

$$\begin{array}{r}
 1 \ 2 \ 3 \ 4 \ 5 \ 6 \ 7 \ 8 \ 9 \ 10 \\
 \hline
 6 \ 3 \ 6 \ 4 \ 2 \ 8 \ 2 \ 7 \ 7 \ 5 \\
 \hline
 \end{array}$$

Σ 50

Задача 1.2.

$$n(O) = \frac{1,5953 \cdot 10^{24}}{6,02 \cdot 10^{23}} = 2,65 \text{ моль} \quad n(P) = \frac{2,709 \cdot 10^{23}}{6,02 \cdot 10^{23}} = 0,45 \text{ моль}$$

Пусть $n(Mg_2P_2O_7 \cdot 4H_2O) = x \text{ моль}$ $n(Cu_2(P_2O_7)(OH)) = y \text{ моль}$

$$n(O) = 12x \text{ моль} \quad n(P) = 2x \text{ моль}$$

$$n(O) = 5y \text{ моль} \quad n(P) = y \text{ моль}$$

$$\begin{cases}
 12x + 5y = 2,65 \\
 2x + y = 0,45
 \end{cases}
 \Rightarrow
 \begin{cases}
 x = 0,2 \text{ моль} \\
 y = 0,05 \text{ моль}
 \end{cases}$$

$$M(Mg_2P_2O_7 \cdot 4H_2O) = 416 \text{ г/моль}$$

$$M(Cu_2(P_2O_7)(OH)) = 240 \text{ г/моль}$$

$$m = 416 \cdot 0,2 = 83,2 \text{ (г)}$$

$$m = 240 \cdot 0,05 = 12 \text{ (г)}$$

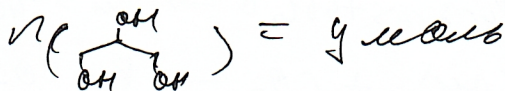
$$m_{\text{образца}} = 83,2 + 12 = \underline{95,2 \text{ (г)}}$$

Задача 2.2:

Пусть $m_{p-pa} = 100 \text{ г}$

$$n(C_4H_8O_4 \cdot 10H_2O) = x \text{ моль}$$

$$M = 381,2442 \text{ г/моль}$$



$$M = 180 \text{ г/моль}$$

$$\begin{cases}
 381,244 \cdot x + 180 \cdot y = 100 \\
 0,08 = \frac{20x + 8y}{100}
 \end{cases}$$

$$\Rightarrow
 \begin{cases}
 y = 0,1815 \text{ моль} \\
 x = 0,2185 \text{ моль}
 \end{cases}$$

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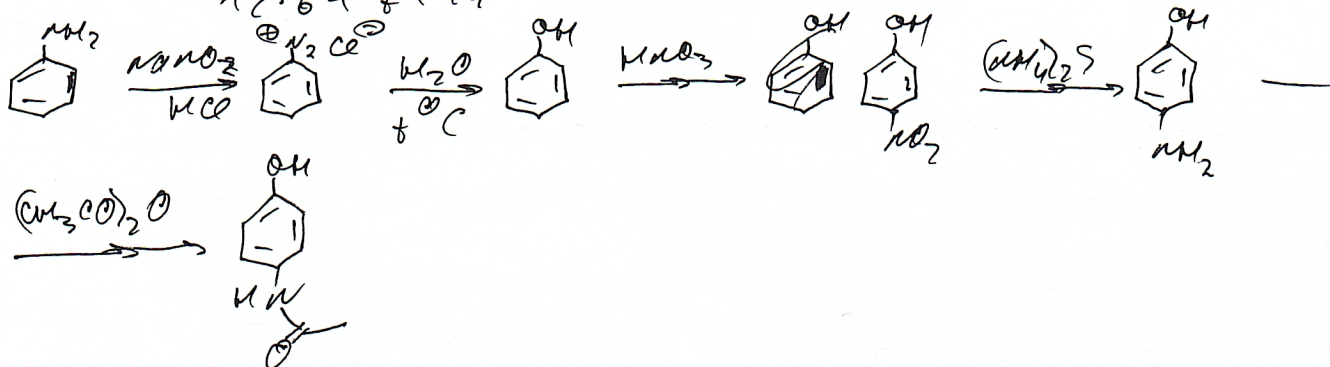
11024

$$\omega(\text{Mg}, \text{FeO}_4 \cdot 10\text{H}_2\text{O}) = \frac{381,244 \cdot 0,2185}{100} = 0,833 = 83,3\%$$

