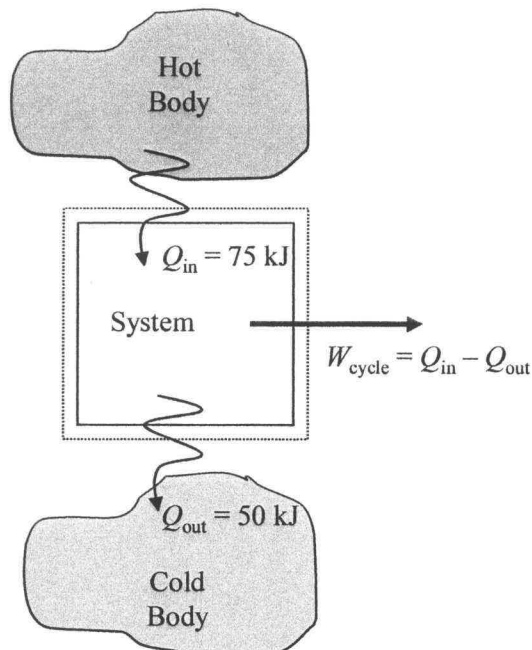


PROBLEM 2.78

KNOWN: Power cycle operates with given heat transfers.

FIND: Determine the cycle net work and the thermal efficiency.

SCHEMATIC AND GIVEN DATA:



ENGINEERING MODEL:

1. The system undergoes a power cycle.
2. Energy transfers are positive in the direction of arrows on the schematic.

ANALYSIS:

Net work for the power cycle is determined from an energy balance for the cycle

$$W_{cycle} = Q_{cycle} = Q_{in} - Q_{out} = 75 \text{ kJ} - 50 \text{ kJ} = \underline{\underline{25 \text{ kJ}}}$$

Applying the definition of thermal efficiency for a cycle and substituting values gives

$$\eta = W_{cycle}/Q_{in} = (25 \text{ kJ})/(75 \text{ kJ}) = \underline{\underline{0.33 \text{ (33\%)}}}$$