CS 4400 - SAMPLE QUIZ 3

Spring 2005

1. Which of the following can be done with an SQL INSERT statement?

(a) add a single tuple to a relation

(b) add multiple tuples (i.e., the resulting tuples from an SQL query) to a relation

(c) all of the above

(d) none of the above

2. Given the relational schema consisting of Student(Snumber,Sname,GPA), Course(Cnumber,Cname,Hours) and Enrolled(Snumber,Cnumber,Grade), which SQL statement removes students from being enrolled in Algebra if their GPA is less than 2.0.

(a) Delete From Enrolled Where Snumber In (Select Snumber From Student S, Course C, Enrolled E Where S.Snumber = E.Snumber And E.Cnumber = C.Cnumber And GPA < 2.0 And Cname = 'Algebra')

(b) Delete From Enrolled Where Snumber In (Select Snumber From Student Where GPA < 2.0) And Cnumber In (Select Cnumber From Course Where Cname = 'Algebra')

(c) both (a) and (b)

(d) none of the above

3. In SQL, if we want to designate that columns A, B and C are all candidate keys we can add the following constraint to each column definition

(a) unique

(b) primary key

(c) foreign key

(d) not null

4. Given the relational schema of Course(Cnumber, Cname, Dept, Credits) which SQL query is equivalent to the following: $\pi_{Cname}(\sigma_{Dept='Math'}(\sigma_{Credits=3}(Course)))$?

(a) SELECT Distinct Cname FROM Course WHERE Dept = 'Math' AND Credits = 3;

(b) SELECT Cname FROM Course WHERE Dept = 'Math' INTERSECT (SELECT Cname FROM Course WHERE Credits = 3);

(c) Both (a) and (b)

(d) None of the above

5. Given the relational schema consisting of Course(Cnumber, Cname, Dept) and Enroll(SSN, Cnumber, Grade), which SQL query retrieves the courses for each department in which students are not enrolled?

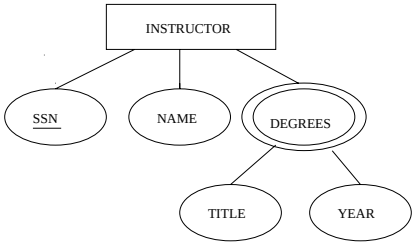
(a) SELECT Dept, Cname FROM Course, Enroll WHERE Course.Cnumber = Enroll.Cnumber ORDER BY Dept;

(b) SELECT Dept, Cname FROM Course ORDER BY Dept;

(c) SELECT Dept, Cname FROM Course WHERE Cnumber NOT IN (SELECT Cnumber FROM ENROLL) ORDER BY Dept;

(d) all of the above

6. Which of the following relational database schemas is a correct representation (via the mapping steps from the text) for the following ER diagram?



(a) INSTRUCTOR(SSN,NAME) DEGREES(SSN,TITLE,YEAR)

(b) INSTRUCTOR(SSN,NAME,TITLE,YEAR)

(c) INSTRUCTOR(SSN,NAME) DEGREESA(SSN,TITLE) DEGREESB(SSN,YEAR)

(d) None of the above

7. When we map a relationship in the ER diagram to the relational model, we must create a relation (table) for the relationship when the cardinality ratio is

(a) one to one

(b) one to many

(c) many to many

(d) all of the above

8. Assume we want to map a relationship type, which involves entity types R and S to the relational model. Entity type R has a key called Rkey and entity type S has a key called Skey. Suppose R has a structural constraint of (1,1) for the relationship type and S has a structural constraint of (0,1) for the relationship type. The relationship type should be mapped to the relational model by

(a) storing Rkey in the corresponding relation for the entity type S

(b) storing Skey in the corresponding relation for the entity type R

(c) storing Rkey and Skey in a new relation

(d) none of the above

9. Given the relational schema consisting of Project(Pnumber, Pname, Deptnumber) and Workson(Enumber, Pnumber, Hours), which SQL query returns the department number and the project for the department that has the most employees working on a single project.

