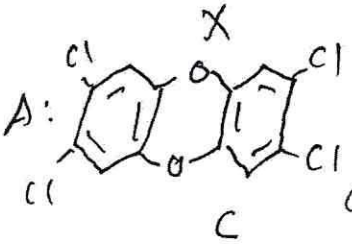
ЧИСТОВИК
Лист № 1

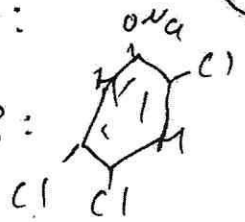
ВСОШ Химия

1 вар.

№1:



C $C_{12}H_4O_2Cl_4$



$C_6H_2ONaCl_3$

Пусть $\nu(A) = x$; $\nu(B) = y$, тогда:

$$\frac{4x+3y}{12x+6y} = \frac{1}{2,7273}$$

$10,9092x + 8,1819y = 12x + 6y$

$1,0908x + 2,1819y = 0$

$x = 2y$

Пусть $m(смеси) = 100г$, тогда:

$644y + 219,5y = 100$

$863,5y = 100$

$y = 0,1158$

$x = 0,2316$

$m(X) = 74,5752\ (г)$

$m(y) = 25,4181\ (г)$

$$w(X) = \frac{74,5752 \cdot 100\%}{100\%} = 74,5752\%$$

$$w(y) = \frac{25,4181 \cdot 100\%}{100\%} = 25,4181\%$$

Σ 5

1	2	3	4	5	6	7	8	9	10
6	10	4	7			12	12	8	

№2.

$X + O_2 \xrightarrow{t} CO_2 + H_2O$

$V(CO_2) = 8,96\ л \Rightarrow \nu(CO_2) = 0,4 \Rightarrow m = 4,8\ (г)$

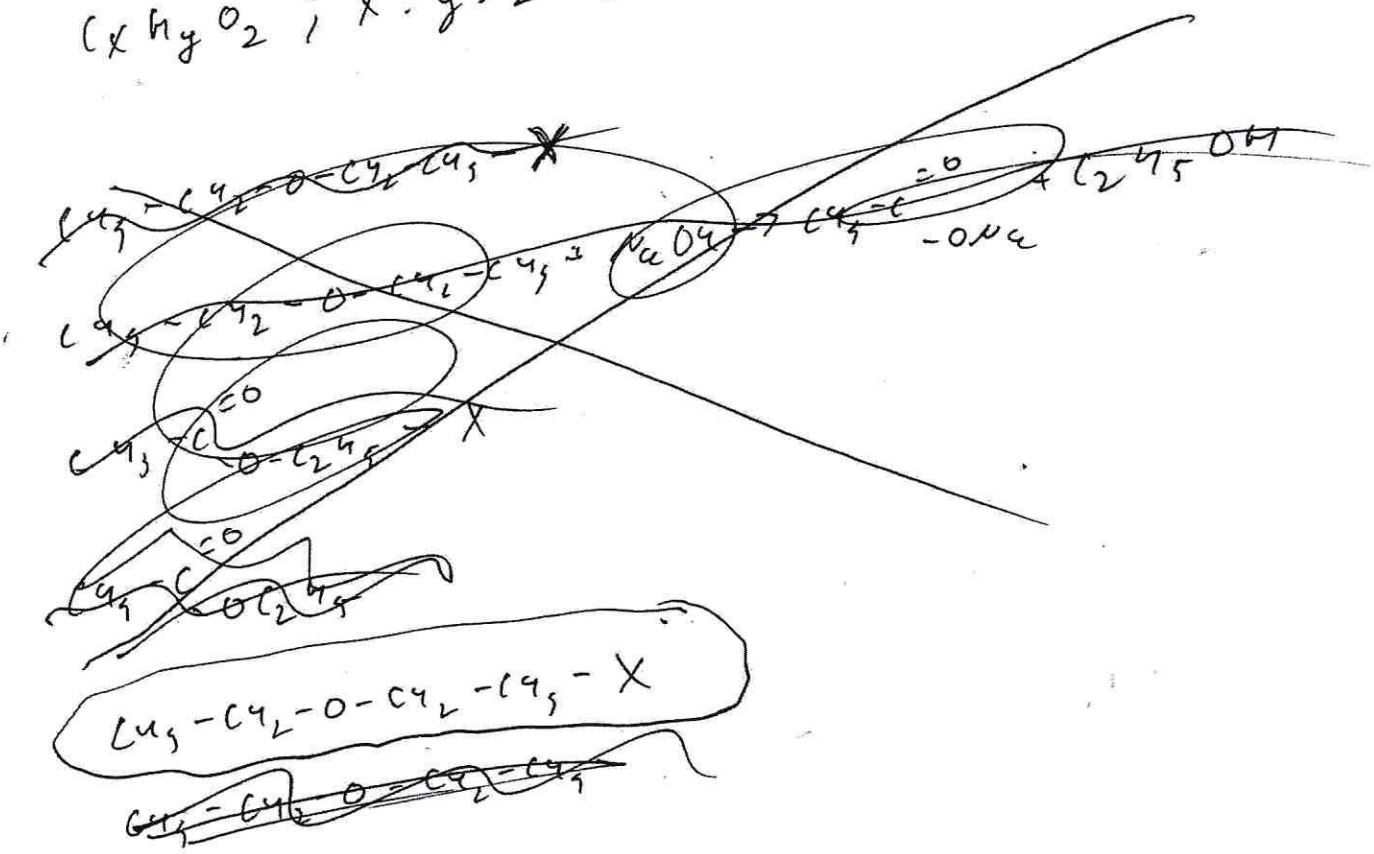
$\nu(H_2O) = 1\ моль \Rightarrow m = 1\ (г)$

