

Moles Conversion Problems Practice



Here are six problems based on the equation $\text{Number of moles} = \frac{\text{Weight}}{\text{Molecular weight}}$:

Problem 1: Calculating Moles from Mass (Water)

Problem: Calculate the number of moles in 36 grams of water (H_2O).

Solution:

1. **Find the molar mass of H_2O :** H: 1 g/mol, O: 16 g/mol

$$\text{Molar mass of } \text{H}_2\text{O} = 2 \times 1 + 16 = 18 \text{ g/mol}$$

2. **Calculate the number of moles:**

$$\text{Number of moles} = \frac{\text{Weight}}{\text{Molecular weight}} = \frac{36 \text{ g}}{18 \text{ g/mol}} = 2 \text{ moles}$$

Problem 2: Calculating Moles from Mass (Sodium Chloride)

Problem: Determine the number of moles in 58.5 grams of sodium chloride (NaCl).

Solution:

1. **Find the molar mass of NaCl :** Na: 23 g/mol, Cl: 35.5 g/mol

$$\text{Molar mass of } \text{NaCl} = 23 + 35.5 = 58.5 \text{ g/mol}$$

2. **Calculate the number of moles:**

$$\text{Number of moles} = \frac{\text{Weight}}{\text{Molecular weight}} = \frac{58.5 \text{ g}}{58.5 \text{ g/mol}} = 1 \text{ mole}$$

Problem 3: Calculating Moles from Mass (Carbon Dioxide)

Problem: How many moles are there in 88 grams of carbon dioxide (CO_2)?

Solution:

1. **Find the molar mass of CO_2 :** C: 12 g/mol, O: 16 g/mol

$$\text{Molar mass of } \text{CO}_2 = 12 + 2 \times 16 = 44 \text{ g/mol}$$

2. **Calculate the number of moles:**

$$\text{Number of moles} = \frac{\text{Weight}}{\text{Molecular weight}} = \frac{88 \text{ g}}{44 \text{ g/mol}} = 2 \text{ moles}$$

Problem 4: Calculating Moles from Mass (Methane)

Problem: Find the number of moles in 16 grams of methane (CH_4).

Solution:

1. **Find the molar mass of CH_4 :** C: 12 g/mol, H: 1 g/mol

$$\text{Molar mass of } \text{CH}_4 = 12 + 4 \times 1 = 16 \text{ g/mol}$$

2. **Calculate the number of moles:**

$$\text{Number of moles} = \frac{\text{Weight}}{\text{Molecular weight}} = \frac{16 \text{ g}}{16 \text{ g/mol}} = 1 \text{ mole}$$

Problem 5: Calculating Moles from Mass (Sulfuric Acid)

Problem: Calculate the number of moles in 98 grams of sulfuric acid (H₂SO₄).

Solution:

1. **Find the molar mass of H₂SO₄:** H: 1 g/mol, S: 32 g/mol, O: 16 g/mol

$$\text{Molar mass of H}_2\text{SO}_4 = 2 \times 1 + 32 + 4 \times 16 = 98 \text{ g/mol}$$

2. **Calculate the number of moles:**

$$\text{Number of moles} = \frac{\text{Weight}}{\text{Molecular weight}} = \frac{98 \text{ g}}{98 \text{ g/mol}} = 1 \text{ mole}$$

Problem 6: Calculating Moles from Mass (Glucose)

Problem: Determine the number of moles in 180 grams of glucose (C₆H₁₂O₆).

Solution:

1. **Find the molar mass of C₆H₁₂O₆:** C: 12 g/mol, H: 1 g/mol, O: 16 g/mol

$$\text{Molar mass of C}_6\text{H}_{12}\text{O}_6 = 6 \times 12 + 12 \times 1 + 6 \times 16 = 180 \text{ g/mol}$$

2. **Calculate the number of moles:**

$$\text{Number of moles} = \frac{\text{Weight}}{\text{Molecular weight}} = \frac{180 \text{ g}}{180 \text{ g/mol}} = 1 \text{ mole}$$

These problems should provide a clear understanding of how to use the equation

Number of moles = $\frac{\text{Weight}}{\text{Molecular weight}}$ to calculate the number of moles from a given mass.