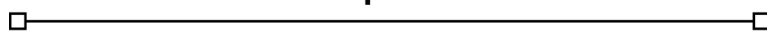# Mole Concept Worksheet

Answer the following questions.

1. What does the term 'mole' signify?

2. How many moles of iron does a jar containing 388.2 g of iron filings contain?

3. How many moles of lithium are there in 1.204 x 10^{24} Li atoms?

4. How many boron atoms are there in 2 grams?

5. How many moles of CO_2 are in 66 g of dry ice?

6. How many molecules are in 0.05 mol of hexane (C_6H_{14})?

7. How many molecules are there in 90.1 grams of water?

Mole Concept Worksheet

Answers

1. What does the term 'mole' signify?

   The mole is a unit of measurement directly proportional to the number of elementary entities present in a substance. One mole contains exactly 6.023×10^{23} elementary entities, which can be atoms, molecules, ions, or other particles. The number of particles in a mole is the Avogadro number (N_0) with a unit expressed in mol^{-1}.

2. How many moles of iron does a jar containing 388.2 g of iron filings contain?

   Molar mass of Fe = 55.85 g/mol

   Number of moles = (388.2/55.85) = 6.95 moles

3. How many moles of lithium are there in 1.204×10^{24} Li atoms?

   Number of moles of Li = $[(1.204 \times 10^{24})/(6.023 \times 10^{23})]$ = 1.9 moles

4. How many boron atoms are there in 2 grams?

   Molar mass of Boron = 10.81 g/mol

   Number of boron atoms = $(2/10.81) \times 6.023 \times 10^{23}$ = 1.11×10^{23} atoms

5. How many moles of CO_2 are in 66 g of dry ice?

   Molar mass of Carbon Dioxide = 44.01 g/mol

   Number of moles of CO_2 = (66/44.01) moles = 1.49 moles ~ 1.5 moles

6. How many molecules are in 0.05 mol of hexane (C_6H_{14})?

   Number of molecules = $0.05 \times 6.023 \times 10^{23}$ molecules = 3.01×10^{22} molecules

7. How many molecules are there in 90.1 grams of water?

   Molar mass of H_2O = 18 g/mol

   Number of molecules = $(90.1/18) \times 6.023 \times 10^{23}$ molecules = 3.01×10^{24} molecules