

Algebra/ Applied Alg Qual

Part 1: Matrix Theory

September 12, 2007

Name _____

Staple to your work on Part 1.

#1	12	
#2	12	
#3	16	
Part 1	40	
Part 2	40	
B.C	120	
Total	200	

- (12) 1. State and prove the Singular Value Decomposition Theorem. (If you use the Polar Decomposition Theorem, then also state and prove it.)
- (12) 2. State and prove the Schur Decomposition Theorem.
- (16) 3 (a) Use Schur's Theorem to prove that every square matrix is arbitrarily close to a diagonalizable matrix.
- (b) Show that a square matrix matrix A has an orthonormal basis of eigenvectors iff $A^H A = A A^H$ ($A^* A = A A^*$).