(a)
```
SELECT Deptnumber, Project.Pnumber
FROM Project, Workson
WHERE Workson.Pnumber = Project.Pnumber
GROUP BY Department,Project.Pnumber
Having COUNT(*) = (SELECT COUNT(*)
                   FROM Project, Workson
                   WHERE Workson.Pnumber = Project.Pnumber);
```

(b)
```
SELECT Deptnumber, Project.Pnumber
FROM Project, Workson
WHERE Workson.Pnumber = Project.Pnumber
GROUP BY Deptnumber,Project.Pnumber
Having COUNT(*) = (SELECT MAX(COUNT(*))
                   FROM Project, Workson
                   WHERE Workson.Pnumber = Project.Pnumber
                   GROUP BY Deptnumber,Project.Pnumber);
```

(c)
```
SELECT Deptnumber, Project.Pnumber
FROM Project, Workson
WHERE Workson.Pnumber = Project.Pnumber
AND Project.Pnumber IN
                   (SELECT MAX(Project.Pnumber)
                   FROM Workson);
```

(d) None of the above

10. What is the result of the SQL query
SELECT A FROM MyView WHERE B = 20;
given the view definition: Create MyView AS SELECT A,B FROM R, S WHERE R.C = S.C AND F < 6;
and the following two tables, R and S?

R

A	B	C
41	21	32
42	20	32
43	24	32
43	21	31
45	21	31
41	20	31

S

C	E	F
30	11	4
31	12	5
32	13	6

(a) A table with column A whose 1 row is (41)

(b) A table with columns A and B whose 1 row are (41,20)

(c) A table with column A whose 2 rows are and (42) and (41)

(d) A table with column A whose 3 rows are and (43), (45) and (41)

11. When we map an n-ary relationship (where n > 2) from the ER Model to the relational model we

(a) create a table with n foreign keys

(b) create a table with a primary key but no foreign keys

(c) create n tables

(d) none of the above

12. Given the relational schema consisting of Faculty(Fnumber, Fname, Homedeptnumber), Course(Cnumber, Cname, Deptnumber) and Teaches(Fnumber, Cnumber), which SQL query returns the courses (names and number) that are taught by faculty from another department.

(a)
```
SELECT Cname, Cnumber
FROM Faculty, Course, Teaches
WHERE Teaches.Cnumber = Course.Cnumber AND
Faculty.Fnumber = Teaches.Fnumber AND
Course.Deptnumber NOT = Faculty.Homedeptnumber;
```

(b)
```
SELECT Cname, Cnumber
FROM Faculty, Course, Teaches
WHERE Teaches.Cnumber = Course.Cnumber AND
Faculty.Fnumber = Teaches.Fnumber;
```

(c)
```
SELECT Cname, Cnumber
FROM Faculty, Course, Teaches
WHERE Teaches.Cnumber = Course.Cnumber AND
Faculty.Fnumber = Teaches.Fnumber AND
Faculty.Homedeptnumber NOT IN (SELECT Deptnumber
                               FROM Course);
```

(d)
```
SELECT Cname, Cnumber
FROM Faculty, Course
WHERE Course.Deptnumber NOT = Faculty.Homedeptnumber;
```

13. What is the result of the SQL query
SELECT C,F FROM R,S WHERE B = D AND A = E;
given the following two tables, R and S?

R

A	B	C
41	21	32
42	22	32
43	24	32
43	21	31
45	21	31
41	20	31

S

D	E	F
20	41	4
22	42	5
23	43	6
24	43	6

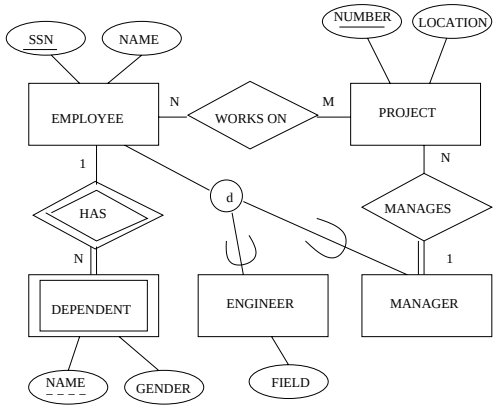
(a) A table with columns C and F whose 3 rows are (32,5), (32,6) and (31,4)

(b) A table with columns C and F whose 3 rows are (32,4), (32,5) and (32,6)

(c) A table with columns C and F whose 1 rows is (31,6)

(d) A table with columns C and F whose 2 rows are (32,5) and (31,6)

14. Which of the following relational database schemas is a correct representation (via the mapping steps from the text) for the following ER diagram?



