

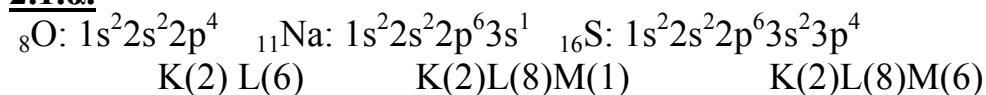
ΠΡΟΤΕΙΝΟΜΕΝΕΣ ΛΥΣΕΙΣ ΕΞΕΤΑΖΟΜΕΝΟ ΜΑΘΗΜΑ ΧΗΜΕΙΑ ΚΑΤΕΥΘΥΝΣΗΣ

ΘΕΜΑ 1ο

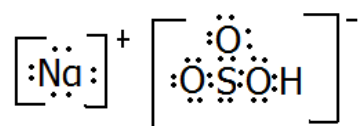
- 1.1** γ
1.2 γ
1.3 β
1.4 δ
1.5 α→Λ
 β→Σ
 γ→Σ
 δ→Λ
 ε→Σ

ΘΕΜΑ 2ο

2.1.α.



2.1.β.



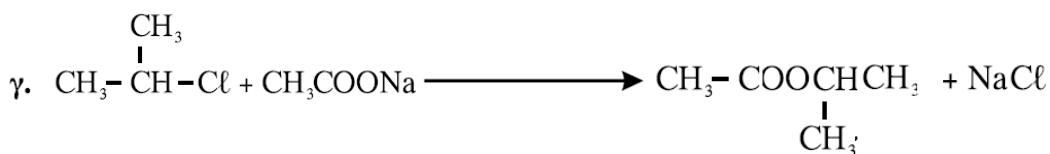
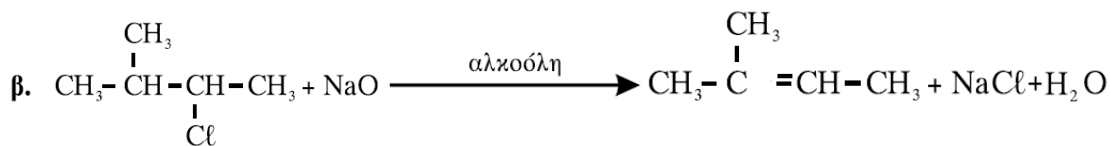
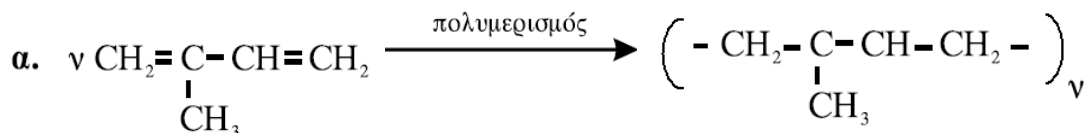
2.2α.

K_a	Οξύ	Συζυγής βάση	K_b
10^{-2}	HSO_4^-	SO_4^{2-}	10^{-12}
10^{-5}	CH_3COOH	CH_3COO^-	10^{-9}

2.2.β

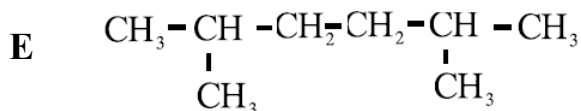
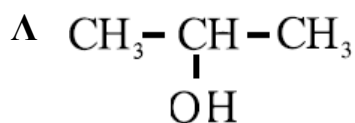
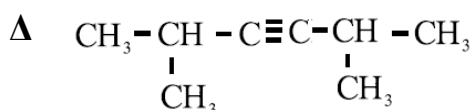
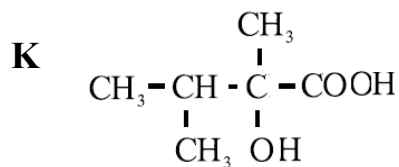
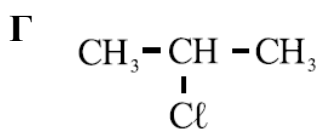
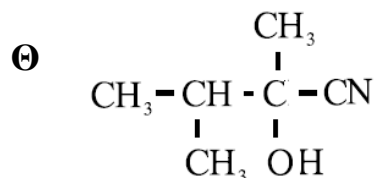
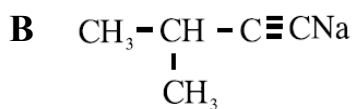
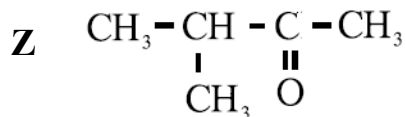
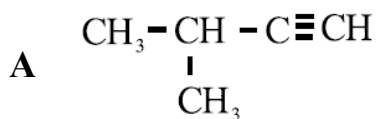
Η ισορροπία είναι μετατοπισμένη προς τα αριστερά. Το CH_3COOH είναι ασθενέστερο οξύ από το HSO_4^- αφού $K_{\alpha(\text{CH}_3\text{COOH})} < K_{\alpha(\text{HSO}_4^-)}$. Επίσης το SO_4^{2-} είναι ασθενέστερη βάση από το CH_3COO^- αφού $K_{\text{b}(\text{SO}_4^{2-})} < K_{\text{b}(\text{CH}_3\text{COO}^-)}$. Επειδή κάθε ισορροπία είναι μετατοπισμένη προς το ασθενέστερο οξύ και την ασθενέστερη βάση συμπεραίνουμε ότι είναι μετατοπισμένη προς τα αριστερά.

