Problem 11.1

What is the change in entropy when 0.7 m^3 of CO_2 and 0.3 m^3 of N_2, each at 1 bar and 25 °C blend to form a gas mixture at the same conditions? Assume ideal gases.

Solution:

Label CO_2 and N_2 as (1) and (2) respectively

$$V_1 = 0.7 \text{ m}^3 \qquad V_2 = 0.3 \text{ m}^3$$

For ideal gases it follows that:

$$x_1 = 0.7 \qquad x_2 = 0.3 P = 1 \text{ bar} \qquad T = 298.15 \text{ K}$$

$$n = \frac{P \sum_i V_i}{RT}$$

$$n =$$

$$\Delta S = -nR \sum_i x_i \ln x_i$$

$$\boxed{\Delta S =}$$