(a) Workson(ssn,number) Project(number,location,ssn) Employee(ssn,name) Dependent(ssn,name,gender) Engineer(ssn,field) Manager(ssn)

(b) Emp-Project(ssn,number,name,location) Dependent(ssn,name,gender) Eng-Mgr(ssn,field)

(c) Emp-Eng-Mgr(ssn,name,field) Dependent(name,gender) Project(number,location,ssn)

(d) All of the above

15. Given the following two tables, R and S,

R

A	B	C
11	21	31
11	22	32
12	21	31
12	27	32
12	27	33
14	27	33

S

B	C
22	31
24	32
25	33
27	32

what is the result of the SQL query

```
SELECT B,C
FROM R
INTERSECT
(SELECT B,C
FROM S);
```

(a) A table with columns B,C whose contents is empty

(b) A table with columns B,C containing only the row (27,32)

(c) A table with columns B,C containing two rows: (27,32) and (27,33)

(d) A table with columns B,C containing four rows: (22,31), (22,32), (27,32), (27,33)

16. Given the following table definition

```
CREATE TABLE Employee(
                    Enumber integer primary key,
                    Name char(4),
                    City char(7));
```

and the table:

Employee

Enumber	Name	City
1001	john	detroit
1012	jane	newyork
1013	jack	atlanta
1022	bill	chicago
1033	mary	chicago

Whch of the following queries returns the second and third rows from the Employee table?

(a) SELECT * FROM Employee WHERE Name = 'ja%' ;

(b) SELECT * FROM Employee WHERE Name LIKE 'ja%' ;

(c) SELECT * FROM Employee WHERE Name LIKE '_a__' ;

(d) SELECT * FROM EMPLOYEE WHERE City = 'atlanta';

17. Given the following relation schema, Employee(ssn,lname,fname,salary,city,deptnumber), and the following SQL query

```
SELECT lname,fname
FROM Employee
WHERE salary >
        ALL (SELECT salary
        FROM Employee
        WHERE deptnumber = 5);
```

What is returned by the above query?

(a) the lname and fname of employees whose salary does not match a salary of an employee who works in deptnumber 5

(b) the lname and fname of employees whose salary is greater than the salary of every employee who works in deptnumber 5

(c) the lname and fname of employees who do not work in deptnumber 5

(d) the lname and fname of employees with the highest salary who work in deptnumber 5

18. Given the following relation schema, Employee(ssn,lname,fname,salary,city,deptnumber,superssn), and the following SQL query

```
SELECT Max(salary)
FROM Employee AS E
WHERE NOT EXISTS
        (SELECT *
        FROM Employee
        WHERE superssn = E.ssn);
```

What is returned by the above query?

(a) the maximum salary of employees

(b) the maximum salary of employees who are supervisors

(c) the maximum salary of employees who are not supervisors

(d) the maximum salary of employees who do not have a supervisor

Use the following table definitions and table contents for the next 2 questions

```
CREATE TABLE Project(
                Pnumber integer,
                Location char(10),
                Budget decimal(8,2),
        PRIMARY KEY (Pnumber));

CREATE TABLE Employee(
                Enumber integer,
                Name char(30),
                Pnumber integer,
        PRIMARY KEY (Enumber),
        FOREIGN KEY (PNUMBER) REFERENCES Project(Pnumber)
                ON DELETE SET NULL ON UPDATE CASCADE);
```

and the tables:

Project

Pnumber	Location	Budget
11	new york	1000.00
12	chicago	4000.00
14	miami	3500.00

Employee

Enumber	Name	Pnumber
1001	john smith	11
1012	jane doe	11
1033	bill jones	14

19. What happens when we execute the following: DELETE FROM Project WHERE Pnumber = 11;

(a) the delete is rejected

(b) the first row is deleted and the Pnumber column for the first two rows in the Emplyees table is set to NULL

(c) the first row is deleted and the first two rows from the Employee table are deleted as well

(d) none of the above

20. What happens when we execute the following: UPDATE Project SET Pnumber = 13 WHERE Location = 'miami';

(a) the update is rejected

(b) the Pnumber column value for the third row would be changed to 13

(c) the Pnumber column value for the third row would be changed to 13 and the Pnumber column value for the third row in the Employee table would be changed to 13 as well

(d) none of the above

21. Given the relational schema consisting of Project(Pnumber, Pname, Deptnumber) and Workson(Enumber, Pnumber, Hours), which of the following SQL assertions enforces the constraint that a project can have at most 10 employees working on it?

