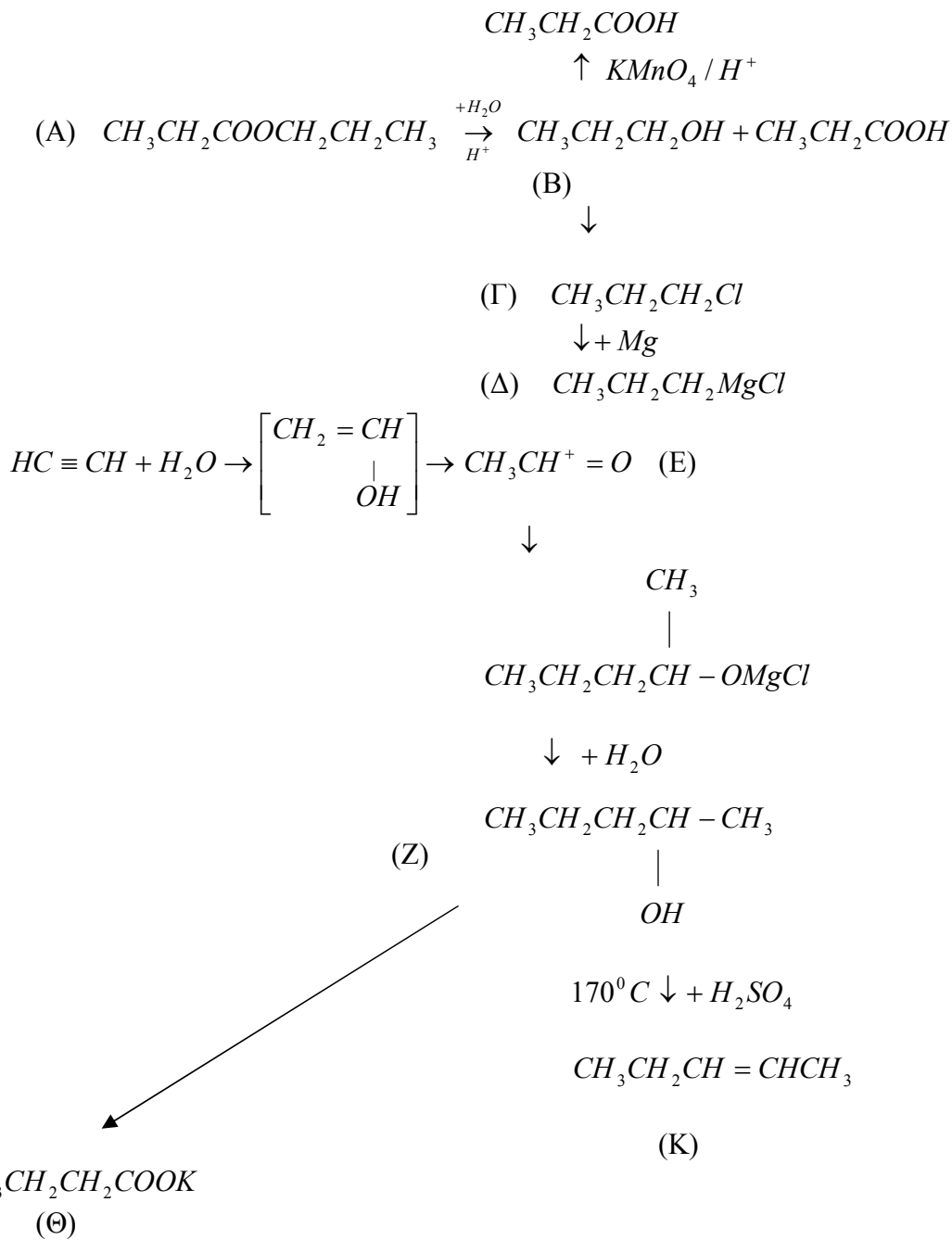


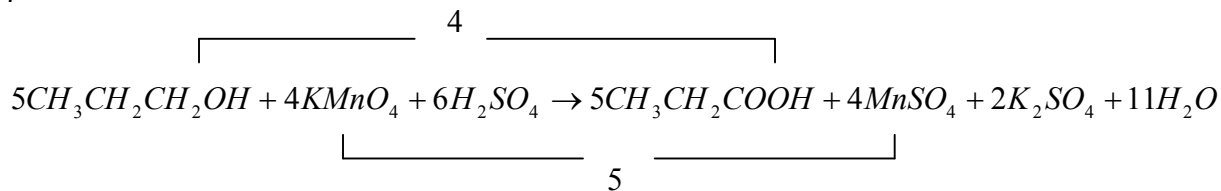


ΘEMA 3<sup>ο</sup>

α.



β.

