Solutions

Each answer shows the steps, then the **result**.

2.1

- moles from mass:

$$n = \frac{m}{M} = \frac{44\text{ g}}{44\text{ g mol}^{-1}}$$

- $n = \mathbf{1.0}$ mol

2.2

- add the atomic masses, two H and one O:

$$M(\text{H}_2\text{O}) = 2(1) + 16$$

- $M = \mathbf{18}$ g mol^{-1}

2.3

- mass from moles:

$$m = nM = (3\text{ mol})(12\text{ g mol}^{-1})$$

- $m = \mathbf{36}$ g

2.4

- 6.022×10^{23}

3.1 B

- a mole is Avogadro's number of particles

3.2 B

- $12 + 2(16) = 44$ g/mol

3.3

(a)

- moles from mass:

$$n = \frac{m}{M} = \frac{88\text{ g}}{44\text{ g mol}^{-1}}$$

- $n = \mathbf{2.0}$ mol

(b)

- number of particles is moles times Avogadro's constant:

$$N = nN_A = (2.0\text{ mol})(6.022 \times 10^{23}\text{ mol}^{-1})$$

- $N = \mathbf{1.2 \times 10^{24}}$ molecules

3.4

(a)

- mass from moles:

$$m = nM = (0.5\text{ mol})(58.5\text{ g mol}^{-1})$$

- $m = \mathbf{29.25}$ g, about 29 g

(b)

- g/mol (grams per mole)