

How many molecules are contained in a 3.36 mole sample of NH<sub>3</sub>? Need written out formula please.

**Solution:**

We can determine the number of moles either by one of the three formulas, mentioned below:

$$n(\text{NH}_3) = \frac{m(\text{NH}_3)}{M(\text{NH}_3)}, \text{ (where } m \text{ - mass of NH}_3, M \text{ - molar mass of NH}_3\text{);}$$

or

$$n(\text{NH}_3) = \frac{V(\text{NH}_3)}{V_m}, \text{ (where } V \text{ - volume of NH}_3, V_m \text{ - molar volume);}$$

or

$$n(\text{NH}_3) = \frac{N(\text{NH}_3)}{N_A}, \text{ (where } N \text{ - number of molecules of NH}_3, N_A \text{ - Avogadro constant);}$$

We can express a number of molecules of NH<sub>3</sub> (N variable) from the third equation, mentioned above:

$$N(\text{NH}_3) = n(\text{NH}_3) * N_A = 3.36 \text{ mol} * 6.02 * 10^{23} \text{ molecules/mol} = 2.02272 * 10^{24} \text{ molecules;}$$

**Answer:**

There are  $2.02272 * 10^{24}$  molecules of ammonia in 3.36 moles.

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