195232 Thermodynamics II

Name-Surname.....ID.....Sec.....

1st Home Work

Review of Thermodynamics I

Sent date:.....(Due: 3 Feb 2018)

My Learning Summary

Suggestion:.....
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Score:.....

1. Two kilograms of water, initially a saturated liquid at 100 kPa, are heated to saturated vapor while the pressure is maintained constant. Determine the work and heat transfer for the process, each in kJ. Show that the heat transfer equals the change in enthalpy of the water in this case.

2. Steam enters the condenser of a steam power plant at 20 kPa and a quality of 95 percent with a mass flow rate of 20,000 kg/h. It is to be cooled by water from a nearby river by circulating the water through the tubes within the condenser. To prevent thermal pollution, the river water is not allowed to experience a temperature rise above 10°C. If the steam is to leave the condenser as saturated liquid at 20 kPa, determine the mass flow rate of the cooling water required.

3. An inventor claims to have developed a heat engine that receives 700 kJ of heat from a source at 500 K and produces 300 kJ of net work while rejecting the waste heat to a sink at 290 K. Is this a reasonable claim? Why?

4. Refrigerant-134a enters the coils of the evaporator of a refrigeration system as a saturated liquid–vapor mixture at a pressure of 160 kPa. The refrigerant absorbs 180 kJ of heat from the cooled space, which is maintained at -5°C, and leaves as saturated vapor at the same pressure. Determine

(*a*) the entropy change of the refrigerant,

(*b*) the entropy change of the cooled space, and

(*c*) the total entropy change for this process.