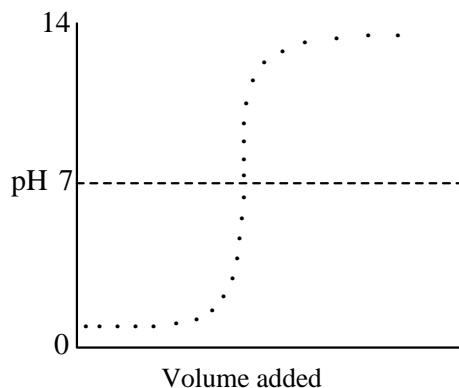


1. A 1.0 L flask contains a mixture of hydrogen (8.0 atm), oxygen (4.0 atm) and neon (2.0 atm) at the stated partial pressures at a temperature of 40 °C. What is the total pressure inside the flask at 40 °C after the mixture is sparked. Ignore the vapour pressure of water.
a) 14.0 atm b) 10.0 atm c) 6.0 atm d) 2.0 atm e) 0.0 atm
2. Assuming ideal behaviour, what is the boiling point of a solution of sodium hydroxide (150.0 g) in water (900.0 g)? The boiling point elevation constant, K_b , for water is 0.51 K kg mol⁻¹.
a) 106.38 °C b) 104.25 °C c) 102.13 °C d) 97.88 °C e) 95.75 °C
3. Which one of the following is **not** an example of a conjugate acid-base pair?
a) NH₄⁺, NH₃
b) HI, I⁻
c) CH₃CH₂OH₂⁺, CH₃CH₂O⁻
d) HSO₃⁻, SO₃²⁻
e) H₂O, OH⁻
4. Which one of the following sets of 0.1 M solutions is arranged in order of increasing boiling point?
a) glucose < NaCl < NH₃ < Na₂SO₄
b) glucose < HBr < Na₃PO₄ < Na₂SO₄
c) Na₂SO₄ < Na₃PO₄ < HBr < glucose
d) glucose < HBr < Na₂SO₄ < Na₃PO₄
e) HBr < Na₂SO₄ < Na₃PO₄ < glucose
5. What is the pH of a 0.20 M solution of boric acid? The p*K*_a of boric acid is 9.24.
a) 0.70 b) 2.73 c) 4.97 d) 5.12 e) 5.87

6. What is the pH of a 0.045 M solution of KOB_r? The pK_a of HOBr is 8.63.
- a) 4.74 b) 4.99 c) 8.25 d) 9.01 e) 10.64
7. A buffered solution is 0.0500 M CH₃COOH and 0.0400 M NaCH₃CO₂. If 0.0100 mol of gaseous HCl is added to 1.00 L of the buffered solution, what is the final pH of the solution? For acetic acid, pK_a = 4.76
- a) 4.76 b) 4.46 c) 4.66 d) 4.86 e) 4.54
8. In each of the following titrations, the first solution is in the burette and the second solution is in the titration flask. For which titration would the curve illustrated be typical?



- a) Na₂CO₃ (0.05 M) / HCl (0.1 M)
- b) NaOH (0.1 M) / HI (0.1 M)
- c) NaOH (0.1 M) / CH₃COOH (0.1 M)
- d) NH₃ (0.1 M) / CH₃COOH (0.1 M)
- e) NH₃ (0.1 M) / HCl (0.1 M)

9. What is the electronic configuration of Mn⁴⁺?
- a) 1s² 2s² 2p⁶ 3s² 3p⁶ 4s² 3d¹
- b) 1s² 2s² 2p⁶ 3s² 3p⁶ 4s¹ 3d²
- c) 1s² 2s² 2p⁶ 3s² 3p⁶ 3d³
- d) 1s² 2s² 2p⁶ 3s² 3p⁶ 3d⁵
- e) 1s² 2s² 2p⁶ 3s² 3p⁶ 4s² 3d⁹
10. What is the systematic name for the coordination compound, [Mo(NH₃)₃(OH₂)₃]Cl₃?
- a) triaquatriamminemolybdenum(VI) trichloride
- b) triaquatriamminemolybdenum(III) trichloride
- c) triamminetriaquamolybdenum(III) trichloride
- d) triaquatriamminemolybdenum(III) chloride
- e) triamminetriaquamolybdenum(III) chloride

Correct answers: 1D, 2B, 3C, 4D, 5C, 6E, 7B, 8B, 9C, 10E