Answer on Question #76179 - Engineering - Mechanical Engineering

For a reversed heat engine the evaporator and condenser temperature at -5 and 50 degree Celsius respectively. The specific heat capacity at constant pressure is 0.956kJ/KgK if the mass flow rate of the refrigerant is 0.012kg determine the evaporator heat loads, C.O.P Of the refrigerator and heat pump and power

Solution

$$m = 0.012kg$$

$$c = 956\frac{J}{kg}$$

$$T_1 = 50 \ ^0C$$

$$T_2 = -5 \ ^0C$$

Thermal load of the evaporator

$$Q = c * m * (T_1 - T_2) = 630.96J \tag{1}$$

Efficiency for refrigerating machines

$$\eta = \frac{T_1}{T_1 - T_2} = 0.909 \tag{2}$$

Required heat pump power

$$A = \frac{Q}{\eta} = 694.056J \tag{3}$$