- **(10pt) Consider the database shown in Figure 1.2, write appropriate SQL DDL statements to create the database shown in Figure 1.2 in your MySQL account.**

```
CREATE TABLE STUDENT (
    Name VARCHAR(20) NOT NULL,
    Student_number INT NOT NULL,
    Class INT NOT NULL,
    Major VARCHAR(10) NOT NULL,
    PRIMARY KEY(Student_number)
);

CREATE TABLE COURSE (
    Course_name VARCHAR(60) NOT NULL,
    Course_number VARCHAR(10) NOT NULL,
    Credit_hour INT(3) NOT NULL,
    Department VARCHAR(10) NOT NULL,
    PRIMARY KEY(Course_number)
);

CREATE TABLE SECTION (
    Section_identifier INTEGER NOT NULL,
    Course_number VARCHAR(10) NOT NULL,
    Semester VARCHAR(10) NOT NULL,
    Year INT(2) NOT NULL,
    Instructor VARCHAR(15) NOT NULL,
    PRIMARY KEY(Section_identifier),
    FOREIGN KEY(Course_number) REFERENCES COURSE(Course_number)
);

CREATE TABLE GRADE_REPORT (
    Student_number INT NOT NULL,
    Section_identifier INT NOT NULL,
    Grade CHAR(1) NOT NULL,
    PRIMARY KEY(Student_number, Section_identifier),
    FOREIGN KEY(Student_number) REFERENCES
    STUDENT(Student_number),
    FOREIGN KEY(Section_identifier) REFERENCES
    STUDENT(Section_identifier)
);
```

```
CREATE TABLE PREREQUISITE (
    Course_number VARCHAR(10) NOT NULL,
    Prerequisite_number VARCHAR(10) NOT NULL,
    PRIMARY KEY(Course_number, Prerequisite_number),
    FOREIGN KEY(Course_number) REFERENCES COURSE(Course_number),
    FOREIGN KEY(Prerequisite_number) REFERENCES
    COURSE(Course_number)
);
```

- **(15pt) Consider the database shown in Figure 5.6, whose schema is shown in Figure 5.7. Write appropriate SQL DDL statements to create the database shown in Figure 5.6 in your MySQL account.**

```
CREATE TABLE EMPLOYEE (
    Fname VARCHAR(15) NOT NULL,
    Minit CHAR,
    Lname VARCHAR(15) NOT NULL,
    Ssn CHAR(9) NOT NULL,
    Bdate DATE,
    Address VARCHAR(50),
    Sex CHAR,
    Salary DECIMAL(10,2),
    Super_ssn CHAR(9),
    Dno INT NOT NULL,
    PRIMARY KEY(Ssn),
    FOREIGN KEY(Super_ssn) REFERENCES EMPLOYEE(Ssn),
    FOREIGN KEY(Dno) REFERENCES DEPARTMENT(Dnumber)
);

CREATE TABLE DEPARTMENT (
    Dname VARCHAR(15) NOT NULL,
    Dnumber INT NOT NULL,
    Mgr_ssn CHAR(9) NOT NULL,
    Mgr_start_date DATE,
    PRIMARY KEY(Dnumber),
    UNIQUE(Dname),
    FOREIGN KEY(Mgr_ssn) REFERENCES EMPLOYEE(Ssn)
);
```

```
CREATE TABLE DEPT_LOCATIONS (
        Dnumber INT NOT NULL,
        Dlocation VARCHAR(15) NOT NULL,
        PRIMARY KEY(Dnumber, Dlocation),
        FOREIGN KEY(Dnumber) REFERENCES EMPLOYEE(Ssn)
);

CREATE TABLE PROJECT (
        Pname VARCHAR(15) NOT NULL,
        Pnumber INT NOT NULL,
        Plocation VARCHAR(15),
        Dnum INT NOT NULL,
        PRIMARY KEY(Pnumber),
        UNIQUE(Pname),
        FOREIGN KEY(Dnum) REFERENCES DEPARTMENT(Dnumber)
);

CREATE TABLE WORKS_ON (
        Essn CHAR(9) NOT NULL,
        Pno INT NOT NULL,
        Hours DECIMAL(3,1),
        PRIMARY KEY(Essn, Pno),
        FOREIGN KEY(Essn) REFERENCES EMPLOYEE(Ssn),
        FOREIGN KEY(Pno) REFERENCES PROJECT(Pnumber)
);

CREATE TABLE DEPENDENT (
        Essn CHAR(9) NOT NULL,
        Dependent_name VARCHAR(15) NOT NULL,
        Sex CHAR,
        Bdate DATE,
        Relationship VARCHAR(8),
        PRIMARY KEY(Essn, Dependent_name),
        FOREIGN KEY(Essn) REFERENCES EMPLOYEE(Ssn)
);
```

