

### Answer on Question #54197 – Chemistry – General Chemistry

#### Task:

At certain temperature and pressure  $\text{NH}_3$  diffuses 1.48 times more than  $\text{HCl}$ . If the density of  $\text{NH}_3$  is 0.66 g/l, find the density of  $\text{HCl}$ .

#### Solution:

The rate of diffusion of a gas is inversely proportional to the square root of its density under given conditions of temperature and pressure.

$$\frac{r_1}{r_2} = \sqrt{\frac{d_2}{d_1}}$$

where  $r_{1,2}$  – rate of diffusion,

$d_{1,2}$  – gas densities.

$$1.48 = \sqrt{\frac{d(\text{HCl})}{0.66}}$$

$$d(\text{HCl}) = 1.48^2 \cdot 0.66 = 1.45 \text{ g/l}$$

**Answer:** 1.45 g/l