

+ WS 10.9 K_a / K_b (weak acids & bases)

1. 20.0 g of acetic acid is dissolved into 250. mL of solution.
What is the pH of this solution?

substance	formula	K_a
acetic acid	$\text{HC}_2\text{H}_3\text{O}_2$	1.7×10^{-5}
benzoic acid	$\text{HC}_7\text{H}_5\text{O}_2$	6.3×10^{-5}
boric acid	H_3BO_3	5.9×10^{-10}
cyanic acid	HCNO	3.5×10^{-4}
formic acid	HCHO_2	1.7×10^{-4}
hypochlorous acid	HClO	3.5×10^{-8}
nitrous acid	HNO_2	4.5×10^{-4}
propionic acid	$\text{HC}_3\text{H}_5\text{O}_2$	1.3×10^{-5}
pyruvic acid	$\text{HC}_3\text{H}_3\text{O}_3$	1.4×10^{-4}

2. If 1.5 g of cyanic acid (causes tearing & blistering, and can explode if heated rapidly) is made into 0.50 L of solution, what would be its pH?

substance	formula	K_b
ammonia	NH_3	1.8×10^{-5}
aniline	$\text{C}_6\text{H}_5\text{NH}_2$	4.2×10^{-10}
hydrazine	N_2H_4	1.7×10^{-6}
pyridine	$\text{C}_5\text{H}_5\text{N}$	1.4×10^{-9}
urea	NH_2CONH_2	1.5×10^{-14}

3. Formic acid is responsible for the "sting" from fire ants.
What would be the pH of 0.15 g of this acid in 1.0 L of solution?

4. What is the pH of store-bought ammonia solution? (0.050 M)

5. In 1828, German chemist Fredrick Wöhler synthesized urea in the lab. Normally produced by mammals through protein metabolism, it is now produced in large quantity as a fertilizer due to its high nitrogen content. What is the pH of a 0.75 L solution with 100.0 g of urea?