- **(15pt) Exercise 6.10.**

a.

```
SELECT Fname, Minit, Lname, Pname
FROM employee E, works_on W, project P
WHERE E.Salary>3000
      AND E.Dno=5
      AND E.Ssn=W.Essn
      AND W.Pno=P.Pnumber
      AND P.Pname='ProjectZ'
```

b.

```
SELECT Fname, Minit, Lname
FROM employee E
WHERE E.Super_ssn='333445555'
      AND E.Address LIKE '%Houston, TX'
```

c.

```
SELECT Fname, Minit, Lname
FROM employee E, works_on W, project P
WHERE E.Ssn=W.Essn
      AND W.Pno=P.Pnumber
      AND P.Pname='Computerization'
```

- **(15pt) Exercise 6.11 (specify the updates of Exercise 5.11 using the SQL update commands).**

a.

```
INSERT INTO employee VALUES ('Sophia', 'M', 'Wood', '973442298', '1974-05-21', '23
S Lamar Blvd. Rd, Austin, TX', 'F', 62000, '222445555', 5)
```

b.

```
INSERT INTO project VALUES ('6Sigma', 4, 'Austin', 4)
```

c.

```
INSERT INTO department VALUES ('Information Technology', 2, '987987987', '2007-
10-01')
```

d.

```
INSERT INTO works_on VALUES ('777624972', 15, '40.0')
```

e.

```
INSERT INTO dependent VALUES ('888665555', 'John', 'M', NULL, 'Son')
```

f.

```
DELETE FROM dependent WHERE Essn = '987654321'
```

g.

```
DELETE FROM department WHERE Dnumber = 5
```

h.

```
DELETE FROM works_on WHERE Pno = 30
```

i.

```
UPDATE project
SET Plocation='Houston', Dnum = 1
WHERE Dnum = 5
```

j.

```
UPDATE employee
SET Super_ssn = NULL
WHERE Ssn = '888665555'
```

k.

```
UPDATE project
SET Pnumber = 40
WHERE Pnumber = 30
```

- **(15pt) Exercise 6.12.**

a.

```
SELECT Course_name
FROM course
WHERE Department='CS'
```

b.

```
SELECT Course_name, Instructor
FROM section, course
WHERE Year='08'
AND SEMESTER='Fall'
AND course.Course_number=section.Course_number
```

c.

```
SELECT course.Course_number, semester, year, Student_number
FROM grade_report, course, section
WHERE section.instructor = 'Anderson'
AND grade_report.Section_identifier=section.Section_identifier
```

d.

```
SELECT student.Name, course.course_name, course.course_number,
course.Credit_hours, section.Semester, section.Year, grade_report.Grade
FROM student, course, section, grade_report
WHERE student.Class = '1'
AND student.major = 'MATH'
AND student.Student_number=grade_report.Student_number
AND course.Course_number=section.Course_number
AND section.Section_identifier=grade_report.Section_identifier
```

- **(15pt) Exercise 6.13.**

a.

```
INSERT INTO course VALUES ('Financial Accounting', 'FAC4390', 5, 'BUSINESS')
```

b.

```
INSERT INTO section VALUES (145, 'FAC4390', 'FALL', '17', 'Hanif')
```

c.

```
INSERT INTO student VALUES ('Robin', 34, 3, 'BUSINESS')
```

d.

```
UPDATE student
SET student.Class = 3
WHERE student.Student_number = 17
      AND student.Class = 1
```

- **(15pt) Exercise 7.5.**

a.

```
SELECT Dname, COUNT(*)
FROM department, employee
WHERE Dno=Dnumber
GROUP BY Dname
HAVING AVG(Salary)>30000
```

Dname	COUNT(*)
Administration	3
Headquarters	1
Research	4

b.

```
SELECT Dname, COUNT(*)
FROM department, employee
WHERE Dno=Dnumber
AND Sex='M'
AND Salary>30000
GROUP BY Dname
```

Dname	COUNT(*)
Headquarters	1
Research	2