1. Designate the conjugate Brønsted-Lowry base for each of the following acids:

(i) H_2CO_3 **(ii)** HNO_3 **(iii)** $H^+(aq)$

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○ HCO_3^-, NO_3^{2-}, H_2O

○ CO_3^{2-}, NO_3^-, OH^-

○ HCO_3^-, NO_3^-, OH^-

○ HCO_3^-, NO_3^-, H_2O

○ CO_3^{2-}, NO_3^{2-}, H_2O

2. What is the conjugate base of OH^-?

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○ O^-

○ O^{2-}

○ O_2

○ H_3O^+

○ H_2O

3. What is the concentration of hydronium ions in a solution with a hydroxide-ion concentration of 2.31×10^{-4} M at 25°C?

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○ 2.31×10^{10} M

○ 2.31×10^{-4} M

○ 4.33×10^{-11} M

○ 2.31×10^{-18} M

4. At normal body temperature, 37°C, $K_w = 2.4 \times 10^{-14}$. Calculate $[H^+]$ if $[OH^-] = 1.3 \times 10^{-9}$ M at this temperature

5. Calculate the pH of a solution if its [OH⁻] = 0.000700 M and indicate whether the solution is acidic, basic, or neutral.

6. If a solution has a pH = 9.50, what are the molar concentrations of $H^+(aq)$ and $OH^-(aq)$ in the solution?

7. Calculate the pH of the following strong acid solutions:

(i) 1.02 g of HNO_3 in 250. mL of solution

8. Calculate the pOH of the following solutions:

(i) 3.98 x 10^{-2} M $Mg(OH)_2$

9. Phenol (C_6H_5OH) is a weak acid with one acidic hydrogen. The pH of a 0.00500 M solution of phenol is 6.09. Calculate K_a.

10. Barbital is a weak monoprotic acid with $K_a = 1.0 \times 10^{-8}$. What is the pH of a 1.5×10^{-4} M solution of barbital?

11. Ammonia, NH_3, is a weak base. Write the K_b expression for ammonia

12. The pH of a 0.25 M solution of base, B, is 9.10. Calculate the K_b for base B