

1.51

1.51 The density of oxygen contained in a tank is  $2.0 \text{ kg/m}^3$  when the temperature is  $25^\circ\text{C}$ . Determine the gage pressure of the gas if the atmospheric pressure is  $97 \text{ kPa}$ .

$$p = \rho R T = \left(2.0 \frac{\text{kg}}{\text{m}^3}\right) \left(259.8 \frac{\text{J}}{\text{kg}\cdot\text{K}}\right) \left[(25^\circ\text{C} + 273)\text{K}\right]$$
$$= 155 \text{ kPa (abs)}$$

$$p(\text{gage}) = p_{\text{abs}} - p_{\text{atm}} = 155 \text{ kPa} - 97 \text{ kPa} = \underline{\underline{58 \text{ kPa}}}$$