

KSU – Chemical Engineering Department
ChE 212 (Thermodynamics) – TUT #6

Name:

ID:

SN:

1. A steam power plant receives heat from a furnace at a rate of 280 GJ/h. The total heat rejected by this power plant is 153 GJ/h. If the waste heat is transferred to the cooling water at a rate of 145 GJ/h, determine:
 - a. Net power output

 - b. The thermal efficiency of this power plant.

2. A household refrigerator with a COP of 1.2 removes heat from the refrigerated space at a rate of 60 kJ/min. Determine:
 - a. The electric power consumed by the refrigerator

 - b. The rate of heat transfer to the kitchen air.

3. Air is compressed by a 12-kW compressor from P_1 to P_2 . The air temperature is maintained constant at 25 °C during this process as a result of heat transfer to the surrounding. Determine the rate of entropy change of the air, assuming air is an ideal gas.