4.3 Exercise 2 – pH calculations

1. Calculate the pH of the following solutions:

a) 0.001 $moldm^{-3}$ HCl
b) 0.002 $moldm^{-3}$ KOH
c) 0.10 $moldm^{-3}$ C_6H_5COOH (K_a of benzoic acid = 6.3×10^{-5} $moldm^{-3}$)
d) 0.30 $moldm^{-3}$ NH_4Br (K_a of NH_4^+ = 5.6×10^{-10} $moldm^{-3}$)
e) 0.05 $moldm^{-3}$ $NaHSO_4$ (K_a of HSO_4^- = 1.0×10^{-2} $moldm^{-3}$)
f) 0.02 $moldm^{-3}$ $Ba(OH)_2$.

2. Calculate the molarity of the following solutions:

a) HCl , pH = 3.
b) HCOOH (K_a = 1.6×10^{-4} $moldm^{-3}$), pH = 3.
c) NaOH, pH = 11.

3. The pH of a 0.10 $moldm^{-3}$ solution of a weak monoprotic acid, HA is 2.85. Determine the K_a of the acid

4. A 500 cm^3 solution containing 1.9g of a weak acid HA has a pH of 3.5. Calculate the molar mass of the acid, given that it has a K_a of 2.0×10^{-6} $moldm^{-3}$.