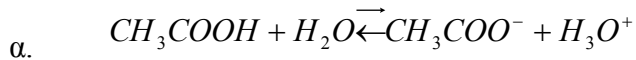


$$\begin{array}{ll} 4\text{mol} & 5\text{mol} \\ ; = 0,016\text{mol} & 0,02\text{mol} \end{array}$$

Άρα:

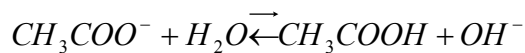
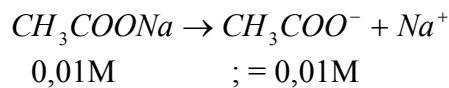
$$C = \frac{n}{V} \Rightarrow V = \frac{n}{C} = \frac{0,016}{0,1} \Rightarrow V = 0,16L \quad \eta \quad 160mL$$

### ΘΕΜΑ 4<sup>ο</sup>



αρχή	0,1	-	-
μετ.	-x	x	x
X.I.	0,1-x	x	x

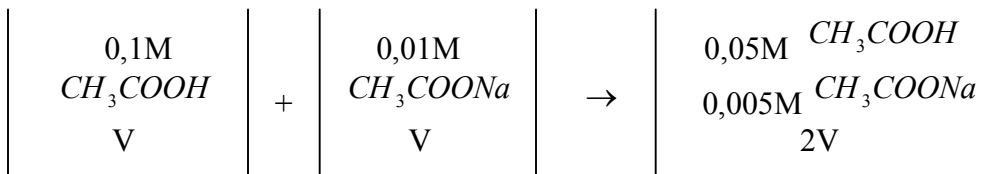
$$\left. \begin{array}{l} K_a = 10^{-5} = \frac{x^2}{0,1-x} \\ \frac{K_a}{C} < 10^{-2} \Rightarrow 0,1-x \approx 0,1 \end{array} \right\} \Rightarrow 10^{-5} = \frac{x^2}{0,1} \Rightarrow x = 10^{-3} M \quad \Rightarrow pH = 3$$



αρχή	0,01	-	-
μετ.	-y	y	y
X.I.	0,01-y	y	y

$$\left. \begin{array}{l} K_b = \frac{K_w}{K_a} = \frac{10^{-14}}{10^{-5}} = 10^{-9} = \frac{y^2}{0,01-y} \\ \frac{K_b}{C} < 10^{-2} \Rightarrow 0,01-y \approx 0,01 \end{array} \right\} \Rightarrow 10^{-9} = \frac{y^2}{0,01} \Rightarrow y = 10^{-5,5} M \quad \Rightarrow pOH = 5,5 \Rightarrow pH = 8,5$$

β.



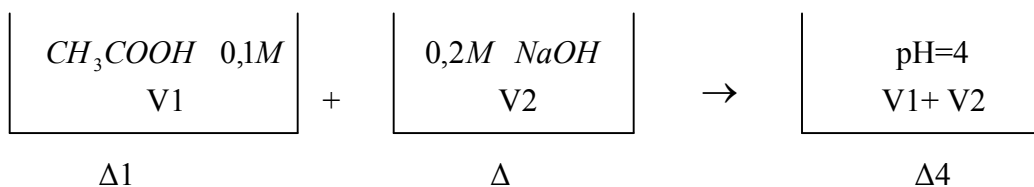
$$CH_3COOH : 0,1 \cdot V = C_1 \cdot 2V \Rightarrow C_1 = 0,05M$$

$$CH_3COONa : 0,01 \cdot V = C_2 \cdot 2V \Rightarrow C_2 = 0,005M$$

Το διάλυμα είναι ρυθμιστικό, άρα:

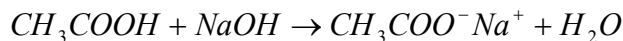
$$pH = pK_a + \log \frac{0,005}{0,05} \Rightarrow pH = 5 + \log 10^{-1} \Rightarrow pH = 4$$

γ.



$$CH_3COOH : 0,1 \cdot V_1 = C_0(V_1 + V_2) \Rightarrow C_0 = \frac{0,1V_1}{V_1 + V_2} \quad (1)$$

$$NaOH : 0,2 \cdot V_2 = C_\beta(V_1 + V_2) \Rightarrow C_\beta = \frac{0,2V_2}{V_1 + V_2} \quad (2)$$



αρχή	$C_0$	$C_\beta$	-
μετ.	$-C_\beta$	$-C_\beta$	$C_\beta$
X.I.	$C_0 - C_\beta$	-	$C_\beta$

Το νέο διάλυμα είναι ρυθμιστικό, άρα:

$$pH = pK_a + \log \frac{C_\beta}{C_0 - C_\beta} \Rightarrow 4 = 5 + \log \frac{C_\beta}{C_0 - C_\beta} \Rightarrow \log \frac{C_\beta}{C_0 - C_\beta} = -1 \Rightarrow$$

$$\frac{C_\beta}{C_0 - C_\beta} = 0,1 \Rightarrow C_\beta = 0,1C_0 - 0,1C_\beta \Rightarrow 1,1C_\beta = 0,1C_0 \Rightarrow 11C_\beta = C_0 \stackrel{(1),(2)}{\Rightarrow}$$

$$11 \frac{0,2V_2}{V_1 + V_2} = \frac{0,1V_1}{V_1 + V_2} \Rightarrow 22V_2 = V_1 \Rightarrow \frac{V_1}{V_2} = \frac{22}{1}$$

Τα ερωτήματα β και γ μπορούν να επιλυθούν και με τον αναλυτικό τρόπο.