2.2.γ.

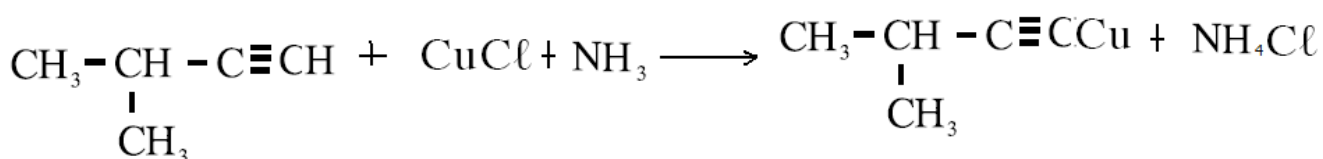


ΘΕΜΑ 3^ο

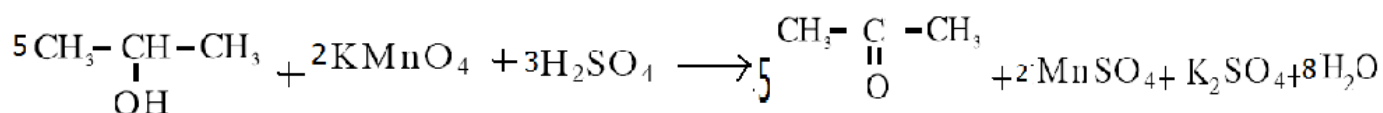
3.1



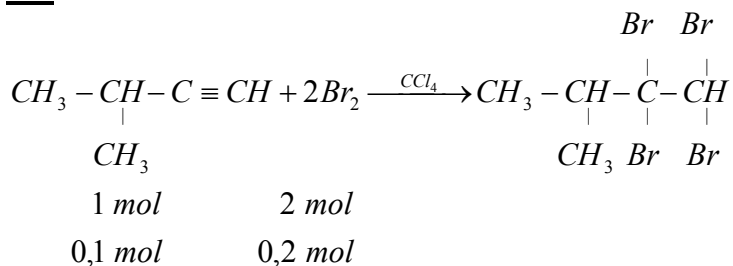
3.2.α.



3.2.β.



3.3

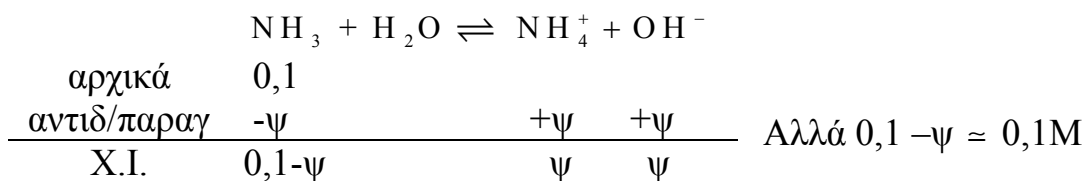


$$C = \frac{n}{V} \Rightarrow V = \frac{n}{C} = \frac{0,2}{0,4} = 0,5L$$

ΘΕΜΑ 4ο

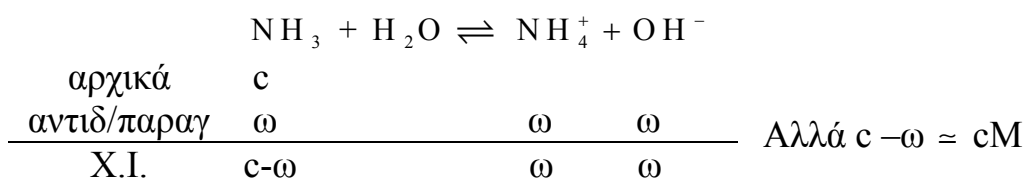
4.1.

