BCEE Department, Concordia University
ENGR 251/4 XX: Thermodynamics i
Instructor; Dr C. Rajalingham

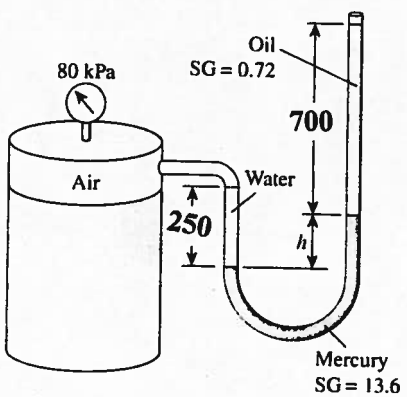
Friday, Jan 30, 2015 **Quiz # 1** **45 Mins. (16:25 – 17:10)**

Instructions

1. **This is a closed book quiz. Necessary tables are provided. This quiz is 5% worth.**
2. **Answer all three questions. Show the important steps or reasons clearly.**
3. **Only the faculty approved calculators are permitted.**
4. **You can write your answers using pencil or pen.**
5. **Cell phones and similar electronic devices must be turned off and kept away from you. If any cell phone is found with you, you will receive 0 marks**

Question 1: (15 marks on 50)

The gage pressure of air in the tank is 80 kPa. The manometer has 250 mm of water and 700 mm of oil. The difference in mercury column is h mm. The density of water is 1000 kg.m3. The specific gravities of oil and mercury are 0.72 and 13.6 respectively. Calculate the value of h.



Question 2: (20 marks on 50)

The property tables A-4, A-5, A-6, A-7 for H_20 are annexed. Use them to answer the following short questions.

(a) 2.0 kg of H_2O is at 100°C temperature 5 MPa pressure. Identify the phase and determine the volume.

(b) 2.0 kg of saturated mixture occupies 1.0 m^3 volume at 110°C temperature. Determine the pressure and its quality.

(c) Saturated mixture of 0.6 quality occupies 1.0 m^3 volume at 110°C temperature. Determine its internal energy

(d) The internal energy of super-heated steam at 50 kPa pressure and 100°C temperature is 1000 kJ. Determine its volume

Question 3: (15 marks on 50)

A piston-cylinder device shown contains 0.2 kg of H_2O of 0.8 quality at 100 kPa pressure. This material undergoes constant pressure process until its temperature becomes 150°C.

(a) Draw the process on a P-v diagram

(b) Determine the change in volume and the change in internal energy during this process.