四川大学期末考试试题（闭卷）

（2016~2017 学年第 2 学期）

课程号：**311038040** 课程名称：**数据库系统（B 卷）** 任课教师：**张天庆、龚勋、屈立笳**

适用专业年级：**软件工程 2015 级** 学号：_____ 姓名：_____

考试须知

四川大学学生参加由学校组织或由学校承办的各级各类考试，必须严格执行《四川大学考试工作管理办法》和《四川大学考场规则》。有考试违纪作弊行为的，一律按照《四川大学学生考试违纪作弊处罚条例》进行处理。

四川大学各级各类考试的监考人员，必须严格执行《四川大学考试工作管理办法》、《四川大学考场规则》和《四川大学监考人员职责》。有违反学校有关规定的，严格按照《四川大学教学事故认定及处理办法》进行处理。

题　　号	1	2	3	4	5				卷面成绩
得　　分									
阅卷时间									

注意事项：1. 请务必将本人所在学院、姓名、学号、任课教师姓名等信息准确填写在试题纸、答题纸和添卷纸上；

2. **请将答案全部填写在答题纸上；**

3. 考试结束，请将试题纸、答题纸、添卷纸和草稿纸一并交给监考老师。

评阅教师	本题得分

(1)	(2)	(3)	(4)	(5)

1. Multiple Choices. (Total marks: 10)

(1) Please select the right option/options. (　　)

A. Every cell is an atomic (single) value.

B. An attribute values are from the same domain.

C. The order of attributes has no significance.

D. Two tuples of a relation can have the same values.

(2) Please select the right option/options. (　　)

A. A view is a dynamic result of one or more relational operations operating.

B. Contents of a view are defined as a query on one or more base relations.
C. A view can simplify complex operations on base relations.
D.A view can hide parts of database from certain users.

(3) In a relation, no attribute of a primary key can be null. Which of the following option/options is/are related to the above statement? (　　)
A. Entity Integrity　　B. Referential Integrity　　C. Enterprise constraints　　D. Super key

(4) (　　) is used to specify the database schema.
A. data definition function　　B. data manipulation function　　C. data maintenance function　　D. data control function

(5) In the SQL statement of the SELECT language, which clause (　　) is the implementation of the projection operation?
A. SELECT　　B. FROM　　C. WHERE　　D. GROUP, BY

评阅教师	本题得分

2. Relational Algebra.　(Total marks: 20)

There is a SPJ database that includes four relational modes: S, P, J, and SPJ:

S (SNO, SNAME, STATUS, CITY)

P (PNO, PNAME, COLOR, WEIGHT)

J (JNO, JNANE, CITY)

SPJ (SNO, PNO, JNO, QTY)

The primary keys are underlined.

Table S: the supplier table

supplier code (SNO), supplier name (SNAME), supplier status (STATUS), city (CITY)

Table P: the part table

part code (PNO), part name (PNAME), part color (COLOR), part weight (WEIGHT)

Table J: the project table

project code (JNO), project name (JNAME), city (CITY)

Table SPJ: the supplying table

supplier code (SNO), parts code (PNO), project code (JNO), the number of the supplied parts (QTY)

Give an expression in the relational algebra to express each of the following queries:

1) Find the SNO of the supplier who supplies parts to the engineering J1. **(Marks: 5)**

2) Find the SNO of the supplier who supplies parts P1 to the engineering J1. **(Marks: 5)**

3) Find the codes (JNO) of the projects which don't use the red parts produced by the suppliers in Tianjin. **(Marks: 5)**

4) Find the codes (JNO) of the projects which use all the parts supplied by the supplier S1. **(Marks: 5)**

评阅教师	本题得分

3. SQL statements. (Total marks: 45)

（1）There is an Engineering Management database, including three tables in the database: (Marks: 20)

Employee (employeeNo char (6), name, sex, nationality, salary, ID number)

Project (projectNo char (6), projectName)

Participation (ID, employeeNo, projectNo, days)

Using SQL language to achieve the following functions of the SQL statement code:

1) Create a database, called project management, and other parameters can be designated by yourself. **(Marks: 3)**

2) Create the above three tables. **(Marks: 5)**

Require the use of the following constraints:

- **The primary key** is shown in the above three table.
- **The foreign key**:

  Participation table: employeeNo, projectNo
- **The default value**:

  nationality: Han
- The ID number of an Employee is **unique**.
- The name of an employee is **not null**.
- The sex of an employee：**male or female**.
- The "days" of the Participation table is **between 0 and 200**.

3) Insert, modify, and delete record operations: **(Marks: 12)**

① Insert into Project table:

projectNo	projectName
100001	Road (A section)
100003	Paving (B section)

② Change the name of the projectNo 100003 into "pedestal piling".

③ Delete the project information of projectNo 100003.

（2）There is a Teaching database in which three tables are included: (Marks: 25)

Students (studentNo, name, sex, age, Department)

Courses (courseNo, courseName, Prerequisite-courseNo, credit)

Course choice (studentNo, courseNo, grade)

Write SQL statements based on the tables above:

1) Find all names of departments. **(Marks: 3)**
2) Calculate the total number of departments. **(Marks: 3)**
3) Calculate the number of courses which are chosen by each student respectively. **(Marks: 4)**
4) Find all the students who have taken **at least two courses**. **(Marks: 5)**
5) Find **the courseNo of the common courses** chosen by the student whose studentNo is "@s1" and the student whose studentNo is "@s2". **(Marks: 5)**
6) Find all the courses taken by 2 to 4 students. **(Marks: 5)**

评阅教师	本题得分

4. Database Design　　(Total marks: 25)

Consider the management system below.

Each research institute has attributes: ID, name and address.

Each researcher has attributes: staff ID, name, sex, age, position.

Each research project has attributes: project ID, project name, funding.

The agreement:

- The ID of research institute, the staff ID and the project ID are unique respectively.
- Each research institute has many researchers.
- Each researcher is belongs to only one research institute.
- Each research institute has a number of research projects.
- Each project has more than one researcher.
- Each researcher can participate in a variety of research projects.
- Scientific research personnel participate in the project to calculate the workload.

1) Design the **E-R diagram** of the system.　　**(Marks: 10)**

Note: mapping **cardinality** of each relationship and **participation** of each entity to the relationship should be described in the diagram.

2) Transform the E-R diagram into **relational schema**.　　**(Marks: 10)**

3) Give **the relational keys (primary keys, foreign keys)** of each relational schema, **using directed arcs**. **(Marks: 5)**

注： 试题字迹务必清晰，书写工整。

教务处试题编号：311-34