

$$\lg \frac{c_1}{c_2} = -\frac{H_o}{2,303 \cdot R} \cdot \left[ \frac{1}{T_1} - \frac{1}{T_2} \right]$$

$$a_i = \gamma_i \cdot c_i \qquad \lg a_i = \lg \gamma_i + \lg c_i$$

$$\lg \frac{c_1}{c_2} = - \left[ \frac{H_o}{2,303 \cdot R} \left( \frac{1}{T_1} - \frac{1}{T_2} \right) + \lg \frac{\gamma_1}{\gamma_2} \right]$$

$$\text{pH}_{sz} = \text{pK}_a + \lg \frac{c-s}{s} \qquad \text{pH}_{sz} = \text{pK}_b + \lg \frac{c-s}{s}$$

$$\text{pH}_{sz} = \text{pK}_v - \text{pK}_b + \lg \frac{s}{c-s}$$

$$\lg \frac{s_1}{s_2} = \frac{2 \cdot \sigma \cdot V_{\text{mol}}}{2,303 \cdot RT \cdot r}$$

$$\text{HA} \Leftrightarrow \text{H}^+ + \text{A}^- \qquad K = \frac{[\text{A}^-] \cdot [\text{H}^+]}{[\text{HA}]}$$

$$\lg K = \lg [\text{A}^-] + \lg [\text{H}^+] - \lg [\text{HA}]$$

$$\text{pK} = \text{pH} - \lg [\text{A}^-] + \lg [\text{HA}]$$

$$\text{pK} - \text{pH} = \lg \frac{[\text{HA}]}{[\text{A}^-]} = \lg \frac{c}{c_d}$$

$$\text{pK} - \text{pH} = \lg \frac{c_d}{c}$$

$$\alpha = \frac{\gamma_{\text{mol}}}{\gamma_{\infty}}$$

$$K = \frac{\alpha^2}{1-\alpha} \cdot c^*$$

$$\gamma_{\text{mol}} = \frac{\gamma}{c}$$

$$\gamma_{\infty} = \gamma_{\infty \text{ kation}} + \gamma_{\infty \text{ anion}}$$

$$\gamma_{\text{elm}} = 0,1408 \text{ S/m} \qquad K_{\text{cella}} = \frac{\gamma_{\text{elm}}}{\kappa_{\text{KCl}}}$$

$$\gamma = (\kappa - \kappa_{\text{H}_2\text{O}}) K_{\text{cella}} \qquad \gamma = \frac{1}{R} \cdot K_c$$

$$\text{pK} = \text{pH} + \frac{A - A_B}{A_S - A}$$

$$V_2 = \frac{V_1 + V_3}{2}$$

$$U = \frac{V_1 \cdot C_o}{X}$$

$$Q = \frac{V_2 \cdot C_o}{X}$$

$$\frac{U \cdot 100}{Q} \text{ [\%]}$$

$$M = \frac{C_o \cdot Q_h \cdot t}{U}$$

$$\Delta T = \Delta T_M \cdot c; \quad \Delta T = \Delta T_M$$

$$c = \Delta T / 1,86$$

$$F = \eta \cdot A \frac{v_1 - v_2}{l_1 - l_2} = \eta \cdot A \frac{dv}{dl} \quad \tau = \frac{F}{A}$$

$$G = \frac{dv}{dl} \quad \tau = \eta \cdot G \quad \eta = \frac{\tau}{G} \quad v = \frac{\eta}{\rho}$$

$$\eta_{\text{rel}} = \frac{\eta}{\eta_0} \quad \eta_{\text{sp}} = \frac{\eta - \eta_0}{\eta_0} = \eta_{\text{rel}} - 1 \quad \frac{\eta_{\text{sp}}}{c} = \eta_{\text{red}} \quad \eta_h = KM^\alpha \quad B = \frac{\eta_1 - \eta_2}{\ln \frac{t_2}{t_1}}$$

$$\frac{V}{t} = \frac{\pi \cdot \Delta p \cdot r^4}{8 \cdot \eta \cdot l} \quad \Delta p = \frac{h_1 + h_2}{2} \cdot \rho \cdot g = h \cdot \rho \cdot g$$

$$\frac{V}{t} = \frac{\pi \cdot \rho \cdot g \cdot h \cdot r^4}{8 \cdot \eta \cdot l} \quad \frac{\eta_1}{\eta_2} = \frac{\rho_1 \cdot t_1}{\rho_2 \cdot t_2} = \eta_{\text{rel}}$$

