns. Whereas, SQL LEFT JOIN keyword returns all records from the left table and the matched records from the right table. The result is NULL from the right side, if there is no match. The FULL JOIN keyword return all records when there is a match in either left or right table records.

Solution-42

Answer A

Explanation:



Solution-43

Answer D

The given schedule is not serializable, since it is not conflict serializable, not view serializable.

Solution-44

Answer A

Explanation: There are three relations. Select distinct name, select the name of students and then there are three predicates Course.instructor = Verma specify the courses taught by Verma. The other two predicates specify that student can earn a grade A or B or C but not D(fail) from courses so the SQL query compute. Name of students who haven’t got an D grade (passed students) in at least one of the courses taught by Verma.

Solution-45

Answer. C

Inconsistency occurs when we try to delete the data from gate2016 table which is being referred by bid in candidate table. It also occurs when we try to insert a value into bid of candidate table which is not present in the primary key attribute of the table gate2016. So, the answer should be option C.

Solution-46

Answer.C

First query will successfully execute and after execute this statement, attribute Dept_id of Student table with Roll_no=1 becomes „NULL‟ which is foreign key from Department‟s Dept_id. Now, second statement will not execute, because primary key cannot be NULL.

Solution-47

Answer . B

Given every (n-2) attributes will form key. So, total number of candidate keys is nc(n-2). We know that every candidate key is super key. Therefore these keys are also super keys. Since every (n-2) attributes form candidate key every (n-1) attributes will obviously form superkey. Therefore the number of super keys added in addition to the previous one will be 5 nc(n-1). By default all n attributes of the given relation forms candidate key. So, the total number of superkeys is nc(n-2) + nc(n-1) + 1 = nc2+nc1+1.

Solution-48

Answer B

Explanation: Q1: results in department in which average salary of male employee is more than the average salary of all employees.

Solution-49

Answer B

Internal node in B+ contains tree pointer and search key. $(P + 1) * 7 + P * 9 <= 512$

$7P + 7 + 9P <= 512$ $P \leq 31.5$

$16P <= 50$ ^ F

order (P) = 31

Solution-50

Answer D

Explanation: In database transaction system if transaction is commit then it becomes permanent there is no effect of any failure. For that reason, we need not redo log records 2 & 3 as transaction has committed.

Solution-51

Answer C

A	B
1	1
2	3
3	7
4	15
5	31
6	63
7	127

Solution-52

Answer B

A right outer join will return all the rows that an inner join returns plus one row for each of the other rows in the second table that did not have a match in the first table. It is the same as a left outer join with the tables specified in the opposite order

Solution-53

Answer: A

Explanation:

The inner query retrieves the name of the class in which atleast has 100 marks in mathematics.

The outer query will output the name of all students of the classes retrieved by the inner query.

Solution-54

Answer B

Explanation: From the given relations, the following FD's can be inferred:

empcode ->pincode city state name street

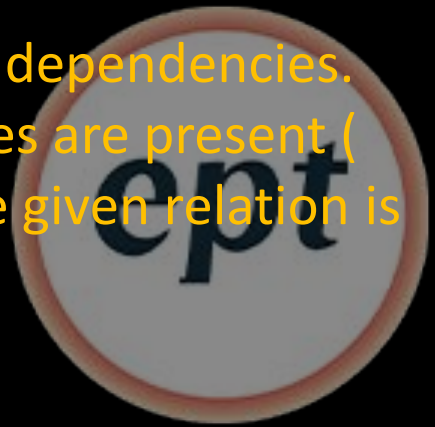
pincode ->city state

city state street ->pincode

Key for relation is thus {empcode}

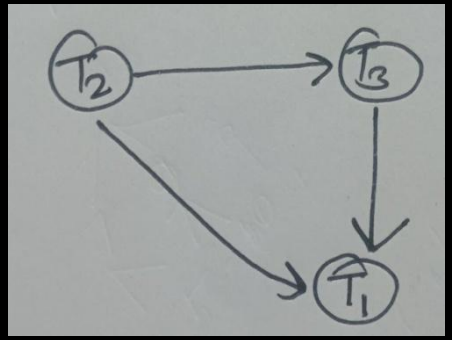
Therefore, Prime attribute= {empcode}

Since there is only one prime attribute, there are no partial dependencies. So, the given relation is in 2 NF. Here transitive dependencies are present ((pincode -> city state), (city state street -> pincode)). So the given relation is not in 3 NF. So the answer is option B