$m(H_2O) = 9\ (г) \Rightarrow \nu(H_2O) = 0,5 \Rightarrow \nu(H) = 1\ моль \Rightarrow m = 1\ (г)$

$m(H) + m(C) = 5,8$, $m(X) = 7,4$

$m(O) = 1,6 \Rightarrow \nu(O) = 0,1\ моль$ — остальное

$C_xH_yO_2$; $x : y : 2 = 0,4 : 1 : 0,1 \Rightarrow$ $\overline{IV}$ $\overline{I}$ $\overline{II}$ $C_4H_{10}O$ — изомеры



$CH_3-\overset{\overset{X}{=O}}{C}-O-C_2H_5 + \overset{X}{NaOH} \rightarrow CH_3-\overset{\overset{=O}{}}{C}-ONa + C_2H_5OH$

$CH_3-\overset{\overset{X}{=O}}{C}-ONa + NaOH \xrightarrow{t} CH_4 + \overset{X}{Na_2CO_3}$

$\nu(NaOH) = 0,25025$ моль $\Rightarrow \nu(Na) = 0,25025$ моль

$\omega(Na\ атомарный) = \dfrac{0,25025\ моль \cdot 23\ г/моль \cdot 100\%}{45,0}$

$m(Na\ атомарный) = 0,25025\ моль \cdot 23\ г/моль = 5,75575(г)$

$m(см) = \dfrac{5,75575 \cdot 100\%}{45\%} = 12,79(г)$

$\overset{X}{Na_2CO_3} + \overset{0,25025-2X}{NaOH}$

$m(Na_2CO_3) + m(NaOH) = 12,79(г)$

$106X + 10,07 - 80X = 12,79 \Rightarrow X = 0,1$

$m(CH_3-\overset{\overset{=O}{}}{C}-OC_2H_5) = 9,4(г)$

$\omega(C_4H_{10}O) = \dfrac{15 - 9,4}{15} \cdot 100\% = 37,33\%$

ЧИСТОВИК
Лист № 4

ВСОШ Химия

№3

$$V(H_2O) = \frac{(10см - 0,1см \cdot 2) \cdot 20см \cdot 60\%}{100\%} = 117,6 мл \approx 0,1176 л$$

