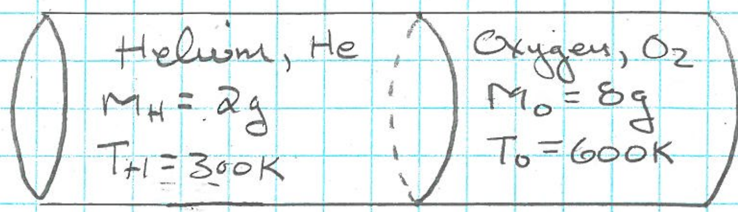

first, the number of moles

Helium: $M_{mol} = 0.004$ kg/mole ; $n_H = \frac{M_H}{M_{mol}} = 0.5$ mol
(He)
and He is monatomic, so

$$C_{V_H} = \frac{3}{2}R \quad \& \quad C_{P_H} = \frac{5}{2}R$$

Oxygen: $M_{mol} = 0.032$ kg/mol ; $n_O = \frac{M_O}{M_{mol}} = 0.25$ mol
(O_2)
and O_2 is diatomic, so

$$C_{V_O} = \frac{5}{2}R \quad \& \quad C_{P_O} = \frac{7}{2}R$$

Now: One gas will lose thermal energy while the other one gains, but the total thermal energy will remain constant.

find final temp. T_f :

The total thermal energy is:

$$E = E_{Hi} + E_{Oi}$$

$$= n_H C_{V_H} T_H + n_O C_{V_O} T_O$$

$$= n_H \frac{3}{2} R T_H + n_O \frac{5}{2} R T_O$$

So $E = 4988.4$ J

Now, as heat flows from one gas to the other, the thermal energy of each gas changes, but the total remains constant.

So, at the final equilibrium temp, T_f:

$$E = 4988.6\,J = n_H C_{VH} T_f + n_O C_{VO} T_f$$

and,

$$T_f = \frac{E}{n_H \frac{3}{2}R + n_O \frac{5}{2}R} = \underline{436.4\,K}$$

You could also do this like this:

The total change in thermal energy $\Delta E = \Delta E_H + \Delta E_O = 0$

and,

$$\Delta E = n_H C_{VH} \Delta T_H + n_O C_{VO} \Delta T_O = 0$$

$$= n_H \frac{3}{\cancel{2}} \cancel{R} (T_f - T_H) + n_O \frac{5}{\cancel{2}} \cancel{R} (T_f - T_O) = 0$$

So:

$$(3n_H + 5n_O)T_f - 3n_H T_H - 5n_O T_O = 0$$

$$T_f = \frac{3n_H T + 5n_O T_O}{3n_H + 5n_O} = 436.4\,K$$