北京交通大学　　软件学院 2010 级

《Database System》Final Exam(A) （2012-06-13）

姓名____＿_____学号____＿_____班级___＿_____教师____＿_____

题号	I	II	III	IV	V	VI	总分
得分							

I. Single Choice (15 points)

1. Database design typically consists of which of the following phases?

   I.   Conceptual design   II. Logical design   III. Physical design

  (a) I, II, and III   (b) I and II only   (c) I only   (d) I only

2. Which of the following is true about updateability of views?

  (a) A view is updateable under all circumstances.

  (b) A view is not updateable under any circumstance.

  (c) A view is not updateable if it involves one table and contains a key.

  (d) A view is not updateable if it involves aggregate functions and nested queries.

3. The SQL keyword _____ makes the modifications of the transaction permanent, while the SQL keyword _____ discards the modifications of the transaction.

     (a) WRITE, ABORT   (b) COMMIT, ROLLBACK

     (c) SAVE, CANCEL   (d) UPDATE, SELECT

4. Which of the following commands can be used to remove access privileges associated with a table?

  (a) REVOKE   (b) DENY   (c) RETRACT   (d) REMOVE

5. An exclusive lock on a data item represents permission to perform which of the operations, read and write, on the data item?

  (a) Both read and write   (b) Write only

  (c) Neither read nor write   (d) Read only

6. When removing a table from the schema, using the CASCADE option would

  (a) recursively remove the table and all other tables that the removed table refers to

  (b) remove the table and all references to it

(c) remove the table and all other tables that the specified table refers to.

(d) remove the table if there are no references to it

7. Which of the following SQL commands can be used to change, add, or drop column definitions from a table?

    (a) MODIFY TABLE   (b) CHANGE TABLE

    (c) ALTER TABLE   (d) UPDATE TABLE

8. The undo action undoes the effects of a(n) _____ transaction, and the redo action redoes the effects of a(n) _____ transaction.

    (a) aborted, aborted   (b) aborted, committed

    (c) committed, aborted   (d) committed, committed

9. Indexing a database table is likely to _____ performance of _____ operation on the table.

    (a) improve, update   (b) impair, insert

    (c) improve, delete   (d) impair, select

10. In SQL, a semantic integrity constraint that involves specifying an action that is executed whenever a specified condition becomes true is known as a(n)

    (a) event   (b) check   (c) assertion   (d) trigger

11. Which SQL keyword is used to eliminate duplicate rows in the results of a SQL SELECT query?

    (a) DISTINCT   (b) UNIQUE   (c) REDUCE   (d) SORT   (e) ORDER BY

12. Which of the following is true about stored procedures?

    (a) Stored procedures are stored as an embedded function in the application program

    (b) Stored procedures are invoked automatically by the DBMS when specific events occur

    (c) Stored procedures cannot be passed parameters like a regular application function

    (d) Stored procedures are written in languages provided by the DBMS

    (e) All of the above are true about stored procedures

13. Which feature is NOT one of limitations of file-based approach ?

    (a) Separation and isolation of data   (b) Duplication of data

    (c) Data dependence   (d) Data independence

14. If foreign key exists in a relation, either foreign key value must match a candidate key value of some tuple in its home relation or foreign key value must be wholly null. The property is called _____

    (a)   Entity Integrity   (b) Referential Integrity

(c) Enterprise Constraints   (d) User-defined Integrity

15. Among four isolation levels Only _____level   can guarantee all ACID properties of transaction.

   (a) Serializable   (b) Repeatable read

   (c) Read committed   (d) Read uncommitted

Please write your answer in this table, otherwise invalid.

No.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Answer								
No.	(9)	(10)	(11)	(12)	(13	(14)	(15)	
Answer								

II. Fill in blanks   (10 points,   2points/blank)

1. Database Recovery is the process of restoring database to a __(1)__ state in the event of a failure.

2. Checkpoint facility enables updates to database in progress to be made __(2)__.

3. "write- ahead logging rule" means writing __(3)__ on hard disks before writing __(4)__ on hard disks.

4. A subclass has all the __(5)__ of its superclass, and possibly more.

Please write your answer in this table, otherwise invalid.

No.	(1)	(2)	(3)	(4)	(5)
answer					

III.（25points）There are 4 relation schemas as follows. Please answer the following questions based on the database below.

S (sno, sname, sex, age, classno)

    <PK>=sno , the student ID

    < FK > = classno , the class number of a student , not null

Class(classno ,studentnumber)   < PK > =classno

    studentnumber is the number of students in the class

C (cno, cname, credit) $< PK >$ = cno

SC(sno, cno, grade)

   $< PK >$ =(sno,cno), $< FK >$ =sno, $< FK >$ = cno

1. (5points) Design a trigger that can update the corresponding value of studentnumber in table *Class* after deleting a certain student from table *S* .
   answer：

2. (5points) Insert male student's ID and average score intoTable S_G(sno,avg_g), where the average score of course is over 80.
   answer：

3. (5points) List ID and name of the student whose scores of all his or her chosen courses are over 90.
   Answer：

4. (5points) $\pi_{Cno}(C) - \pi_{Cno}(\delta_{Sname='WANG'} \wedge {}_{S.Sno=SC.Sno}(S \times SC))$

Please write the equivalent SQL statement of the above relational algebra expression to implement the same function.
   Answer:

5. (5points) Increase the grade of Database course of female students by 5%.
   Answer:

IV. （**15 points**）**Specify all candidate keys of each relation and the highest normal formal to which the following relation belongs to. Please write your reasons, and decompose it to BCNF if it is not in BCNF.**

1. Table1 (A, B, C) is known and its set of functional dependencies is as follows.   F={ A →B,   B →C}
   Solution:

2. Table2 **(A,B,C,D)** is known and its set of functional dependencies is as follows. **F={(A,B) →C,   B →D,   D→ B }**
   Solution:

V. **(15points) Please answer the following questions briefly.**

1. **(5 points**)Tell the objective of serializability and how to judge which schedule is serializable.

2. **(10 points)** Please draw the diagram of ANSI-SPARC Three-Level Architecture and tell the reason why it can guarantee two levels of data independence.

VI. (20 points) Dreamhome company consists of many branches in different cities. Every branch has its address, telephone number, postcode and many staffs. A staff only belongs to one branch. An owner can approach only one branch with a view to marketing his or her property for rent, she or he should fill in two forms. One includes the property information: address, city, postcode, type, rent, number of rooms, staff responsible. Another includes the owner's name, address, telephone number, owner number. An owner can own many properties and a property can be owned by only one owner.

A client can go to only one branch in order to inquiry about the properties, and should fill in a form which includes the client's first name, last name, address, telephone number, preferred property type, Maximum monthly rent. A staff could be responsible for many clients to show them a property, and a client can be served by only one staff. A client can view many properties and a property can be viewed by many clients. After viewing a property, a form should be filled in which includes the client number, staff number, the property number, viewing date and client's comments about the property.

When a client agrees to rent a property, she or he should sign the lease agreements associated with properties for rent, which includes LeaseNo, ownerNo, clientNo, propertyNo, staffNo, Payment, rent, start date and end date.

Please draw the ER-diagram for the application, **leaving the attributes out of the diagram**, and write the set of relation schemas. Then point out the primary key of each relation schema and foreign keys if it has.

SOLUTION：