You use 25mL of 6.0M NaOH to neutralize 100mL of an unknown acid in a titration experiment. What is the molarity of the acid? Show work

Molarity (C) is defined as the amount of a constituent (n_i) divided by the volume of the mixture (V), so if given molarity of NaOH is 6.0 mol/L and volume is 25 ml, or 0.025L the amount is:

n=V*C =0.025L*6.0 mol/L = 0.15 mol.

There are some different cases of finding molarity of the acid and it is connected with number of protons in acid structure:

When *number is **1***, the amount ratio of NaOH and acid is 1: 1.

$NaOH + HX \rightarrow NaX + H_2O$

Molarity in this case is 0.15 mol per 100 ml, or 1.5 mol/L (**1.5M**)

When *number is **2***, the amount ratio of NaOH and acid is 2: 1.

$2NaOH + H_2X \rightarrow Na_2X + 2H_2O$

Molarity in this case is 0.15/2 mol per 100 ml, or 0.75mol/L (**0.75M**)

When *number is **n***, the amount ratio of NaOH and acid is n: 1.

Molarity in this case is 0.15/n mol per 100 ml, or (**(0.15/n * 100 ml/1000 ml)M)**