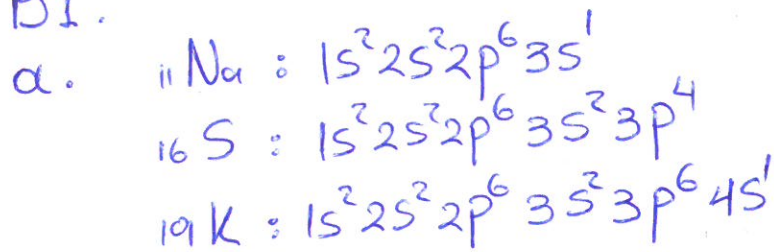


Θέμα Β

B1.



Na - S

ίδια περίοδος

$$Z_{\text{Na}}^* < Z_{\text{S}}^* \quad (R_{\text{Na}} > R_{\text{S}})$$

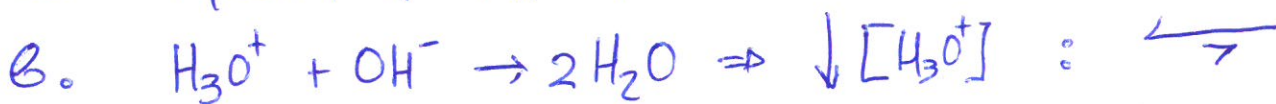
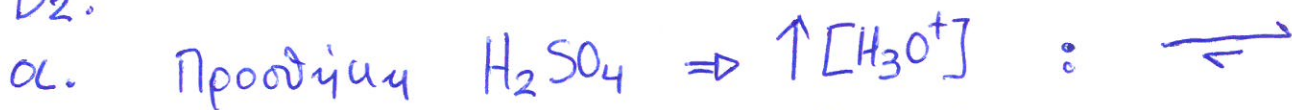
ίδια ομάδα Na - K

$$\chi_{\text{eff K}} > \chi_{\text{eff Na}} \quad (R_{\text{K}} > R_{\text{Na}})$$

$$R_{\text{K}} > R_{\text{Na}} > R_{\text{S}} \Rightarrow R_{\text{S}} < R_{\text{Na}} < R_{\text{K}}$$

β. $E_{\text{IS}} > E_{\text{INa}} \quad (\text{από } \odot)$

B2.



B3. $^2\text{He}^+$: υδρογονοειδές

$$E_{3s} = E_{3d} \Rightarrow f_i = f_{ii}$$

B4. Σειρά -I : $\text{C}_6\text{H}_5 < -\text{OH} < \text{F}^- < \text{NO}_2^-$

α. Διότι $\uparrow pK_a \Rightarrow \downarrow \text{ισχύς} \Rightarrow \downarrow -\text{I}$ επηρεάζω.

β. $\uparrow$ πηλίκος $\text{F}^- \Rightarrow \uparrow -\text{I} \Rightarrow \uparrow \text{ισχύς}$

B5. Δομή Α : $\mu_{\text{ολ}} = 0$ μη πολικό (λόγω δομής)

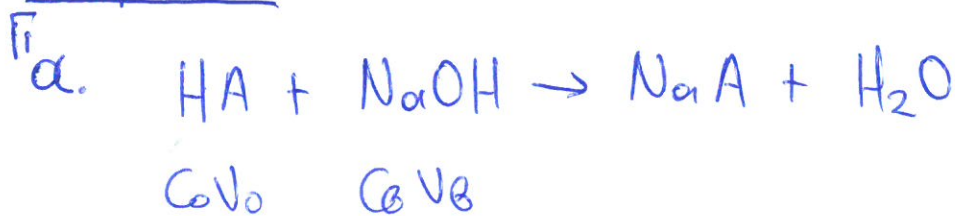
Δομή Β :

$\begin{array}{c} \text{Cl} \quad \text{NH}_3 \\ \diagdown \quad / \\ \text{Pt} \\ / \quad \diagdown \\ \text{Cl} \quad \text{NH}_3 \end{array}$

