SQL Queries - Database System Sessional (CCE 224)

From Exam Sheet (Image 1):

1. Titles of courses in the Comp. Sci. department with 3 credits:

SELECT title

FROM course

WHERE dept_name = 'Comp. Sci.' AND credits = 3;

2. IDs of students taught by instructor 'Einstein' (no duplicates):

SELECT DISTINCT t.ID

FROM takes t

JOIN teaches te ON t.course_id = te.course_id AND t.sec_id = te.sec_id

    AND t.semester = te.semester AND t.year = te.year

JOIN instructor i ON te.ID = i.ID

WHERE i.name = 'Einstein';

3. Highest salary of any instructor:

SELECT MAX(salary) AS highest_salary

FROM instructor;

4. All instructors earning the highest salary:

SELECT *

FROM instructor

WHERE salary = (SELECT MAX(salary) FROM instructor);

5. Enrollment of each section offered in Autumn 2009:

```sql
SELECT course_id, sec_id, COUNT(ID) AS enrollment

FROM takes

WHERE semester = 'Autumn' AND year = 2009

GROUP BY course_id, sec_id;
```

6. Maximum enrollment across all sections in Autumn 2009:

```sql
SELECT MAX(student_count) AS max_enrollment

FROM (

    SELECT COUNT(ID) AS student_count

    FROM takes

    WHERE semester = 'Autumn' AND year = 2009

    GROUP BY course_id, sec_id

) AS sub;
```

7. Section(s) with maximum enrollment in Autumn 2009:

```sql
SELECT course_id, sec_id

FROM takes

WHERE semester = 'Autumn' AND year = 2009

GROUP BY course_id, sec_id

HAVING COUNT(ID) = (

    SELECT MAX(student_count)

    FROM (

        SELECT COUNT(ID) AS student_count

        FROM takes

        WHERE semester = 'Autumn' AND year = 2009

        GROUP BY course_id, sec_id

    ) AS sub
```

);

8. Total distinct students taught by instructor ID '10101':

SELECT COUNT(DISTINCT t.ID) AS total_students

FROM takes t

JOIN teaches te ON t.course_id = te.course_id AND t.sec_id = te.sec_id

   AND t.semester = te.semester AND t.year = te.year

WHERE te.ID = '10101';

9. Insert students with tot_cred > 100 as instructors (salary 10000):

INSERT INTO instructor(ID, name, dept_name, salary)

SELECT ID, name, dept_name, 10000

FROM student

WHERE tot_cred > 100;

10. Instructors, ID, name, and number of sections they taught (including 0):

SELECT i.ID, i.name, COUNT(te.course_id) AS num_sections

FROM instructor i

LEFT JOIN teaches te ON i.ID = te.ID

GROUP BY i.ID, i.name;

From SQL Lab Exam (Image 2):

a. IDs of students taught by 'Lember' (descending order, no duplicates):

SELECT DISTINCT t.ID

FROM takes t

JOIN teaches te ON t.course_id = te.course_id AND t.sec_id = te.sec_id

   AND t.semester = te.semester AND t.year = te.year

JOIN instructor i ON te.ID = i.ID

WHERE i.name = 'Lember'

ORDER BY t.ID DESC;

b. ID and name of students (ascending) who took Comp. Sci. course:

SELECT DISTINCT s.ID, s.name

FROM student s

JOIN takes t ON s.ID = t.ID

JOIN course c ON t.course_id = c.course_id

WHERE c.dept_name = 'Comp. Sci.'

ORDER BY s.ID ASC;

c. Instructor names by salary-to-budget ratio (descending):

SELECT i.name

FROM instructor i

JOIN department d ON i.dept_name = d.dept_name

ORDER BY (i.salary * 1.0) / d.budget DESC;

d. Instructor names and buildings (NULL if not taught any class):

SELECT i.name, b.building

FROM instructor i

LEFT JOIN teaches te ON i.ID = te.ID

LEFT JOIN section s ON te.course_id = s.course_id AND te.sec_id = s.sec_id

   AND te.semester = s.semester AND te.year = s.year

LEFT JOIN classroom b ON s.building = b.building

```
GROUP BY i.name, b.building;
```