CS 589: Quiz 7, 1 March 2011 Name:____KEY (fixed)

No books or notes. Work individually.

Question 7A(10 points): In the process of query optimization, sometimes expressions are generated that can be immediately simplified. Propose simplified forms for each of the algebra expressions below.

DE is duplicate elimination, G1 is scalar group-by, G is vector group-by and $\cup^+$ is duplicate-preserving union. Let $\varnothing$ be the empty relation (no tuples) over the appropriate schema.

Assume all expressions are well-formed and that r has no duplicates.

a. $r - r \equiv \varnothing$

b. $\varnothing \cup r \equiv r$

c. DE(G1[Count(*) as CA](r)) ≡ G1[Count(*) as CA](r) (*Since G1 returns a single tuple.*)

d. $\pi_{AB}(r) \bowtie r \equiv r$

e. $\pi_{AB}(\pi_{ABC}(r)) \equiv \pi_{AB}(r)$

f. $\sigma_{A=5}(\sigma_{A=5}(r)) \equiv \sigma_{A=5}(r)$

g. $\sigma_{A=5}(\sigma_{A=6}(r)) \equiv \varnothing$

h. $r \cap r \equiv r$

i. $DE(r \cup^+ r) \equiv r$

j. $r - \sigma_{A<5}(r) \equiv \sigma_{A\geq 5}(r)$