$\mu_{\text{ολ}} \neq 0$

πολικό
Πιο διαλυτό
στο H_2O

Θέμα Γ

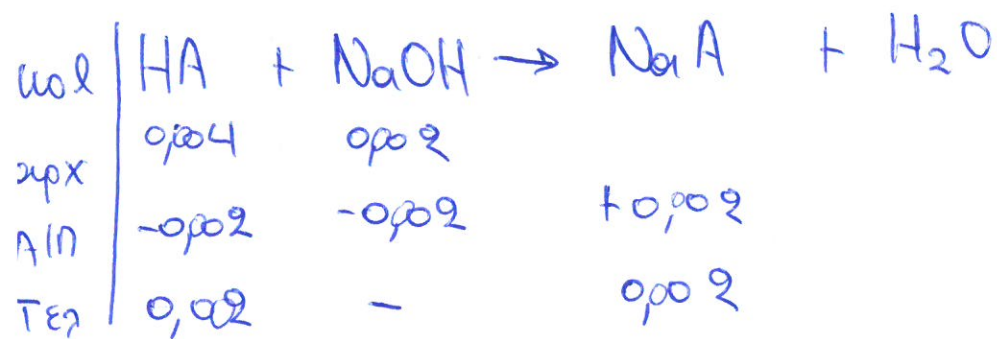


$$\Rightarrow C_0 = \frac{C_B V_B}{V_0} = \frac{0,2 \cdot \cancel{0,2}}{\cancel{0,2}} = 0,2 \text{ M}$$

β. Στα μισά της ογκομέτρησης

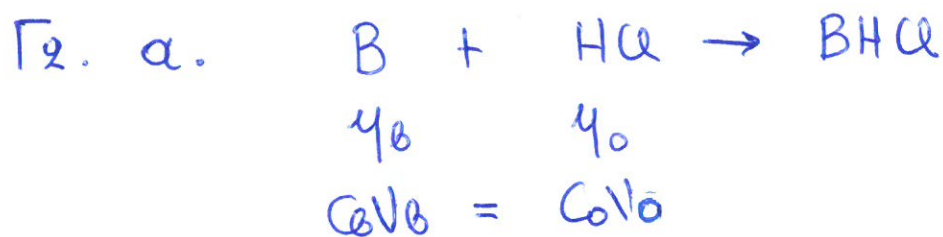
$$\gamma_0 = 0,04 \text{ mol}$$

$$\gamma_B = 0,02 \text{ mol}$$



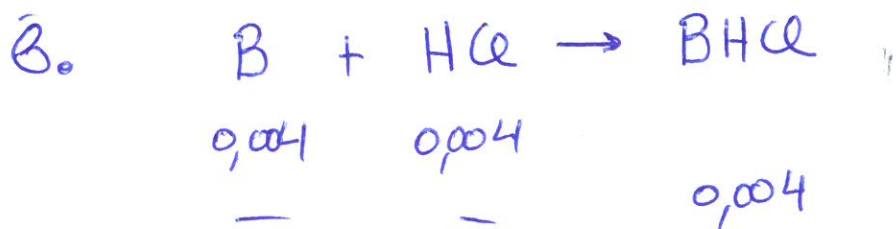
$$[\text{HA}] = [\text{NaA}] = \frac{0,02}{0,03} = 0,67 \text{ M (P.A.)}$$

$$\text{pH} = \text{pK}_a + \log \frac{C_B}{C_0} \Rightarrow \text{pH} = \text{pK}_a = 6.$$

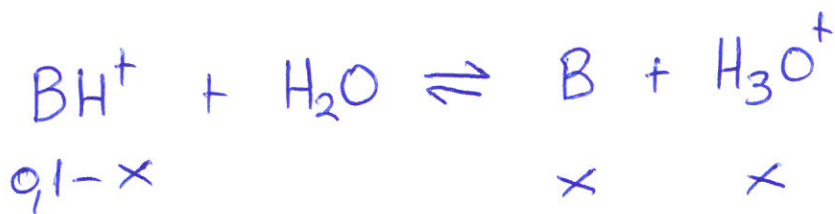
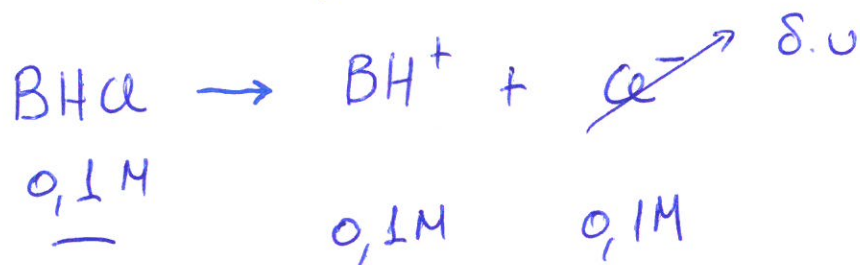


$$V_0 = \frac{C_B V_B}{C_0} = \frac{0,02 \cdot \cancel{0,2}}{\cancel{0,2}} = 0,02 \text{ ή } 20 \text{ mL}$$

(2)