Задача 4.2:

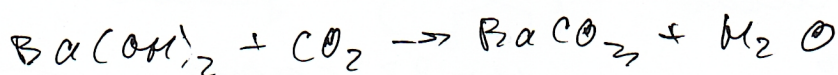
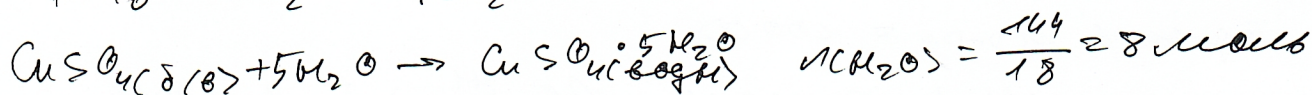
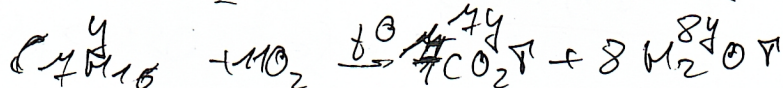
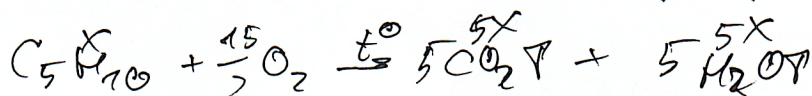
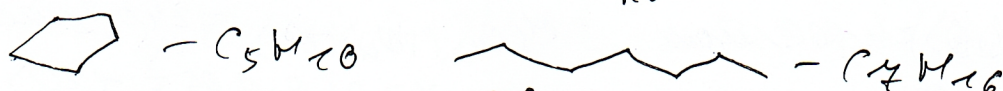
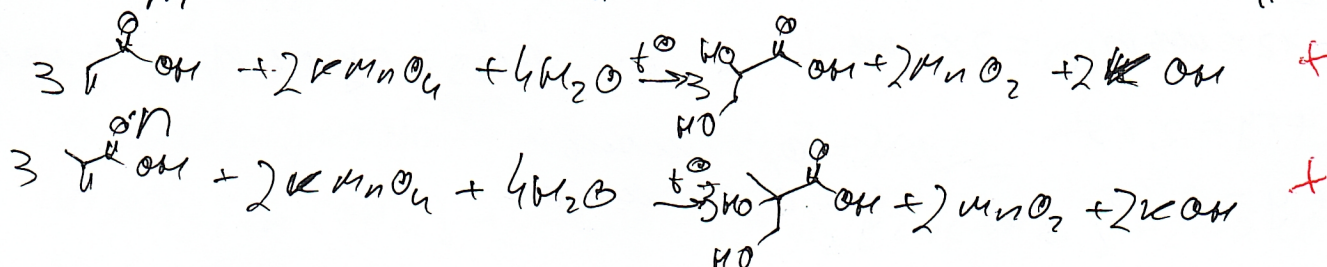
A - скорее всего аллилы.

$$\omega(\text{H}^+) = \frac{6 \cdot 6 + 4 + 4}{12 \cdot 6 + 4 + 4} = 0,53463 \leftarrow \text{что соот. условию}$$



Задача 3.2:

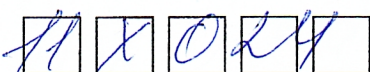
акриловая к-та: CC(=O)O метакриловая: CC(C)=CC(=O)O



$$n(\text{BaCO}_3) = \frac{1477,5}{197} = 7,5 \text{ моль}$$



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$$\begin{cases} 5x + 8y = 8 \\ 5x + 7y = 7,5 \end{cases} \quad \begin{matrix} x = 0,8 \text{ моль} \\ y = 0,5 \text{ моль} \end{matrix} \quad +$$

$$m(\text{KOH}) = 117,5 - 0,8 \cdot (12 \cdot 5 + 16) - 0,5 \cdot (12 \cdot 4 + 16) = 11,5(2)$$

$$n(\text{KOH}) = 0,5 \cdot 0,934 = 0,467 \text{ моль}$$

$$\begin{cases} \frac{2}{3}m + \frac{2}{3}n = 0,467 \\ m \cdot (12 \cdot 3 + 4 + 16 \cdot 2) + n \cdot (12 \cdot 4 + 6 + 16 \cdot 2) = 11,5 \end{cases}$$

$$m = 3,48 \text{ моль} \quad n = -2,48 \text{ моль} \quad ? \text{ моль} \quad ?$$

