ACADEMY OF TECHNOLOGY

2nd Internal Question bank PCC -CS-601

PART- A **1 mark Questions**

1. A relation is in _____ if an attribute of a composite key is dependent on an attribute of other composite key
   (A) 2NF
   (B) 3NF
   (C) BCNF
   (D) 1NF
2. Fifth Normal form is concerned with
   (A) Functional dependency.
   (B) Multivalued dependency.
   (C) Join dependency.
   (D) Domain-key.
3. In 2NF
   (A) No functional dependencies (FDs) exist.
   (B) No multivalued dependencies (MVDs) exist.
   (C) No partial FDs exist.
   (D) No partial MVDs exist.
4. R (A,B,C,D) is a relation. Which of the following does not have a lossless join dependency preserving BCNF decomposition
   (A) A→B, B→CD
   (B) A→B, B→C, C→D
   (C) AB→C, C→AD
   (D) A→BCD

5. A variable in relational calculus is
   (A) bound variable
   (B) free variable
   (C)either free or bound
   (D) neither free nor bound.

6. When all the columns in a table non-transitively depend upon the primary key, the table is said to satisfy the normal form.
   (A) First
   (B) Second
   (C) Third
   (D) Fourth
7. The normal form that is not necessarily dependency preserving is
   (A) 2NF
   (B) 3NF
   (C) BCNF
   (D) 4NF

8. A functional dependency is a relationship between or among
   (A) Entities
   (B)Rows

(C) Attributes
(D) Tables

9. Which functional dependency types is/are not present in the following dependencies?
   Empno ->EName, Salary, Deptno, DName
   DeptNo ->DName
   EmpNo ->DName
   (A) Full functional dependency
   (B) Partial functional dependency
   (C) Transitive functional dependency
   (D) Both B and C
10. The database design prevents some data from being stored due to _____.
   (A) Deletion anomalies
   (B) Insertion anomalies
   (C) Update anomalies
   (D) Selection anomalies
11. A relation is in 2NF if:
   (A) All the values of non-key attributes are dependent fully on the candidate key.
   (B) Any non-key attribute that are dependent on only part of the candidate key should be moved to another relation where the partial key is the actual full key.
   (C) It must be already in the 1NF.
   (D) All of the above.

12. 4NF is designed to cope with :
   (A) Transitive dependency
   (B) Join dependency
   (C) Multi valued dependency
   (D) None of these

13. A BCNF is :
   (A) Loss less join and dependency preserving
   (B) Loss less join but not dependency preserving
   (C) Not loss less join but dependency preserving
   (D) None of these

14. Which forms simplifies and ensures that there are minimal data aggregates and repetitive groups:
   (A) 1NF
   (B) 2NF
   (C) 3NF
   (D) All of the mentioned
15. Collections of operations that form a single logical unit of work are called _____
   (A) Views
   (B) Networks
   (C) Units
   (D) Transactions
16. The “all-or-none” property is commonly referred to as _____
   (A) Isolation
   (B) Durability
   (C) Atomicity
   (D) None of the mentioned

17. Execution of translation in isolation preserves the _____ of a database
    (A) Atomicity
    (B) Consistency
    (C) Durability
    (D) All of the mentioned
18. Which of the following systems is responsible for ensuring isolation?
    (A) Recovery system
    (B) Atomic system
    (C) Concurrency control system
    (D) Compiler system
19. Which of the following is not a transaction state?
    (A) Active
    (B) Partially committed
    (C) Failed
    (D) Compensated
20. The execution sequences in concurrency control are termed as _____
    (A) Serials
    (B) Schedules
    (C) Organizations
    (D) Time tables
21. The set of _____ in a precedence graph consists of all the transactions participating in the schedule
    (A) Vertices
    (B) Edges
    (C) Directions
    (D) None of the mentioned
22. The phenomenon in which one failure leads to a series of transaction rollbacks is called as _____
    (A) Cascading rollback
    (B) Cascade less rollback
    (C) Cascade cause
    (D) None of the mentioned
23. Which of the following are the advantages of transaction concurrency?
    (A) Increased throughput
    (B) Increased utilization
    (C) Reduces average response time
    (D) All of the mentioned
24. If a transaction Ti may never make progress, then the transaction is said to be _____
    (A) Deadlocked
    (B) Starved
    (C) Committed
    (D) Rolled back
25. The two phase locking protocol consists which of the following phases?
    (A) Growing phase
    (B) Shrinking phase
    (C) Both
    (D) None of the mentioned

