热力学博士资格考

2006. 0

每题 20分

1 试绘图并说明 (a) 朗肯循环 (Rankine Cycle)
(b) 布雷顿循环 (Brayton Cycle)

2. 试绘图并说明液态水与水蒸汽之温度容积图

3. 请简绘 (a) 蒸汽动力厂
(b) 简单冷冻循环

4. 请在 P-v 图和 T-S 图上表示多变过程 (Reversible Polytropic Process)

5. 试说明熵增定理 (Principle of the increase of entropy)

95 (1)Ph.D. 熱傳學資格考

1. (15%) (a). Please describe the physical mechanisms of conduction, convection and radiation, and write their rate equations.
(b). What is the difference between natural convection and force convection ?

2. (15%) A thin walled copper tubes of radius r_i is used to transport a low temperature refrigerant and is at a temperature T_i that is less than that of the ambient air at T_∞ around the tube. Is there an optimum thickness associated with application of insulation to the tube. Please construct the thermal circuit of heat flow resistance. And prove the optimal insulation radius is $r_{cr} = k/h$.

3. (20%) A two-dimensional rectangular plate is subjected to the boundary conditions shown. Derive an expression for the steady state temperature distributions T(x,y) by solve a P.D.E. problem..