



**RUTGERS**  
UNIVERSITY

Department of Materials Science and Engineering

**Glass Engineering -- 635:312**  
**Hourly #1 – Study Guide**

Spring Term 2009

Prof. Lehman  
Exam is Monday March 9, 2009

**Notebook pages covered by exam:**

**Pages 1 – 70, but no redox number**

**Topics covered by exam:**

**Introduction**

Definition of glass and glass transition  
Glass formers, modifiers and intermediates  
Molecular structure of silicate glass  
Zachariasen's rules  
Bridging and non-bridging oxygen  
Effect of sodium additions to pure silica  
Major processes, major products

**Viscosity and Crystallization**

Fiberglass example  
Viscosity measurement methods  
Fixed viscosity points and RMS  
Andrade and Fulcher Equations  
What is devitrification and how to avoid it

**Batching**

Segregation  
Batch house design and operation  
Batch calculations

**Glass Compositions**

Soda Lime silicate  
Borosilicates  
Lead glasses  
Silica glass  
Aluminosilicate glass