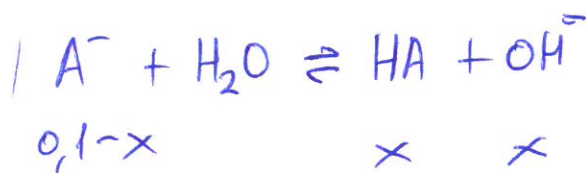
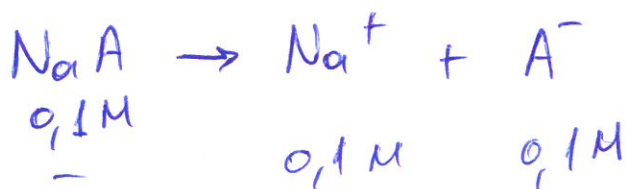
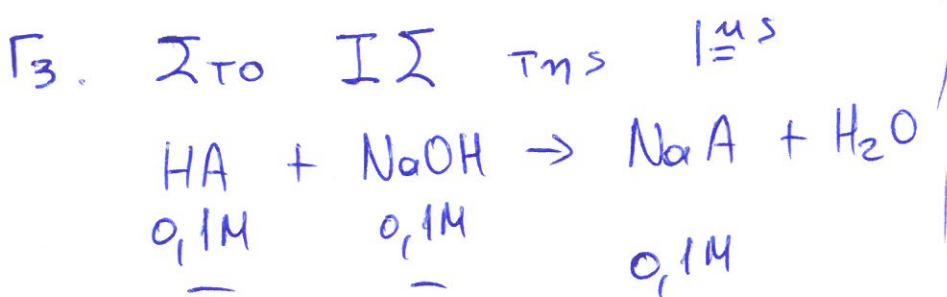
$$[\text{BHCl}] = \frac{0,004}{0,04} = 0,1 \text{ M}$$



$$K_a = \frac{10^{-14}}{10^{-6}} = 10^{-8}$$

$$10^{-8} = \frac{x^2}{c} \Rightarrow x^2 = 10^{-9} \Rightarrow x = 10^{-4,5} \text{ M}$$

$$\text{pH} = 4,5$$

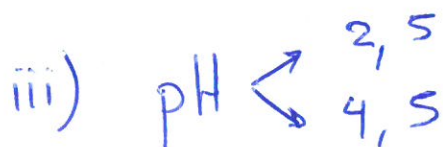
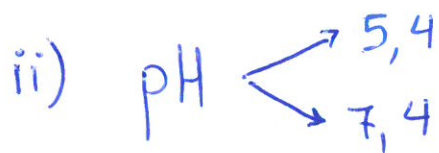
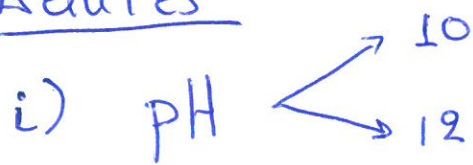


$$K_b = 10^{-6}$$

$$10^{-6} = \frac{x^2}{0,1}$$

$$x^2 = 10^{-7} \Rightarrow \text{pH} = 9,5$$

Δείκτες

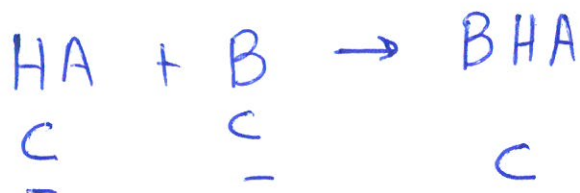
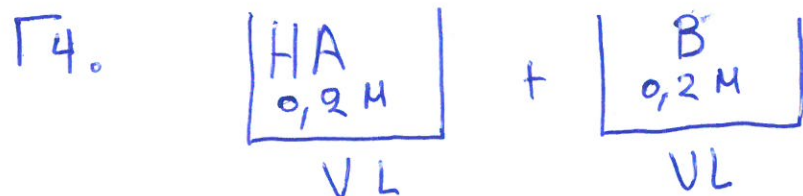


Για την 1^η

αίτιο αλκαλινότητας

Για την 2^η

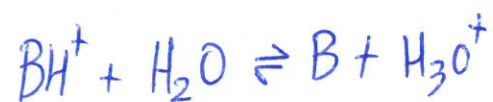
υδατοδιαλυ



$$K_{\text{a BH}^+} = 10^{-8}$$

$$K_{\text{b A}^-} = 10^{-8}$$

$$\text{pH} = 7$$



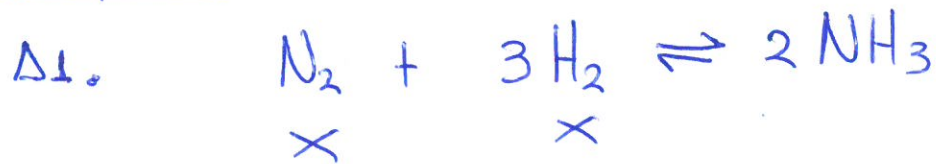
Γς.