$V(NH_3) = 1822,8 мл = 1,8228 л$

$V(р\text{-}ра) = V(NH_3) + V(H_2O) = 1,9404$

$c(NH_4OH) = 0,042 M$

$NH_4OH \rightleftarrows NH_4^+ + OH^-$

	NH_4OH	NH_4^+	OH^-
c0	0,042	–	–
cпр	x	x	x
cп	0,042 − x	x	x

$pK_b = -\lg K_b \Rightarrow K_b = 1,7378 \cdot 10^{-5}$

$1,7378 \cdot 10^{-5} = \frac{x^2}{0,042 - x} \Rightarrow x = 0,000845683$

$pOH = -\lg[OH^-] = 3,0728 \Rightarrow pH = 14 - pOH = 10,9272 \approx 11$

№4

$$\begin{cases} \underset{x}{C(=O)H-(CHOH)_4-CH_2OH} + 2Cu(OH)_2 \xrightarrow{t} C(=O)OH-(CHOH)_4-CH_2OH + \underset{x}{Cu_2O} + 2H_2O \\ \underset{y}{C_{12}H_{14}O_3(OH)_8} + 2Cu(OH)_2 \xrightarrow{t} C_{12}H_{14}O_4(OH)_8 + \overset{2y}{Cu_2O} + H_2O \end{cases}$$

$$\underset{(x+y)}{Cu_2O} + \underset{6x+6y}{6HNO_{3(к)}} \rightarrow 2Cu(NO_3)_2 + 2NO_2 + 3H_2O$$

$\nu(HNO_3) = 0{,}9$ моль

$6x + 6y = 0{,}9$

$$\begin{cases} 5\underset{x}{C_6H_{12}O_6} + 24KMnO_4 + 36H_2SO_4 \rightarrow \overset{6x}{30CO_2} + 24MnSO_4 + 12K_2SO_4 + 66H_2O \\ \underset{y}{C_{12}H_{22}O_{11}} + KMnO_4 + H_2SO_4 \rightarrow \overset{12y}{12CO_2} + \ldots \end{cases}$$

$\nu = \frac{PV}{RT} = 1{,}2$ моль

$$\begin{cases} 6x + 6y = 0{,}9 \\ 6x + 12y = 1{,}2 \end{cases} \qquad \begin{cases} x = 0{,}1 \\ y = 0{,}05 \end{cases}$$

$m(C_6H_{12}O_6) = \nu \cdot M = 0{,}1 \cdot 170 = 17$ (г)

$m(C_{12}H_{22}O_{11}) = \nu \cdot M = 0{,}05 \cdot 342 = 17{,}1$ (г)

ЧИСТОВИК
Лист № 6

ВСОШ Химия

№1

1) $4Fe(NO_3)_2 \xrightarrow{t} 2Fe_2O_3 + 8NO_2\uparrow + O_2\uparrow$

2) $Fe_2O_3 + 6HBr \rightarrow 2FeBr_3 + 3H_2O$

3) $2FeBr_3 + 3Na_2SO_3 + 3H_2O \rightarrow 2Fe(OH)_3\downarrow + 6NaBr + 3SO_2\uparrow$

