

. HCl is a molecular gas as a pure substance but acts as an acid in aqueous solution.

(a) A sample of $\text{HCl}(g)$ is stored in a rigid 6.00 L container at 7.45 atm and 296 K.

(i) Calculate the number of moles of $\text{HCl}(g)$ in the container.

(ii) The rigid 6.00 L container of $\text{HCl}(g)$ is cooled to a temperature of 271 K. Calculate the new pressure, in atm, of the $\text{HCl}(g)$.

(c) The following particulate diagram represents the ionization of one of the acids in the data table. Water molecules have been omitted for clarity. Which acid (HNO_2 , HCl , or HClO_4) is represented in the diagram? Justify your answer using the information in the table.