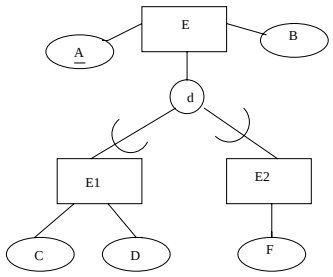
(a)
```
CREATE ASSERTION Work_Constraint
CHECK ( NOT EXISTS
        (SELECT *
        FROM Workson
        WHERE Enumber IN
                (SELECT Enumber
                FROM Workson
                GROUP BY Enumber
                HAVING COUNT(*) > 10)));
```

(b)
```
CREATE ASSERTION Work_Constraint
CHECK ( NOT EXISTS
        (SELECT Pnumber
        FROM Workson
        GROUP BY Pnumber
        HAVING COUNT(*) > 10));
```

(c)
```
CREATE ASSERTION Work_Constraint
CHECK ( NOT EXISTS
        (SELECT Pnumber
        FROM Workson, Project
        WHERE Project.Pnumber = Workson.Pnumber));
```

(d) None of the above

22. If we were to map the following ER diagram to a single relation, R, then what problems would we encounter?



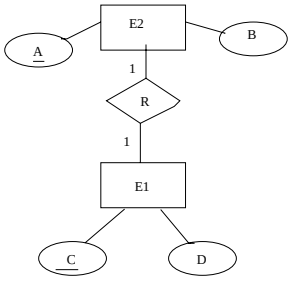
(a) Since E has partial participation, we may have some rows in R with null values for C, D and F columns.

(b) Since the superclass/subclass relationship is disjoint, if a row has values for columns C and D, then it will have a null value for column F.

(c) Since the superclass/subclass relationship is disjoint, if a row has a value for column F, then it will have null values for columns C and D.

(d) All of the above

23. Suppose we decide to map the following ER digram to a single relation with attributes A, B, C and D. What problems would we encounter?



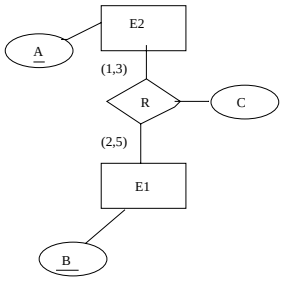
(a) For any given A value, there may be many C values associated with it, leading to the duplication of the B value for every occurrence of that A value.

(b) For any given A value, there may be no associated C and D values, causing the key value to be unspecified.

(c) For any given C value, there may be no associated A and B values, causing the key value to be unspecified.

(d) Both (b) and (c)

24. For the following ER diagram, we map the relationship, R, to a relation with attributes A, B and C. How many times can any specific combination of values for attributes A and B occur in that relation?



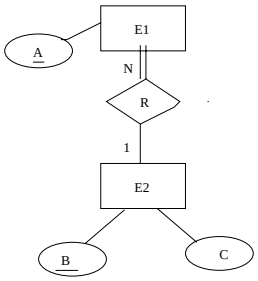
(a) 1

(b) 3

(c) 5

(d) 15

25. Suppose we map the following ER diagram to the relations E1(A,B) and E2(B,C). The create table statement for E2 is defined as the following: Create Table E2(B integer primary key, C integer). Which one of the following create table statements would be correct for E1?



(a) Create Table E1(A integer primary key, B integer not null)

(b) Create Table E1(A integer unique, B integer references E2)

(c) Create Table E1(A integer primary key, B integer not null references E2)

(d) Create Table E1(A integer, B integer)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
C	C	A	A	C	A	C	B	B	A	A	A	A	A	B	B	B	C	B	C	B	D	D	A	C