4) $Fe(OH)_3 + 3NaOH_{(конц)} \rightarrow Na_3[Fe(OH)_6]$

5) $Na_3[Fe(OH)_6] + 3CO_2 \rightarrow 3NaHCO_3 + Fe(OH)_3\downarrow$

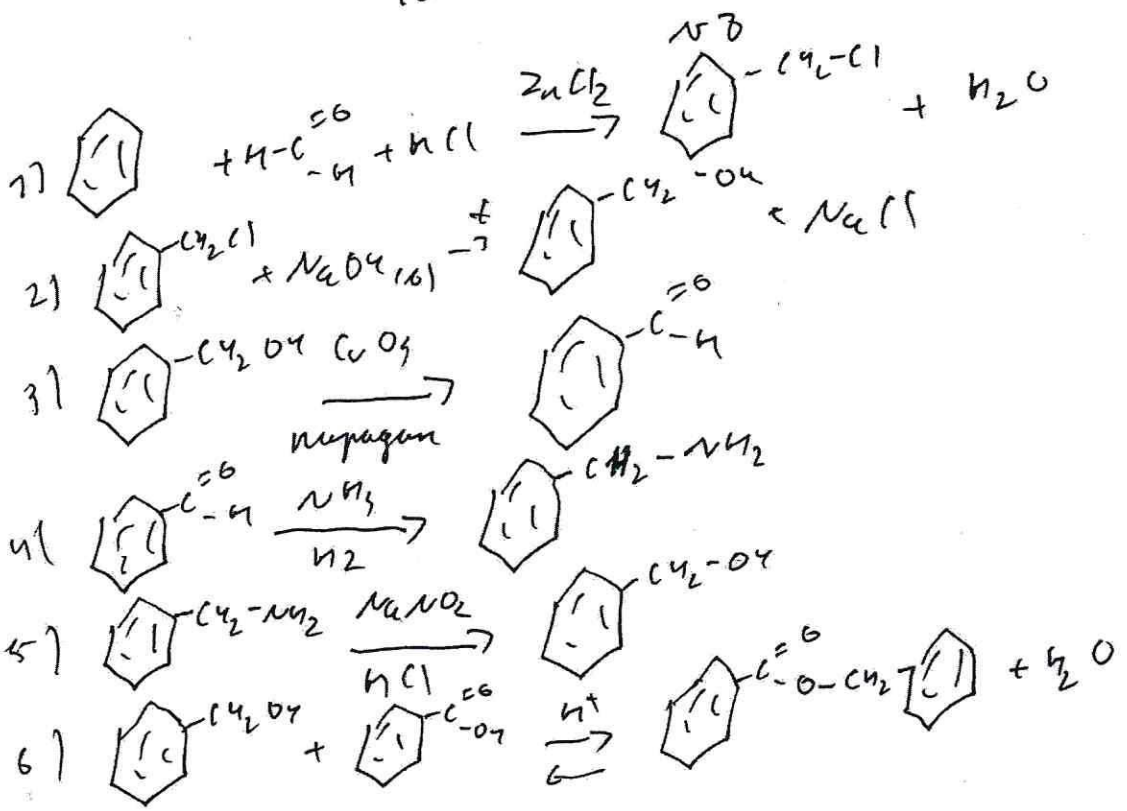
6) $2\overset{+3}{Fe}(OH)_3 + 3\overset{0}{Cl_2} + 10KOH \rightarrow 6K\overset{-1}{Cl} + 2K_2\overset{+6}{Fe}O_4 + 8H_2O$

$\overset{0}{Cl_2} + 2e \rightarrow 2Cl^-$ (+2e)

$Fe^{+3} - 3e \rightarrow Fe^{+6}$ (−3e)

10

№3



СЕЧЕНОВСКИЙ УНИВЕРСИТЕТ

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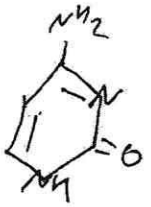
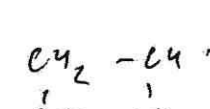


- цианозан

$C_4H_5N_3O$

№ 9



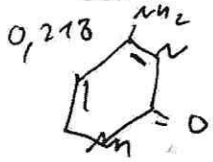
- цистеин

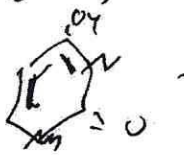
$C_3H_7NO_2S$

$$\overset{0,218}{C_4H_5N_3O} + 4{,}75\,O_2 \xrightarrow{t} \overset{0,872}{4CO_2}\uparrow + 2{,}5\,H_2O + 1{,}5\,N_2\uparrow$$

$$7(C_3H_7NO_2S + 4{,}75\,O_2 \xrightarrow{t} 3CO_2\uparrow + 3{,}5\,H_2O + 0{,}5\,N_2\uparrow + SO_2\uparrow$$

$$\overset{0,872}{Cu(OH)_2} + \overset{0,872}{CO_2} \rightarrow \overset{0,872}{CaCO_3}\downarrow + H_2O$$





$+ N_2 + H_2O$

$\nu(C_4H_5N_3O) = 0{,}218$ моль

$V(N_2) = \nu \cdot V_M = 4{,}8832$ (л)

$\nu(CO_2) = 4 \cdot 0{,}872 \Rightarrow \nu(Cu(OH)_2) = 0{,}872 \Rightarrow m(CaCO_3) = 87{,}2$

$\frac{87{,}2\,(г)}{4{,}8832\,(л)} = 17{,}857$ моз.