2 October 2014

CHE 260 – Thermodynamics and Heat Transfer

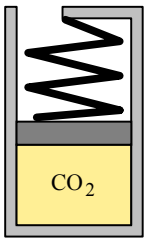
Quiz 1 – 2014

You have 60 minutes to do the following three problems. You may use your textbook and any type of non-communicating calculator.

1) A cylinder fitted with a piston contains propane gas at 100 kPa, 300 K with a volume of 0.2 m^3. The gas is now slowly compressed according to the relation $PV^{1.1}$=constant to a final temperature of 340 K. Find the final pressure and the work done during the process.

(30 Marks)

2) A cylinder with a piston restrained by a linear spring contains 2 kg of carbon dioxide at 500 kPa, 400°C. It is cooled to 40°C, at which point the pressure is 300 kPa. Show the process on a *P-V* diagram, with the pressure and volume values indicated at the start and end. Calculate the heat transfer for the process.



(35 Marks)

3) A gas turbine takes in 0.05 kg/s of helium at 1000 kPa, 550 K and it leaves at 250 kPa, 300 K. The shaft power output is 55 kW. What is the rate of heat loss from the turbine?

(35 Marks)