1. <u>Rankine Cycle Analysis</u> Steam is the working fluid in an ideal Rankine cycle. Saturated vapor enters the turbine at 8.0 MPa and saturated liquid exits the condenser at a pressure of 0.008 MPa. The net power output of the cycle is 100 MW. Determine for the cycle:



Schematic of a typical Rankine cycle

a) the process path on a *T*-s diagram

b) analysis of individual components

c) the thermal efficiency (37.1%)

d) the back work ratio (0.84%)

e) the mass flow rate of the steam (105 kg/sec)

f) the rate of heat transfer into the working fluid as it passes through the boiler (270 MW)

g) the rate of heat transfer from the condensing stream as it passes through the condenser (170 MW)

h) the mass flow rate of the condenser cooling water if cooling water enters the condenser at 15 deg C and exits at 35 deg C (2028 kg/sec)