$$F = 6\pi \cdot \eta \cdot r \cdot v \quad F_f = V_g \cdot \rho_f \cdot g \quad G = V_g \cdot \rho_g \cdot g$$

$$F = G - F_f = V_g \cdot g \cdot (\rho_g - \rho_f) \quad \eta = \frac{2g \cdot r^2 (\rho_g - \rho_f)}{9v}$$

$$\eta = \frac{2g \cdot r^2 (\rho_g - \rho_f) t}{9\Delta h} \quad \frac{\eta_1}{\eta_2} = \frac{(\rho_g - \rho_{f_1}) \cdot t_1}{(\rho_g - \rho_{f_2}) \cdot t_2}$$

$$\eta = k \cdot P \cdot t \quad \eta = \eta_0 \cdot e^{K \cdot c} \quad \ln \eta_{\text{rel}} = K \cdot c$$

$$\lg \eta = \frac{K \cdot c}{2.303} + \lg \eta_0 \quad \eta_h = k \cdot M^\alpha$$

$$\eta_{\text{sp}} = \frac{\eta - \eta_0}{\eta_0} = \eta_{\text{rel}} - 1 \quad \frac{\eta_{\text{sp}}}{c} = \eta_{\text{red}}$$

$$\sigma = \frac{r}{2} (\Delta p \cdot \rho \cdot g \cdot h) \quad m_x : m_v = \sigma_x : \sigma_v \quad \sigma_x = \frac{m_x}{m_v} \cdot \sigma_v$$

$$\sigma_x = \frac{n_v \cdot \rho_x}{n_x \cdot \rho_v} \cdot \sigma_v \quad \sigma_x = \frac{n_v \cdot \rho_x}{n_x} \cdot 73 \quad \sigma = \frac{v(\rho_1 - \rho_2)g}{2 \cdot \pi \cdot r \cdot k}$$

$$\cos \frac{\alpha}{2} = \frac{\sigma_{AC}}{\sigma_{BC} + \sigma_{AB}} \quad \cos \alpha = \frac{\sigma_{AC} - \sigma_{AB}}{\sigma_{BC}} \quad r = k \cdot V^n$$

$$\lg C_k = a - b n \quad \lg \text{CMC} = 16,33 + 0,718 \text{HLB}$$

$$\text{HLB} = 20 \cdot \left(1 - \frac{S}{A}\right) \quad \text{HLB} = \frac{E + P}{5} \quad \text{HLB} = 0,41 \cdot Q + 7,5$$

$$\text{HLB}_E = \frac{X \cdot \text{HLB}_A + (100 - X) \cdot \text{HLB}_B}{100} \quad v = \frac{h}{t} = \frac{2r^2(\rho_1 - \rho_2) \cdot g}{9 \cdot \eta}$$

$$t = \frac{9 \cdot \eta}{2(\rho_1 - \rho_2) \cdot g} \cdot \frac{h}{r^2} = k \cdot \frac{h}{r^2}$$

$$\pm \xi = \frac{v_c}{V_s} \cdot C \quad C = \frac{4\pi\eta}{\varepsilon} \cdot 9 \cdot 10^4$$

$$P = \frac{A}{\frac{1}{\rho_f} - \frac{1}{\rho_{sz}}} \cdot \Delta h$$

$$\eta = \eta_0 (1 + 2,5\Phi)$$

## A számolásokhoz szükséges konstansok

Gravitációs gyorsulás:  $9,81 \text{ m/s}^2$

### Sűrűség

alumínium:  $2700 \text{ kg/m}^3$

napraforgó olaj:  $919 \text{ kg/m}^3$

olívaolaj:  $920 \text{ kg/m}^3$

víz:  $996 \text{ kg/m}^3$

### Viszkozitás

olívaolaj:  $84,0 \text{ mPa}\cdot\text{s}$

víz:  $0,859 \text{ mPa}\cdot\text{s}$

Felületaktív anyag	Molekulatömeg	HLB-érték
Tween 20	1227,5	16,7
Tween 60	1312,0	14,9
Tween 80	1309,7	15,0

# Képlettár a 3. és 4. negyedéves fizikai gyakorlatokhoz

$$\rho = \frac{m}{V} = \frac{m}{\frac{m_f}{\rho_f}} = \frac{b-a}{\frac{(d-a)-(c-b)}{\rho_f}}$$

$\rho_f$  a ciklohexán sűrűsége;  $\rho_f = 0,7676 \text{ g/cm}^3$

$$H = [(V_{\text{felső}} \cdot m_{\text{alsó}})/(V_{\text{alsó}} \cdot m_{\text{felső}})] \cdot 100 \%$$



