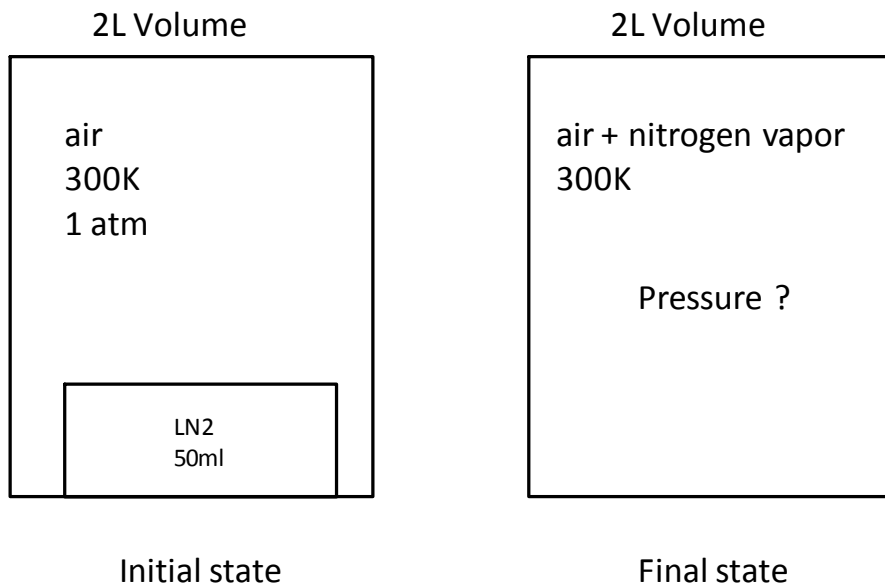


Question 4.

What is the pressure inside a 2L volume when 50 ml of liquid nitrogen is changed to a gas at 300K?



Amount of nitrogen

$m = \rho V = (0.808 \text{ g/ml}) \cdot (50 \text{ ml}) = 40.4 \text{ grams}$	$\rho = 0.808 \text{ g/ml}$
$n_{\text{nitrogen}} = 40.4 / 28 \text{ mol} = 1.44 \text{ mol}$	$1 \text{ mol N}_2 = 28 \text{ g}$

Calculate the final pressure in the 2L volume from the nitrogen

$$P = nRT/V = (1.44 \text{ mol})(0.08206 \text{ atm} \cdot \text{L}/(\text{mol} \cdot \text{K}))(300 \text{ K})/(2 \text{ L}) = 17.7 \text{ atm}$$

$$(17.7 \text{ atm}) \cdot (14.7 \text{ psi/atm}) = 260 \text{ psi}$$

$$\text{Total pressure} = 260 \text{ psi} + 14.7 \text{ psi (air)} = 275 \text{ psi}$$