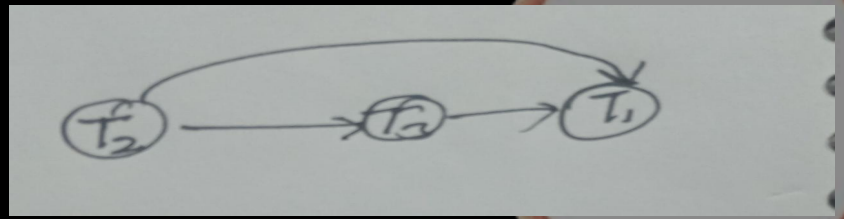
Solution-55

S_1: r1(X) ;r3(Y); r3(X); r2(Y); r2(Z); w3(Y) w2(Z) r1(Z) w1(X); w1(Z)



No cycle S1 is conflict serializable.

S_2:r1(X); r3(Y); r2(Y); r3(X); w2(Z) r1(Z); r 2(Z) w3(Y) w1(X); w1(Z)



No cycle S_2 is conflict serializable.

Solution-56

Answer D

After unlock over A, it locks again on A. Hence it is not in 2PL.

not conflict serializable.

Solution-57

Answer C

Explanation:

- 4 tables are required to represent SUPPLIER, SUPPLT, PROJECT, PART entities.
- Given all relationships are 1:N or N:1. So, no separate table is required to represent SS, SPJ, SP.

Solution-58

Answer: D

Explanation: If 10 different employees from 100 employees in Employee table works with departments in Dept tables then there will be only one match results in 10 tuples (one for each department works)

Solution-59

Answer D

Explanation:

From the given relation the following FD's are hold:

$BC \rightarrow A$

$B \rightarrow C$

(B)+=BCA

So, B is a Candidate key and left side of every FD is a Super key. So, R is in BCNF

Solution-60

Answer D

Canonical cover of a set of FD’s are the minimum no. of FD’s required to cover all the other remaining FD’s. If we apply the method mentioned in video to find minimal cover, In second step after removing redundant FD's the FD's remained will be A->B and B->C, since in LHS of all FD's contains only one attribute , there is no need of applying step 3, so the answer is option D.

Solution-61

Answer D

Explanation: Candidate key= S, T, U, V The answer is option D. Because the original relation R is in BCNF as each attribute is a candidate key. Hence, any decomposition should also be in BCNF

Solution-62

Answer:A

Explanation: 2-phase locking protocol ensures conflict serializability but does not ensure freedom from deadlock. Timestamp-ordering protocol ensures conflict serializability. This is because conflict operations are processed in the order of timestamps of respective timestamps. Timestamp ordering protocols ensure freedom from deadlocks as no transaction ever waits.

Solution-63

Answer B

According to 2PL, if lock conversion is allowed, then upgrading of locks must be done during expansion phase, and degrading of locks must be done in the shrinking phase. .. S2 is true.

Lock upgradation is not allowed in shrinking phase therefore S_{1} is False

Solution-64

Answer B

Explanation:

- S1 is false, since the definition given here is of 2NF.
- S2 is true, since for a relation to be in BCNF it needs to be in 3NF, every relation in BCNF satisfies all the properties of 3NF.

Solution-65

Answer D

Explanation: R1(X), W2(X) [it says T1<T2] and R2(X),W(X)[it says T2<T1]are conflict operations. Hence, options a, b, c are wrong. It can be either serializable with T1 or T2 as at a time we will have only one transaction