27. If a transaction may release locks but may not obtain any locks, it is said to be in _____ phase
    (A) Growing phase
    (B) Shrinking phase
    (C) Deadlock phase
    (D) Starved phase
28. Deadlocks can be prevented using
    (A) Preemption and transaction rollbacks
    (B) Wait and die scheme
    (C) Wound-wait scheme
    (D) All of the mentioned
29. The _____ graph describes deadlocks precisely
    (A) Wound wait graph
    (B) Wait die graph
    (C) Wait for graph
    (D) None of the mentioned
30. W-timestamp(Q) denotes?
    (A) The largest timestamp of any transaction that can execute write(Q) successfully
    (B) The largest timestamp of any transaction that can execute read(Q) successfully
    (C) The smallest timestamp of any transaction that can execute write(Q) successfully
    (D) The smallest timestamp of any transaction that can execute read(Q) successfully
31. In timestamp ordering protocol, suppose that the transaction Ti issues read(Q) and TS(Ti)<W-timestamp(Q), then
    (A) Read operation is executed
    (B) Read operation is rejected
    (C) Write operation is executed
    (D) Write operation is rejected
32. If a transaction does not modify the database until it has committed it is said to use a _____ modification technique
    (A) Deferred
    (B) Immediate
    (C) Both
    (D) None of the mentioned
33. What is a view?
    (A) A view is a special stored procedure executed when certain event occurs
    (B) A view is a virtual table which results of executing a pre-compiled query
    (C) A view is a database diagram
    (D) None of the Mentioned
34. You cannot use an ALTER VIEW statement to change the definition of a view but you can replace views in which of the following ways?
    (A) You can drop and recreate the view
    (B)You can redefine the view with a CREATE VIEW statement that contains the OR REPLACE clause
    (C) Both A & B
    (D) None of the above
35. What is the meaning of “HAVING” clause in SQL?
    (A) To filter out the row values
    (B) To filter out the column values
    (C) To filter out the row and column values
    (D) None of the mentioned

36. When the values in one or more attributes being used as a foreign key must exist in another set of one or more attributes in another table, we have created a(n):

(A) Transitive Dependency
(B) Insertion Anomaly
(C) Referential Integrity Constraint
(D) Normal Form

37. The database design prevents some data from being stored due to _____.

(A) Deletion anomalies
(B) Insertion anomalies
(C) Update anomalies
(D)Selection anomalies

38. Which of the following is not Armstrong's Axiom?
(A) Reflexivity rule
(B) Transitivity rule
(C) Pseudotransitivity rule
(D) Augmentation rule

39. A ___is an indirect functional dependency, one in which X->Z only by virtue of X->Y and Y->Z.

(A) Multivalued Dependencies
(B) Join Dependency
(C) Trivial Functional Dependency
(D) Transitive Dependencies

40. Given an attribute x, another attribute y is dependent on it, if for a given x

(A) there are many y values
(B) there is only one value of y
(C) there is one or more y values
(D) there is none or one y value

PART- B **2 marks Questions**

1. You are given followingFDs
   A->B, BC->DE, AEF->G.
   The closure $(AC)^+$ is
   (A) ABC
   (B) ABCDE
   (C) ABCDEFG
   (D) MABCDEF
2. Given R(A,B,C,D,E) with the set of FDs,
   F{AB→CD, ABC → E, C → A}
   One of the candidate key of R is
   (A) ABC
   (B) E
   (C) AC
   (D) AB
3. Suppose we have two transactions T1 and T2 as follows