ΔΙΑΛΥΜΑ Δ1



$$K_b = \frac{\psi^2}{0,1} \Rightarrow \psi = 10^{-3}M \quad \text{Άρα } [\text{OH}^-] = 10^{-3}M \Rightarrow \text{pOH} = 3 \Rightarrow \text{pH} = 11$$

ΔΙΑΛΥΜΑ Δ2



Λόγω αραίωσης το pH θα μειωθεί

$$\text{pH} = 10 \Rightarrow \text{pOH} = 4 \Rightarrow [\text{OH}^-] = \omega = 10^{-4}M$$

$$K_b = \frac{\omega^2}{c} \Rightarrow 10^{-5} = \frac{10^{-8}}{c} \Rightarrow c = 10^{-3}M$$

$$\text{Λόγω αραίωσης } C_{\text{αρχ}} \cdot V_{\text{αρχ}} = C_{\text{τελ}} \cdot V_{\text{τελ}} \Rightarrow 0,1 \cdot 0,1 = 0,001 \cdot V_{\text{τελ}} \Rightarrow V_{\text{τελ}} = 10L$$

$$\text{Άρα } V_{\text{H}_2\text{O}} = V_{\text{τελ}} - V_{\text{αρχ}} = 10 - 0,1 = 9,9L$$

4.2.

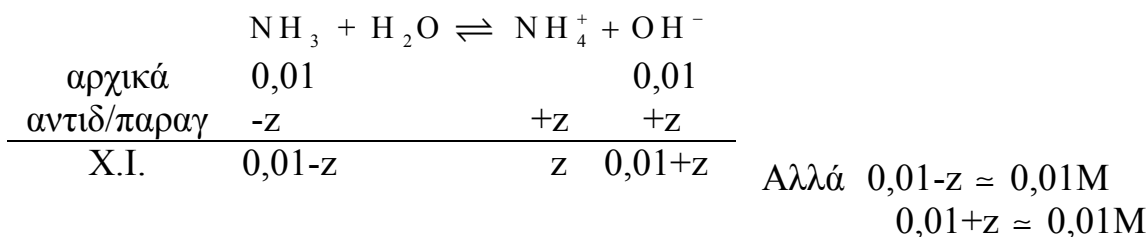
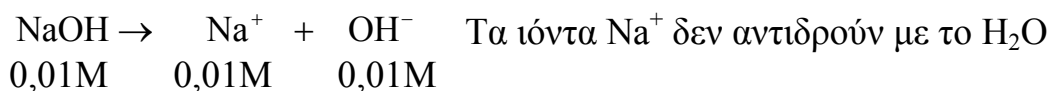
ΔΙΑΛΥΜΑ Δ3

$$n_{\text{NH}_3} = C \cdot V_1 = 0,1 \cdot 0,1 = 0,01 \text{ mol}$$

$$C_{\text{NH}_3} = \frac{n}{V_3} = \frac{0,01}{1} = 0,01 \text{ M}$$

$$n_{\text{NaOH}} = \frac{m}{M_r} = \frac{0,4}{40} = 0,01 \text{ mol}$$

$$C_{\text{NaOH}} = \frac{n}{V_3} = \frac{0,01}{1} = 0,01 \text{ M}$$

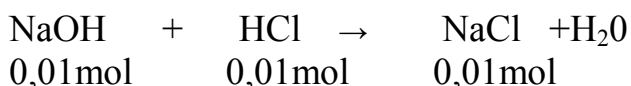
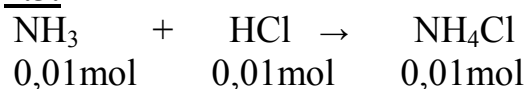


$$K_b = \frac{0,01 \cdot z}{0,01} \Rightarrow z = 10^{-5} \text{ M}$$

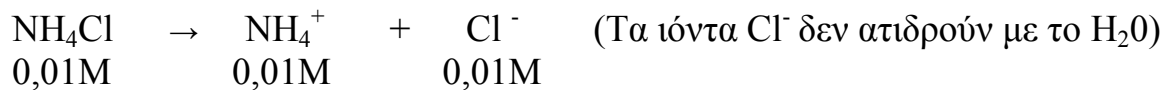
$$\text{Άρα } \alpha = \frac{z}{0,01} = \frac{10^{-5}}{0,01} = 10^{-3}$$

$$[\text{OH}^-] = 10^{-2} \text{ M} \Rightarrow \text{pOH} = 2 \Rightarrow \text{pH} = 12$$

4.3.



$$C_{\text{NH}_4\text{Cl}} = n/V_4 = 0,01/1 = 0,01 \text{ M}$$



	$\text{NH}_4^+ + \text{H}_2\text{O} \rightleftharpoons \text{NH}_3 + \text{H}_3\text{O}^+$		
αρχικά	0,01		
αντιδ/παραγ	-λ	+λ	+λ
X.I.	0,01-λ	λ	λ

(Αλλα $0,01-\alpha=0,01$)

$$K_a K_b = K_w \Rightarrow K_a = K_w / K_b = 10^{-14} / 10^{-5} = 10^{-9}$$

$$K_a = \lambda^2 / 0,01 \Rightarrow 10^{-9} = \lambda^2 / 0,01 \Rightarrow \lambda = 10^{-5,5} \text{M}$$

Άρα $[\text{H}_3\text{O}^+] = 10^{-5,5} \text{M}$

Άρα $\text{pH} = 5,5$