

## Answer on Question #75810, Chemistry / General Chemistry

The density of some gas solution is 1.98 g/L. How many moles of the gas solution are in 19.8 g solution at 740. torr at 50.0°C? a.  $3.67 \times 10^{-1}$  b.  $9.73 \times 10^{-1}$  c. 2.37 d. 2.50 e. 10.0

### Solution

$$\rho = 1.98 \text{ g/L}$$

$$m = 19.8 \text{ g}$$

$$P = 740 \text{ torr} = 740 \cdot 133.32 \text{ Pa} = 98656.8 \text{ Pa}$$

$$T = 50^\circ\text{C} = 273.15 + 50 \text{ K} = 323.15 \text{ K}$$

$$R = 8.314 \text{ m}^3 \cdot \text{Pa} / \text{K} \cdot \text{mol}$$

$$n = ?$$

$$m = \rho \cdot V \Rightarrow V = m / \rho;$$

$$V_{\text{gas}} = 19.8 / 1.98 = 10 \text{ (L)}$$

$$V = 10 \text{ L} = 10 \text{ dm}^3 = 10 \cdot 10^{-3} \text{ m}^3$$

We should use Ideal Gas Law to find amount of chemical substance:

$$PV = nRT \Rightarrow n = PV / RT;$$

$$n = 98656.8 \cdot 10 \cdot 10^{-3} / 8.314 \cdot 323.15 = 0.367 \text{ (mol)} = 3.67 \cdot 10^{-1} \text{ (mol)}$$

**Answer:** a.  $3.67 \times 10^{-1}$