T1	T2
read(A)	read(A)
A=A-50	A=A- A* 0.1
write(A)	write(A)
read(B)	read(B)
B=B+50	B=B+A*1
write(B)	write(B)

The two schedules<T1 ,T2>&<T2,T1> are
   (A) View equivalent
   (B) Conflict Equivalent
   (C) Both a) and b)
   (D) Cannot determined

4. Given the following relation instance {X, Y, Z}={{1, 4, 2},{1, 5, 3},{1, 6, 3},{3, 2, 2}}
   Which of the following functional dependencies are satisfied by the instance?
   (A) XY → Z and Z→ y
   (B) YZ → X and Y →Z
   (C) YZ → X and X→Z
   (D) XZ → Y and Y →X
5. Consider the schema R = (S T U V) and the dependencies

   S → T, T → U, U → V and V → S

   Let R = (RI and R2) be a decomposition such that R intersect R2 = null.
   The decompositionis

(A) Not in 2NF

(B) In 2NF but not 3NF

(C) In 3NF but not in 2NF

(D) In both 2NF and 3NF

6. When transaction Ti requests a data item currently held by Tj, Ti is allowed to wait only if it has a timestamp smaller than that of Tj (that is, Ti is older than Tj). Otherwise, Ti is rolled back (dies). This is
   (A) Wait-die
   (B) Wait-wound
   (C) Wound-wait
   (D) Wait
7. Consider the following four schedules due to three transactions (indicated by the subscript) using read and write on a data item x, denoted by r(x) and w(x) respectively. Which one of them is conflict serializable?

   I. r1(X) ; r2(X); w1(X); r3(X); w2(X)
   II. r2(X) ; r1(X); w2(X); r3(X); w1(X)
   III. r3(X) ; r2(X); r1(X); w2(X); w1(X)
   IV. r2(X) ; w2(X); r3(X); r1(X); w1(X)
   (A) Only I
   (B) I and II
   (C) Only III
   (D) Only IV

8. Consider the relation *R(A, B, C, D, E)* with the set of function dependencies

F= {AB→C,D→ E,A→ D}

The highest normal form satisfied by R is

(A) 3NF

(B) 1NF

(C) BCNF

(D) 2NF

9. Suppose a transaction T accesses a certain set of objects $\{O_1, O_2, \ldots\ldots O_k\}$ for read or write operations. This is done in the following manner:

Step1: T acquires exclusive locks on all objects in increasing order
Step2: The required operations are performed
Step3: All locks are released
This protocol will
(A) guarantee serializability and deadlock freedom
(B) guarantee neither serializability nor deadlock freedom
(C) guarantee serializability but not deadlock freedom
(D) guarantee deadlock freedom but not serializability

10. Which of the following scenarios may lead to an irrecoverable schedule in database system

(A) A transaction writes a data item after it is read by an uncommitted transaction
(B) A transaction reads a data item after it is read by an uncommitted transaction
(C) A transaction reads a data item after it is written by a committed transaction
(D) A transaction reads a data item after it is written by an uncommitted transaction

11. Consider the following transaction involving two bank accounts X and Y.
read(X); X:=X-50; write(X); read(Y); Y:=Y+50; write(Y)
The constraint that the sum of the accounts X and Y should remain constant is
(A) Atomicity
(B) Consistency
(C) Isolation
(D) Durability

12. Consider the following relation
Professor (Pfcode, dept, head, time)
It is assumed that,
i) A professor can work in more than one dept.
ii) The time he spends in every dept. is given
iii) Every dept. has only one head
The highest normal form satisfied in the above relation is
(A) 1NF
(B) 2NF
(C) 3NF
(D) BCNF

13. Consider the following relational schemes for a library database:
Book (Title, Author, Catalog_no, Publisher, Year, Price)
Collection (Title, Author, Catalog_no)
with in the following functional dependencies:

I. Title Author -->Catalog_no
II. Catalog_no --> Title, Author, Publisher, Year
III. Publisher Title Year --> Price
Assume {Author, Title} is the key for both schemes. Which of the following statements is true?
(A) Both Book and Collection are in BCNF
(B) Both Book and Collection are in 3NF only
(C) Book is in 2NF and Collection is in 3NF
(D) Both Book and Collection are in 2NF only

14. Given the following two statements:

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

S2: AB->C, D->E, E->C is a minimal cover for the set of functional dependencies AB->C, D->E, AB->E,E -> C.
Which one of the following is CORRECT?