Στην εξουδετέρωση : $\text{H}_3\text{O}^+ + \text{OH}^- \rightleftharpoons 2\text{H}_2\text{O}$ $\Delta H < 0$

αντίστροφο του $2\text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$ $\Delta H > 0$

Άρα $\uparrow \theta$.

Θέμα Α



$$\begin{array}{ccc} \times & \times & \\ -x & -3x & +2x \end{array}$$

$$\begin{array}{ccc} x-y & x-3x & 2x \end{array}$$

$$\left. \begin{array}{cc} 100 & 20 \\ 2x-2y & 2y \end{array} \right\} \begin{array}{l} 10y = 2x - 2y \\ \frac{10y}{12x} = \frac{2x}{12x} \end{array}$$

$$\frac{y}{x} = \frac{1}{6}$$

$$\boxed{x = 6y}$$

$$\alpha = \frac{3x}{x} = \frac{3x}{6x} = 0,5 \text{ ή } 50\%$$

$$\Delta 2. \quad \left. \begin{array}{l} 2x - 2y = 10 \\ x = 6y \end{array} \right\} \begin{array}{l} 10x = 10 \Rightarrow y = 1 \text{ mol} \\ x = 6 \text{ mol} \end{array}$$

$$K_c = \frac{\left(\frac{2}{V_1}\right)^2}{\frac{5}{V_1} \cdot \left(\frac{3}{V_1}\right)^3} = \frac{\frac{4}{V_1^2}}{\frac{27 \cdot 5}{V_1^4}} = \frac{4V_1^2}{27 \cdot 5} = \frac{20}{27}$$

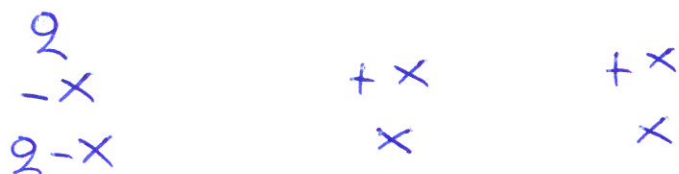
$$\Rightarrow V_1^2 = 27 \Rightarrow \boxed{V_1 = 5 \text{ L}}$$

Δ_3 .



α. $v_1 = k_1$ (0^{us} ταίφος)

$$v_2 = k_2 [\text{CO}_2] \quad (1^{\text{us}} \text{ ταίφος})$$

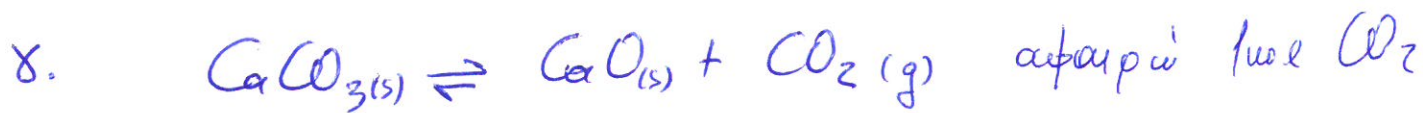


$$\alpha = 0,5 \Rightarrow \frac{x}{2} = 0,5 \Rightarrow x = 1 \text{ mol}$$

$$\gamma_{\text{CaCO}_3} = \gamma_{\text{CaO}} = \gamma_{\text{CO}_2} = 1 \text{ mol}$$

$$v_2 = k_2 [\text{CO}_2] \Rightarrow 0,4 = k_2 \cdot \frac{1}{1} \Rightarrow k_2 = 0,4 \text{ M}^{-1} \cdot \text{min}^{-1}$$

Στην Χ.Ι. $v_1 = v_2 \Rightarrow k_1 = 0,4 \text{ M/min}$



Με διάσπαση όλου του CaCO_3 βρετοποιείται $\rightleftharpoons$
και έχουμε 1 mol CO_2 πάνω (οριακή Χ.Ι.)

Αρα οριακά $P = P_{\text{αρχ}}$

Αρα αφαιρώ 0,5 mol CO_2 ακόμα για

$$P = \frac{P_{\text{αρχ}} x}{2}$$

Συνολικά : 1,5 mol CO_2

⑦

Θέμα Α

$A_1 - \theta$

$A_2 - \chi$

$A_3 - \alpha$

$A_4 - \theta$

$A_5 - \delta$