Задача 4.2:

$$n(\text{HCl}, \text{HNO}_3) = \frac{0,4}{14 + 4 + 14 + 16 \cdot 3} = 5 \cdot 10^{-3} \text{ моль}$$

$$n(\text{CO}_2) = \frac{0,348 \cdot 99,475 \text{ кг}}{8,314 \cdot 298} = 0,014 \text{ моль}$$

$$n(\text{H}_2\text{O}) = \frac{0,504 \cdot 99,475}{8,314 \cdot 298} = 0,02 \text{ моль}$$

$$n(\text{NO}_2) = \frac{1,293 \cdot 99,475}{8,314 \cdot 298} = 0,052 \text{ моль}$$

$$\text{в орг. в-ве: } n(\text{O}) = 0,377 - 5 \cdot 10^{-3} \cdot 14 = 0,014 - 0,01 \cdot \frac{0,02}{2} = 0,2242$$

$$n(\text{O}) = \frac{0,227}{16} = 0,0142 \text{ моль}$$

$$\text{C:H:N:O} = 0,014 : 0,01 : 5 \cdot 10^{-3} : 0,0142 = 2,8 : 2 : 1 : 2,84 = 14 : 10 : 5 : 14 \quad \text{C}_{14}\text{H}_{10}\text{N}_5\text{O}_{14}$$

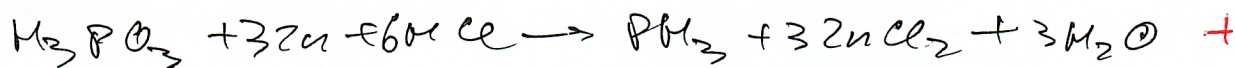
$$n(\text{H}^+) = 241 \text{ моль}$$

$$M(\text{H}^+) = 241 \cdot 6,02 \cdot 10^{23} = 1,45082 \cdot 10^{26}$$



Задача 5.2!

Рассчитать α -фа! M_3PO_3



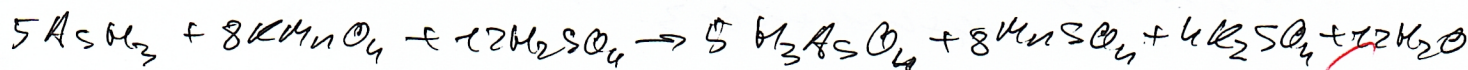
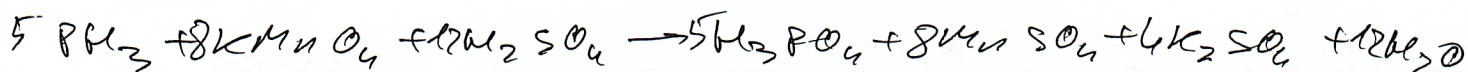
$$M_{\text{смеси}} = 2,4335 \cdot 20,18 = 49,12 / \text{моль}$$

$$49,1 = M(PM_3) \cdot x + M(AsM_3) \cdot (1-x) = 34 \cdot x + 78(1-x)$$

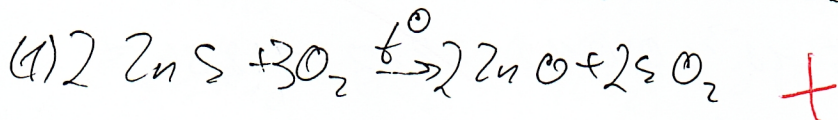
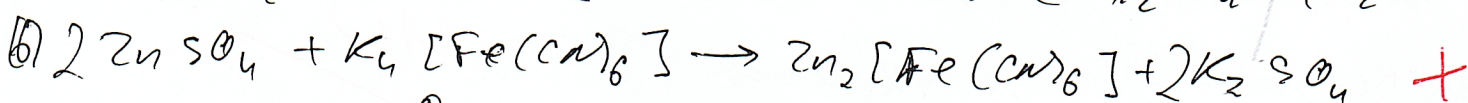
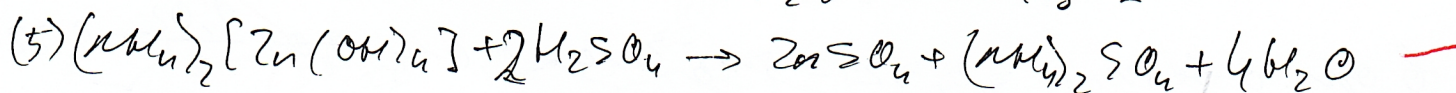
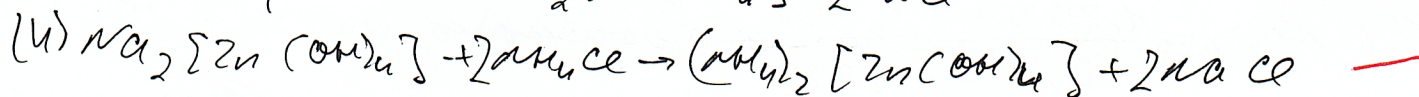
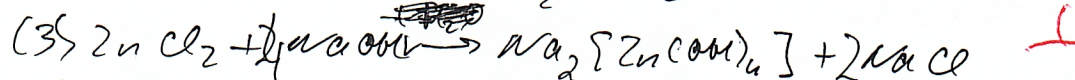
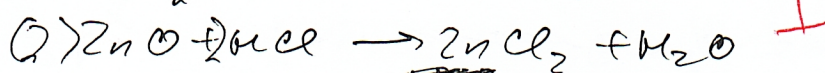
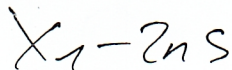
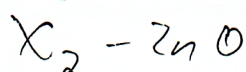
$$x(PM_3) = 0,657 \text{ моль}$$