(A) S1 is TRUE and S2 is FALSE.
(B) Both S1 and S2 are TRUE.
(C) S1 is FALSE and S2 is TRUE.
(D) Both S1 and S2 are FALSE.

15. Consider a relation scheme R = (A, B, C, D, E, H) on which the following functional dependencies hold: {A–>B, BC–>D, E–>C, D–>A}. What are the candidate keys of R?
(A) AE, BE
(B) AE, BE, DE
(C) AEH, BEH, BCH
(D) AEH, BEH, DEH

16. Consider a schema R(A,B,C,D) and functional dependencies A->B and C->D.

Then the decomposition of R into R1(AB) and R2(CD) is
(A) dependency preserving and lossless join
(B) lossless join but not dependency preserving
(C) dependency preserving but not lossless join
(D) not dependency preserving and not lossless join

17. Which of the following statements is TRUE?
D1 : The decomposition of the schema R(A, B, C) into R1(A, B) and R2 (A, C) is always lossless.
D2 : The decomposition of the schema R(A, B, C, D, E) having AD → B, C → DE, B → AE and AE → C, into R1 (A, B, D) and R2 (A, C, D, E) is lossless.
(A) Both D1 and D2
(B) Neither D1 nor D2
(C) Only D1
(D) Only D2

18. Consider the following transactions with data items P and Q initialized to zero:

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 a precedence graph cannot be drawn

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

T1	T2	T3	T4

	Read(X)		
		Write(X) Commit	
Write(X) Commit			
	Write(Y) Read(Z) Commit		
			Read(X) Read(Y) Commit

Which one of the following statements is CORRECT?

(A) S is conflict-serializable but not recoverable
(B) S is not conflict-serializable but is recoverable
(C) S is both conflict-serializable and recoverable
(D) S is neither conflict-serializable nor is it recoverable

20. Let us assume that transaction T1 has arrived before transaction T2. Consider the schedule

S=r1(A); r2(B) ; w2(A); w1(B)
Which of the following is true?
(A) Allowed under basic timestamp protocol.
(B) Not allowed under basic timestamp protocols because T1 is rolled back
(C) Not allowed under basic timestamp protocols because T2 is rolled back
(D) None of these

21. Evaluate the SQL statement:
SELECT a.emp_name, a.sal, a.dept_id, b.maxsal FROM employees a,
(SELECT dept_id, MAX(sal) maxsal FROM employees GROUP BY dept_id) b
WHERE a.dept_id = b.dept_id AND a.sal<b.maxsal;
Which of the following statement is correct?

(A) The statement gives an error at line 1.
(B) The statement gives an error at line 6.
(C) The statement produces the employee name, salary, department ID, and maximum salary earned in the employee department for all departments that pay less salary than the maximum salary paid in the company.
(D) The statement produces the employee name, salary, department ID, and maximum salary earned in the employee department for all employees who earn less than the maximum salary in their department.

22. DBMS must implement management controls to (i) control access rights to users (ii) implement audit trail when changes are made (iii) allow data to be used extensively in the organization (iv) duplicate databases

(A) i, ii
(B) ii, iii
(C) iii, iv
(D) i, iv

23. A relation is said to be in 3 NF if
(i) it is in 2 NF
(ii) non-key attributes are independent of one another
(iii) key attribute is not dependent on part of a composite key
(iv) has no multi-valued dependency

(A) i and iii
(B) i and iv
(C) i and ii
(D) ii and iv

24. Given the following relation:
vendor order (<u>vendor no</u>, <u>order no</u>, vendor name, qty supplied, price/unit)
it is not in 2 NF because

(A) it is not in 1 NF
(B) it has a composite key
(C) non-key attribute vendor name is dependent on vendor no. which is one part of the composite key
(D) Qty supplied and price/unit are dependent

25.

