

G12 Chemistry: Class 12 Homework

1. Write the formula of the conjugate base of each molecule or ion: **[4 marks]**

a) HCl _____

b) HCO_3^- _____

c) H_2SO_4 _____

d) N_2H_5^+ _____

2. Write the formula of the conjugate acid of each molecule or ion: **[4 marks]**

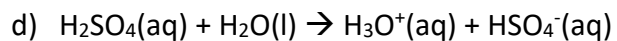
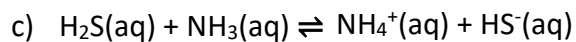
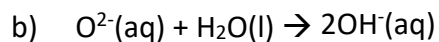
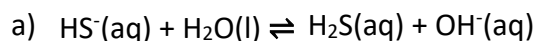
a) NO_3^- _____

b) OH^- _____

c) H_2O _____

d) HCO_3^- _____

3. Determine the conjugate acid-base pairs in each reaction. **[4 marks]**



4. Calculate the concentration of hydronium ions in each solution.

a) 30.0 mL of 4.50 mol/L HBr(aq) diluted to 100.0 mL **[2 marks]**

b) 17.9 mL of 0.175 mol/L HNO₃(aq) added to 35.4 mL of 0.0160 mol/L Ca(OH)₂(aq)
[3 marks]

5. [H₃O⁺] is 1.7x10⁻¹⁴ M in a solution of calcium hydroxide. What is the molar concentration of the Ca(OH)₂(aq)? **[3 marks]**

6. [H₃O⁺] of a sample of milk is found to be 3.98 × 10⁻⁷ mol/L. Is the milk acidic, neutral, or basic? Calculate the pH and [OH⁻] of the sample. **[3 marks]**

7. Butanoic acid gives rancid butter its distinctive odour. Calculate the pH of a 1.0×10^{-2} M solution of butanoic acid ($K_a = 1.51 \times 10^{-5}$). **[4 marks]**
8. HOCl, is used as a bleach and a germ-killer. A chemist finds that 0.027% of HOCl acid molecules are dissociated in a 0.40 M solution of the acid. What is the value of K_a for the acid? **[4 marks]**

9. Morphine, $C_{17}H_{19}NO_3$ is a naturally occurring base that is used to control pain. A 4.5×10^{-3} M solution has a pH of 9.93. Calculate K_b for morphine. **[5 marks]**
10. Methylamine, CH_3NH_2 is a fishy-smelling gas at room temperature. It is used to manufacture several prescription drugs, including methamphetamine. Calculate $[OH^-]$ and pOH of a 0.25M aqueous solution of methylamine. **[4 marks]**