Section A Question 1

a. This was the item in Question 1 that had the best average. The most common mistake was to give too vague an answer, rephrasing the question essentially. The technical gist of the answer was that every operation in which updates are involved must, in the presence of concurrency, display the ACID properties enforced by transaction managers.

b. Many students didn't get right the answer that what is needed is speed-up not scale-up. Many students contrasted scale-up with scale-out and were rewarded for their effort. Other student (as in Item A) were too vague, rephrasing the question or speculating in a non-technical way.

c. The most common mistake here was to call 'deliveryAddress' a multivalued attribute (or composite attribute, or foreign key), when it's really a partial key of the weak entity 'Parts'. There were surprisingly too many students who got it wrong.

d. Very few students displayed any knowledge of what an expression tree for a relational algebraic expression is (see Week 4 Handouts and Mandatory Readings Week 3). It's a tree whose non-leaf nodes are relational algebraic operators parameterized by attribute lists (e.g., in the case of the project operator associated with the SELECT clause in the corresponding SQL query) or by predicates (typically from the WHERE clause in the SQL query, which then become arguments to selection and join nodes in expression trees) and whose leaf nodes are scans over relations (typically from the FROM clause in the SQL query). Some students gave the relational algebraic translation, and this was rewarded generously. This was the item in Question 1 that has the worst average.

Section B Question 3

a. Most students used too many relationship types (typically, 2 or 3, but even 4) when one "ternary" one would have sufficed. However, this question was very generously marked and therefore did not punish students for this oversight whilst more than compensating in overlooking other more common flaws (e.g., using multivalued attributes to make up for relationship types, breaking up a many-to-many relationship into two one-to-many ones, getting cardinalities wrong -- such as one employee per building, in some cases).

B. In this item, the most common problem was not recalling what group-by aggregation queries are and can do. Some students tried to get round this by inventing new syntax on the fly, others tried to use procedural code. Again, the question was marked as generously as possible.

C. As with expression trees in Q1 Item d, here too very few students remembered that a query can be written down as a sequence of assignments the right-hand side of which is a relational algebraic expression. For example, to the SQL `SELECT R.x FROM R, S WHERE R.y = S.z` there corresponds the following sequence of assignments (other sequences would also be correct):

1. \( T := R \text{ join}_{[R.y=S.z]} S \)
2. \( R := \text{project}_{[R.x]}(T) \)

The lack of recall led most students to write an answer in SQL, this was marked as leniently as possible, with just a small penalty for the lack of recall of the above style.

D. Here the most common cause of loss of marks was not recognizing that the worst case is BxD, which follows from the n:m nature of the relationship between Buildings and Departments and the combinatorial nature of joins.

Section B (SS)

This section of the exam paper was changed from the usual multiple choice questions used in previous years to short essay-like questions
Although the questions in this section were simple and did not involve original thought, but only basic definitions, the majority of the students answer them poorly, probably because they did not practice them before the exam, since they were not present in past exam papers. This unfortunately indicates that that most students use past exam papers to prepare for exams, and are not concerned about learning the basic concepts.

Section C - Question 4 (SS)

The questions in this section mostly involved application of technique and original thought. As in previous years, the majority of the students answered the questions reasonably well, getting an average mark. While there was a minority that answered them extremely well, and another significant fraction of students who did not answer them well at all.