The following relation is not normalized because

Roll no	*Name*	*Courses taken*		
		Course No	*Dept*	*Sem*
4568	A.B Moni	CS 101	C.S.	1
		EE 545	E.E.	2
		Phy 325	Physics	1
4894	R. Chamnlal	Phy 101	Physics	1
		Chem202	Chemistry	2
		Math 103	Math.	1
		CS 101	C.S.	1
4954	R. Gupta	CS 101	C.S.	1

(A) It is difficult to store due to non–uniform size of the attributes
(B) Roll no. 4568 have 3 course line whereas Roll no. 4954 has only one course line
(C) The composite attribute (CS 101, C.S., 1) is repeated
(D) Some item lines have composite attributes

26. **Consider the following relation:**

A	B	C
10	b1	c1
10	b2	c2
11	b2	c2
12	b3	c4
13	b1	c1
14	b3	c4

The following dependencies hold in the above relation

(A) A → B
(B) B →C
(C) C → B
(D) B → A

27. **Given a database schema T(s#, city, status, p#, qty) and with FDs:**

s# → city
city → status
s# → status
{ s# , p# } → qty

After reducing it in BCNF, the relations are:

(A) R1(s#,p#,qty) R2(s#,city,status)
(B) R1(s#,p#,qty) R2(s#,city) R3(city,status)
(C) R1(s#,p#) R2(s#,city,status,qty)
(D) Can not reduced to BCNF

28. **Consider the following database:**

employee(*employee-name*, *street*, *city*)
works(*employee-name*, *company-name*, *salary*)
company(*company-name*, *city*)
manages(*employee-name*, *manager-name*)

The sql query to find the names of all employees in the database who earn more than every employee of 'Small Bank Corporation'

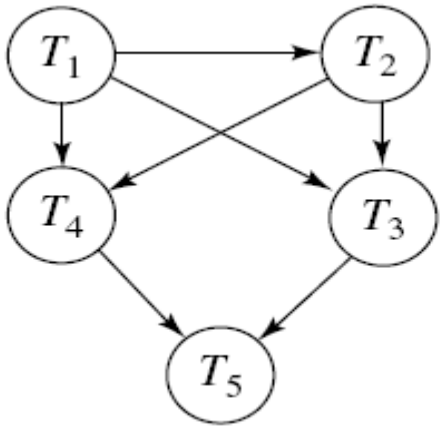
(A) select employee-name from works where salary > all (select salary from works where company-name = 'Small Bank Corporation')
(B) select employee-name from works where salary > any (select salary from works where company-name = 'Small Bank Corporation')
(C) select * from works where salary > all (select salary from works where company-name = 'Small Bank Corporation')
(D) select employee-name from works where salary > (select salary from works where company-name = 'Small Bank Corporation')

29. **Consider the following database:**
employee(*employee-name*, *street*, *city*)
works(*employee-name*, *company-name*, *salary*)
company(*company-name*, *city*)
manages(*employee-name*, *manager-name*)

The sql query to find the name of the company that has the smallest payroll is

(A) select company-name from works where salary=(select min(salary) from works)
(B) select company-name from works group by company-name having sum(salary) <= all (select sum(salary) from works group by company-name)
(C) select company-name from works group by company-name having sum(salary) <= all (select max(salary) from works group by company-name)
(D) select company-name from works group by company-name having sum(salary) <= all (select min(salary) from works group by company-name)

30. **Consider the following precedence graph. Which of the following is the corresponding conflict serializable schedule?**



(A) T1 -> T4 ->T3 ->T2 ->T5
(B) T1 -> T2 ->T3 ->T4 ->T5
(C) T1 -> T2 ->T3 ->T5 ->T4
(D) T1 -> T4 ->T5 ->T2 ->T3

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