National University of Computer and Emerging Sciences, Lahore

Database Systems

Spring 2014

Total Time Allowed: *30 minutess* Max Points: *20*

Final Exam - Part 1

Section: _____ Name: _____ Roll No: _____

Question 1 *(20 points)*

ENCIRCLE THE BEST OPTION FOR EACH OF THE FOLLOWING:

Consider the relation S (*A, B,C*) with a set of fd's {A → C } for the next three questions.

1. What is the key of this S relation?
- **a.** A
- **b.** B
- **c.** C
- **d.** AB
- **e.** AC

2. What is the highest normal form of this S relation?
- **a.** 1NF
- **b.** 2NF
- **c.** 3NF
- **d.** BCNF
- **e.** DKNF

3. Which of the following decomposition of the S relation are in BCNF?
- **a.** S1(A, C), S2(B, C)
- **b.** S1(A, B), S2(B, C)
- **c.** S1(A, C), S2(A, B)
- **d.** S1(A, C), S2(B)
- **e.** S1(A, B, C), S2(A, C)

4. Which of the following is a minimal cover for the set of fd's *T* = {*AB→C, C→D, AB→D* }.
- **a.** {*AB→C, C→D, AB→D* }
- **b.** {*AB→C, C→D* }
- **c.** {*AB→D, C→D* }
- **d.** {*A→C, C→D* }
- **e.** {*B→C, C→D* }

5. Consider the relation R (*A, B, C, D, E*), with a set of fd's {AB → C, C → D, D → B, D → E }. What is the closure of $\{AC\}^+$.
- **a.** {*A, B, C, D* }
- **b.** {*A, C, D, E* }
- **c.** {*A, C, D* }
- **d.** {*A, B, D, E* }
- **e.** {*A, B, C, D, E* }

6. Which of the following guarantees that the spurious tuple generation problem does not occur with respect to the relation schemas crated after decomposition?
- **a.** natural join operation
- **b.** dependency preservation property
- **c.** lossless join property
- **d.** theta join operation
- **e.** None of the above

7. Purpose of normalization process is to minimize
- **a.** data redundancy
- **b.** insertion anomalies
- **c.** deletion anomalies
- **d.** update anomalies
- **e.** all of the above

8. Which of the following is the process of storing the join of higher normal form relations as a base relation, which is in a lower normal form?
- **a.** normalization
- **b.** denormalization
- **c.** BCNF
- **d.** top down
- **e.** none of the above

9. Which of the following update operations may cause a violation of the key constraint?
- a. A deletion of one tuple from the relation
- b. An insertion of one tuple into the relation
- c. An update of one tuple in the relation
- d. Both (b) and (c)
- e. Both (a) and (b)

10. Consider the following relation R and the query given below:

R

X	Y	Z
A	45	NULL
B	NULL	90
C	100	80

```
SELECT X
FROM R
WHERE (Y>Z AND Z>75 AND Y>90) OR (Y <50)
```

Which tuples are returned when we execute above query?

- a. A
- b. B

c. B and C
d. A and C
e. A, B, and C

11. Consider the relation R given in the last question and the query: SELECT COUNT(Y) from R

What does the above query returns?
a. 145
b. NULL
c. 3
d. 2
e. none of the above

12. A relation S(a,b) may have duplicate tuples. Which of the following queries has a result that is guaranteed not to have duplicates, regardless of what tuples S contains?

I) SELECT a FROM S WHERE a = 1
II) SELECT MAX(b) FROM S GROUP BY a
III) SELECT a, b FROM S GROUP BY a, b
IV) SELECT a FROM S WHERE a NOT IN (SELECT a FROM S)

a. III and IV
b. I and II
c. III only
d. I and III
e. I, II and III

13. Consider the schedule S of three transactions T1, T2 and T3.

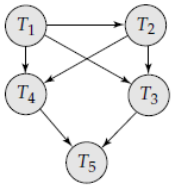
T1	T2	T3
read(A)		
read(B)		
write(A)		
commit		
	read(A)	
	write(A)	
		read(A)
	abort	
		commit

Which of the following is true?
a. schedule S is recoverable
b. schedule S is non-recoverable
c. schedule S is recoverable and cascadeless
d. schedule S is strict
e. none of the above

14. Schedule S suffers from which of the following problems?
a. lost update
b. phantoms
c. dirty read
d. all of the above
e. none of the above

15. How many serial schedules exist for the three transactions T1, T2 and T3.
a. 1
b. 3
c. 4
d. 6
e. 9

16. Consider the precedence graph G given below



Which of the following is true?

a. G is conflict serializable
b. G is not conflict serializable
c. G is not a valid precedence graph
d. Both b and c
e. None of the above

17. Transactions should possess several properties, often called the **ACID** properties. Which of the following are ACID properties?
a. Atomicity, Consistency, Independence, Durability
b. Atomicity, Consistency, Isolation, Durability
c. Atomicity, Control, Isolation, Durability
d. All of the above
e. None of the above

18. An entity set that does not have sufficient attributes to form a primary key is termed a _____
a. Strong entity set
b. Variant set
c. Weak entity set
d. Weak relationship set
e. none of the above

19. A pilot can fly three types of planes and a plane can be piloted by any qualified pilot. The pilot-plane type relationship is
a. N:3
b. 3:N
c. 1:3
d. 3:1
e. none of the above

20. Union subclass will contain
a. all attributes of the super classes
b. union of all attributes of the super classes
c. intersected attributes of the super classes
d. attributes of one class at a time