

KEY

WS 5 - Strengths of Acids

1. Calculate the pH of 500 mL of each of the following acids:

a) 1.0×10^{-2} mol/L HCl(aq) Strong acid $\therefore [HCl] = [H_3O^+]$

$$pH = -\log(0.010) = \boxed{2.00}$$

b) 6.00 mol/L HNO₂(aq)

HNO₂

$$K_a = \frac{[H_3O^+][NO_2^-]}{[HNO_2]} = 5.6 \times 10^{-4} = \frac{x^2}{6.00 M} \quad x = [H_3O^+] = 0.0579 \dots$$

$$pH = -\log(0.0579 \dots) = \boxed{1.237}$$

c) 1.50 mol/L H₂SO₃(aq)

$$pH = \boxed{0.839}$$

d) 6.8×10^{-2} mol/L HNO₃(aq)

$$pH = \boxed{1.17}$$

e) 6.3×10^{-1} mol/L HF(aq)

$$pH = \boxed{1.70}$$

2. A 0.80 mol/L solution of an unknown acid, HX(aq), has a pH of 3.75. Calculate the K_a , the acid ionization constant.

$$K_a = \boxed{4.0 \times 10^{-8}}$$

3. Calculate the pH of a solution containing 0.25 mol/L of an acid with an acid ionization constant (K_a) of 3.2×10^{-6} mol/L.

$$pH = \boxed{3.05}$$