

1.

5 g NaCl in 0,5 L Lösung (Na⁺ und Cl⁻)

$$M(\text{Na}) = 23,0 \text{ g/mol} \quad M(\text{Cl}) = 35,5 \text{ g/mol} \quad M(\text{NaCl}) = 58,5 \text{ g/mol}$$

$$n(\text{NaCl}) = m(\text{NaCl}) / M(\text{NaCl}) \quad n(\text{NaCl}) = 5 \text{ g} / 58,5 \text{ g/mol} = 0,0855 \text{ mol}$$

$$c = n / V$$

$$c(\text{NaCl}) = n(\text{NaCl}) / V(\text{Lsg.}) \quad c(\text{NaCl}) = 0,0855 \text{ mol} / 0,5 \text{ L} = \underline{\underline{0,171 \text{ mol/L}}}$$

2.

1 molar = 1 mol/L

$$n = c * V \quad m = M * n$$

$$n(\text{HCl}) = c(\text{HCl}) * V(\text{Lsg.}) \quad n(\text{HCl}) = 1 \text{ mol/L} * 0,35 \text{ L} = 0,35 \text{ mol}$$

$$m(\text{HCl}) = M(\text{HCl}) * n(\text{HCl}) \quad m(\text{HCl}) = 36,5 \text{ g/mol} * 0,35 \text{ mol} = \underline{\underline{12,78 \text{ g}}}$$

3.

0,4 g Glukose in 0,7 L Wasser

$$\text{a) } M(\text{C}_6\text{H}_{12}\text{O}_6) = \underline{\underline{180 \text{ g/mol}}}$$

$$\text{b) } n(\text{C}_6\text{H}_{12}\text{O}_6) = m(\text{C}_6\text{H}_{12}\text{O}_6) / M(\text{C}_6\text{H}_{12}\text{O}_6) = 0,4 \text{ g} / 180 \text{ g/mol} = \underline{\underline{0,0022 \text{ mol}}}$$

$$\text{c) } c(\text{C}_6\text{H}_{12}\text{O}_6) = n(\text{C}_6\text{H}_{12}\text{O}_6) / V(\text{Lsg.}) = 0,0022 \text{ mol} / 0,7 \text{ L} = \underline{\underline{0,0032 \text{ mol/L}}}$$

4.

$$n = c * V$$

$$n(\text{CH}_3\text{COOH}) = 0,03 \text{ mol/L} * 4 \text{ L} = \underline{\underline{0,12 \text{ mol}}}$$

5.

275 g CaCl₂ in 0,5 L Lösung

$$M(\text{Ca}) = 40,1 \text{ g/mol} \quad M(\text{Cl}) = 35,5 \text{ g/mol} \quad M(\text{CaCl}_2) = 111,1 \text{ g/mol}$$

$$n(\text{CaCl}_2) = m(\text{CaCl}_2) / M(\text{CaCl}_2) \quad n(\text{CaCl}_2) = 275 \text{ g} / 111,1 \text{ g/mol} = 2,46 \text{ mol}$$

$$c = n / V$$

$$c(\text{CaCl}_2) = n(\text{CaCl}_2) / V(\text{Lsg.}) \quad c(\text{CaCl}_2) = 2,46 \text{ mol} / 0,5 \text{ L} = \underline{\underline{4,92 \text{ mol/L}}}$$
 ("4,92-molar")

6.

0,2-molar = 0,2 mol/L

$M(\text{KOH}) = 56,1 \text{ g/mol}$

$n(\text{KOH}) = m(\text{KOH}) / M(\text{KOH})$ $n(\text{KOH}) = 28 \text{ g} / 56,1 \text{ g/mol} = 0,5 \text{ mol}$

$V = n / c$

$V(\text{Lsg.}) = n(\text{KOH}) / c(\text{KOH})$ $V(\text{Lsg.}) = 0,5 \text{ mol} / 0,2 \text{ mol/L} = \underline{\underline{2,5 \text{ L}}}$

7.

$M(\text{H}_2\text{SO}_4) = 98,1 \text{ g/mol}$

$n(\text{H}_2\text{SO}_4) = m(\text{H}_2\text{SO}_4) / M(\text{H}_2\text{SO}_4)$ $= 98 \text{ g} / 98,1 \text{ g/mol} = 1 \text{ mol}$

$c(\text{H}_2\text{SO}_4) = n(\text{H}_2\text{SO}_4) / V(\text{Lsg.})$ $= 1 \text{ mol} / 5,0 \text{ L} = \underline{\underline{0,2 \text{ mol/L}}}$