

Mole & Volume Worksheet

Answers

1. How many atoms are present in 78.4 liters of Ne at STP?

At STP, 1 mole is represented by 22.4 liters.

1 mole is also represented by 6.023×10^{23} atoms

Number of atoms = $(78.4/22.4) \times 6.023 \times 10^{23}$ atoms = 2.1×10^{24} atoms

2. How much does 40.34×10^{23} molecules of H_2 at STP weigh?

Molar mass of H_2 = 2 g/mol

Weight of 40.34×10^{23} molecules of H_2 = $[(40.34 \times 10^{23}) / (6.023 \times 10^{23})] \times 2$ grams
= 13.39 grams

3. What is the volume of 6.5 moles of He at STP?

At STP, 1 mole is represented by 22.4 liters.

Volume of 6.5 moles of He at STP = 6.5×22.4 liters = 145.6 liters

4. How much does 99 liters of NO_2 weigh at STP?

Molar mass of NO_2 = 46.0055 g/mol

At STP, 1 mole is represented by 22.4 liters.

Weight of 99 liters of NO_2 = $(99/22.4) \times 46.0055$ grams = 203.32 grams

5. How many molecules are present in 168 liters of CO_2 at STP?

1 mole is also represented by 6.023×10^{23} molecules

At STP, 1 mole is represented by 22.4 liters.

Number of molecules = $(168/22.4) \times 6.023 \times 10^{23}$ molecules = 45.17×10^{23}
molecules $\sim 4.5 \times 10^{24}$ molecules