**KSU – Chemical Engineering Department**
**ChE 304 (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 $^o$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.