

1. pH of the 1,00 M diprotic acid solution is:

$$pH = \frac{1}{2} (-\lg K_{a1} - \lg C_a^0) = \frac{1}{2} (-\lg 2,5 \cdot 10^{-5} - \lg 1,00) = 4,60$$

2. Acid concentration after 100.00 mL of NaOH have been added:

$$C_a = \frac{C_a^0 \cdot V_a - C_t \cdot V_t}{V_a + V_t} = \frac{1,00 \cdot 200,00 - 1,18 \cdot 100,00}{200,00 + 100,00} = 0,273 \text{ M}$$

3. Salt concentration is:

$$C_s = \frac{C_t \cdot V_t}{V_a + V_t} = \frac{1,18 \cdot 100,00}{200,00 + 100,00} = 0,393 \text{ M}$$

5. pH of the acid solution after 15.00 mL of titrant have been added is:

$$pH = -\lg K_{a2} - \lg \frac{0,273}{0,393} = 8,65$$

Answer: 8,65.