1) Consider the following relational schema; the schema describes a database containing data about theses carried out by students of a master degree. Theses have supervisors and co-supervisors. The underlined attributes denote the primary keys of the relations. The column Prof# in the relation Theses indicates the professors that are supervisors.

Students (S#, FName, LName, Street, City, Phone#)  
Theses (T#, Title, Topic, Prof#, S#, Evaluation)  
Professors (Prof#, PName, Rank, Phone#, Dept#)  
Theses-Co-Supervisors (T#, Prof#)  

(a) (pt.10) Determine which is the correct query for retrieving the number of theses supervised by Professor Brown (assume that there is only one professor with last name equal to ‘Brown’):

(i) SELECT Count(*) FROM Theses, Professors WHERE Theses.Prof# = Professors.Prof# AND PName='Brown';

(ii) SELECT Count (DISTINCT Topic) FROM Theses, Professors WHERE Theses.Prof# = Professors.Prof# AND PName='Brown';

(iii) SELECT Count (DISTINCT *) FROM Theses, Professors WHERE Theses.Prof# = Professors.Prof# AND PName='Brown';

(iv) None of the above

(b) (pt. 10) Assume that there are several professors with last name equal to ‘Brown’. Write an SQL queries that retrieves the Prof# of these professors and for each Prof# the number of theses supervised by the professor with this number.

(c) (pt. 10) Determine which is the correct query for retrieving the Prof# of the professors who supervise the maximum number of theses:

(i) SELECT Prof# FROM Theses GROUP BY T# HAVING COUNT(*) > (SELECT COUNT(*) FROM Theses GROUP BY Prof#);

(ii) SELECT Prof# FROM Theses GROUP BY Prof# HAVING COUNT(*) > (SELECT COUNT(*) FROM Theses GROUP BY Prof#);

(iii) SELECT Prof# FROM Theses GROUP BY Prof# HAVING COUNT(*) > ALL (SELECT COUNT(*) FROM Theses GROUP BY Prof#);

(iv) None of the above.

(d) (pt. 10) Determine which is the correct query for retrieving the names of the professors who co-supervise at least two theses:

(i) SELECT PName FROM Professors WHERE Prof# IN (SELECT Prof# FROM Theses-Co-Supervisors GROUP BY T#);

(ii) SELECT PName FROM Professors WHERE Prof# IN (SELECT Prof# FROM Theses-Co-Supervisors GROUP BY Prof# HAVING COUNT(*) ≥ 2);
(iii) SELECT PName FROM Professors WHERE Prof# =
(SELECT Prof# FROM Theses-Co-Supervisors GROUP BY Prof# HAVING COUNT(*) ≥ 2);

(iv) None of the above.

(c) (pt 10) Determine which is the correct update operation that assigns as supervisor of the thesis by student Bob Smith the same supervisor of the thesis by student Mary Rossi (assume that there is a single student with name Bob Smith and a single student with name Mary Rossi):

(i) UPDATE Theses X, Theses Y SET X.Prof# = Y.Prof#
WHERE X.FName = 'Bob' AND X.LName = 'Smith' AND
Y. FName = 'Mary' AND Y.LName = 'Rossi';

(ii) UPDATE Theses SET Prof# =
(SELECT Prof# FROM Students, Theses WHERE
Students.S# = Theses.S# AND FName = 'Bob' AND LName = 'Smith')
WHERE S# = (SELECT S# FROM Students WHERE
FName = 'Mary' AND LName = 'Rossi');

(iii) UPDATE Theses SET Prof# =
(SELECT Prof# FROM Students, Theses WHERE
Students.S# = Theses.S# AND FName = 'Mary' AND LName = 'Rossi')
WHERE S# = (SELECT S# FROM Students WHERE
FName = 'Bob' AND LName = 'Smith');

(iv) None of the above.

2) (pt 10) Consider the following view definition
CREATE VIEW V1 AS SELECT Title, Evaluation FROM Theses WHERE Topic = 'DB';
Which operations can be executed on this view (mark all that applies)?

   (i) SELECT
   (ii) DELETE
   (iii) INSERT
   (iv) UPDATE of column Title
   (v) UPDATE of column Evaluation

3) (pt 10) Consider the following view definition
CREATE VIEW V2 (T#, Title, Ext-Evaluation)
AS SELECT T#, Title, Evaluation||’ ’||Topic FROM Theses WHERE Topic = 'DB';
Which operations can be executed on this view (mark all that applies)?

   (i) SELECT
   (ii) DELETE
   (iii) INSERT
   (iv) UPDATE of column T#
   (v) UPDATE of column Title
   (vi) UPDATE of column Ext-Evaluation

4) Consider the following view definition
CREATE VIEW V3 AS SELECT * FROM Theses WHERE Topic = 'DB'
WITH CHECK OPTION;

(a) (pt 5) Would the following INSERT statement be executed? Answer YES or NO.
    INSERT INTO V3 VALUES (230, 'Secure OS', 'Security', 200, 1300, 'A')

(b) (pt 5) Would the following INSERT statement be executed? Answer YES or NO.
    INSERT INTO V3 VALUES (230, 'Object DBMS', 'DB', 200, 1300, 'A')

5) Consider the table Tab1 below and assume that the following constraint is defined on this table:
   CHECK (B+C < 1000)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>500</td>
<td>100</td>
</tr>
<tr>
<td>20</td>
<td>700</td>
<td>100</td>
</tr>
<tr>
<td>30</td>
<td>500</td>
<td>300</td>
</tr>
<tr>
<td>40</td>
<td>600</td>
<td>300</td>
</tr>
</tbody>
</table>

   (a) (pt 10) Suppose that the following update is executed on table Tab1
             UPDATE Tab1 SET B=B+150;
             Write the content of the table after this update.

   (b) (pt 10) Suppose that the following update is executed on table Tab1
             UPDATE Tab1 SET B=B+50;
             Write the content of the table after this update.