Answer on Question #55202 - Chemistry – General Chemistry

Question:

A vial contains 6.45g of nitrobenzene, how many moles of nitrobenzene are in the vial? And how many molecules of nitrobenzene in the vial?

Answer:

Nitrobenzene has a formula of $C_6H_5NO_2$.

Molar mass of nitrobenzene is 123.06 g/mol.

Number of moles of nitrobenzene is:

$$n = \frac{m}{M} = \frac{6.45}{123.06} = 0.052\ mol$$

Number of molecules of nitrobenzene in the vial:

$$N = n \cdot N_A = 0.052 \cdot 6.022 \cdot 10^{23} = 3.13 \cdot 10^{22}$$

N – Number of molecules, N = 2.41 x 10^{24} g;

N_A – Avogadro constant, $N_A = 6.022 \cdot 10^{23}$ mol^{-1}.

Answer: 0.052 mol; $3.13 \cdot 10^{22}$ molecules.