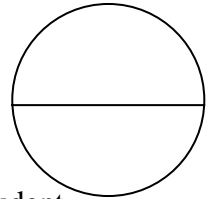


**CHE 321**  
**“COMPUTER AIDED DESIGN OF CHEMICAL PROCESSES”**  
**EXAM-2**

Student Name:  
Student Number:  
Computer Number:



Note: use the simulator to answer the following problems. Assign your student number as the file name. **Your answers in this sheet must match the results of the simulator.**

**Q.1**

A distillation column is needed to separate an equimolar mixture, at 77 °F and 1 atm, of benzene from styrene. The distillate should contain 99% benzene and 95% of the benzene fed to the column.

Use a process simulator (CHEM-CAD) to determine the minimum number of trays ( $N_{min}$ ) at total reflux, the minimum reflux ratio ( $R_{min}$ ), and the theoretical number of trays at equilibrium when  $R = 1.3 R_{min}$ .

**Q.2**

A petroleum gas mixture (1000 mole/hr) containing 65% propane, 25% propylene, and 10% butane (all in mole %) at 60 °C and 3 atm is burned in a combustion chamber with 40% excess air. Air enters at 25 °C and 3 atm. All butane and propylene and 90% of the propane are consumed and no CO is found in the product gas. Using the simulator (CHEM-CAD), Calculate the heat duty and the stack gas temperature, ( $T_{out}$ ).

