

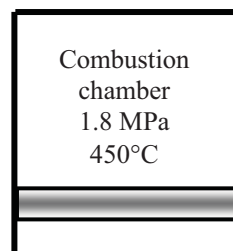
## Review Problems

**4-108** The cylinder conditions before the heat addition process is specified. The pressure after the heat addition process is to be determined.

**Assumptions** **1** The contents of cylinder are approximated by the air properties. **2** Air is an ideal gas.

**Analysis** The final pressure may be determined from the ideal gas relation

$$P_2 = \frac{T_2}{T_1} P_1 = \left( \frac{1300 + 273 \text{ K}}{450 + 273 \text{ K}} \right) (1800 \text{ kPa}) = \mathbf{3916 \text{ kPa}}$$



**4-109** A rigid tank contains an ideal gas at a specified state. The final temperature is to be determined for two different processes.

**Analysis** (a) The first case is a constant volume process. When half of the gas is withdrawn from the tank, the final temperature may be determined from the ideal gas relation as

$$T_2 = \frac{m_1}{m_2} \frac{P_2}{P_1} T_1 = (2) \left( \frac{100 \text{ kPa}}{300 \text{ kPa}} \right) (600 \text{ K}) = \mathbf{400 \text{ K}}$$

(b) The second case is a constant volume and constant mass process. The ideal gas relation for this case yields

$$P_2 = \frac{T_2}{T_1} P_1 = \left( \frac{400 \text{ K}}{600 \text{ K}} \right) (300 \text{ kPa}) = \mathbf{200 \text{ kPa}}$$

