

### Problems of Acid–base equilibria: Strong acids and bases

---

1) An aqueous solution of perchloric acid ( $\text{HClO}_4$ ) has 11 g of this compound and its volume is 850 mL. Find out the pH.

*Atomic masses (g/mol):* H = 1, O = 16, Cl = 35.5.

2) An aqueous solution of potassium hydroxide (KOH) has 9 g of this compound and its volume is 1150 mL. Find out the pH.

*Atomic masses (g/mol):* H = 1, O = 16, K = 39.1.

3) An aqueous solution of hydrobromic acid (HBr) has a pH of 1.379. Calculate the molarity of this solution.

4) An aqueous solution of potassium hydroxide (KOH) has a pH of 13.6. Calculate the molarity of this solution.

5) We prepare an aqueous solution with pH = 1.373 containing 4 g of pure nitric acid ( $\text{HNO}_3$ ). What is the volume of this solution?

*Atomic masses (g/mol):* H = 1, O = 16, N = 14.

6) Calculate the mass of perchloric acid ( $\text{HClO}_4$ ) that is required to prepare 750 mL of an aqueous solution with a pH of 1.032.

*Atomic masses (g/mol):* H = 1, O = 16, Cl = 35.5.

7) Find out the pH of a mixture of 600 mL of an aqueous solution of HI 0.1 mol/L with 420 mL of another aqueous solution of sodium hydroxide 0.11 mol/L.

8) Find out the pH of a mixture of 1100 mL of an aqueous solution of HBr 0.3 mol/L with 660 mL of another aqueous solution of perchloric acid 0.39 mol/L.

9) Find out the pH of a mixture of 250 mL of an aqueous solution of NaOH 0.4 mol/L with 200 mL of another aqueous solution of potassium hydroxide 0.64 mol/L.

10) Calculate the pH of an aqueous solution with a nitric acid ( $\text{HNO}_3$ ) concentration of 0.068 mol/L.

**Problems of Acid–base equilibria: Strong acids and bases**

---

**Answers:**

- 1) 0.89
- 2) 13.145
- 3) 0.0418 mol/L
- 4) 0.398 mol/L
- 5) 1500 mL
- 6) 7 g
- 7) 1.869
- 8) 0.477
- 9) 13.705
- 10) pH = 1.167