Если нас был 1 моль смеси, тогда

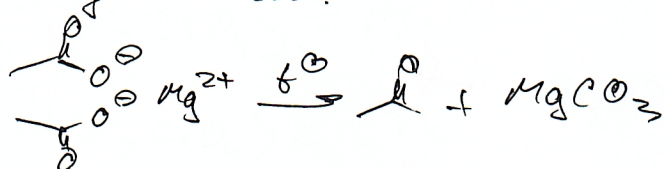
$$m(PM_3) = 0,657 \cdot 34 = 22,338 \text{ г}$$



Задача 6.2!



Задача 8.2:



$$n(\text{C}_6\text{H}_6\text{O}_4\text{Mg}) = \frac{56,8}{17 \cdot 4 + 6 + 16 \cdot 4 + 24} = 0,4 \text{ моль}$$

$$m(\text{CH}_3\text{COOH}) = 0,4 \cdot (12 \cdot 3 + 6 + 16) = 23,2(2)$$

$$n(\text{HCl}) = \frac{21,9}{36,5} = 0,6 \text{ моль}$$

$$n(\text{A}) = 0,6 \text{ моль}$$

$$m(\text{A}) = 46,2 - 23,2 = 23(2)$$

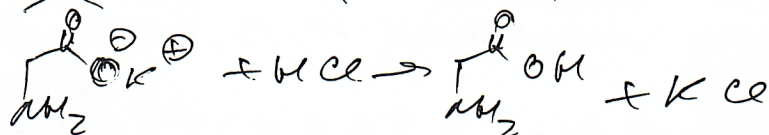
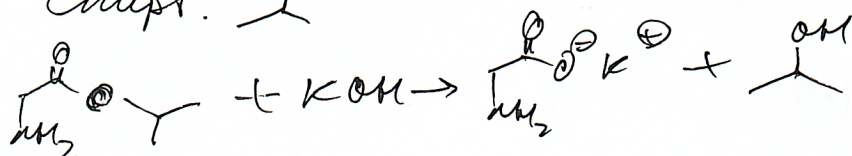
$$M(\text{A}) = \frac{23}{0,6} = 38,33(2) \text{ г/моль}$$

$$\rightarrow \text{получаем } M(\text{A}) = 45(2)$$

т.к. известно, что это аминокислота,



спирт: $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$



соль

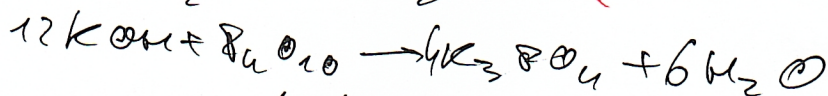
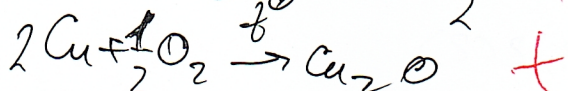
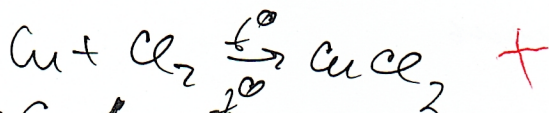
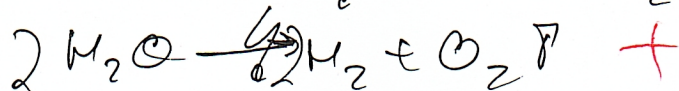
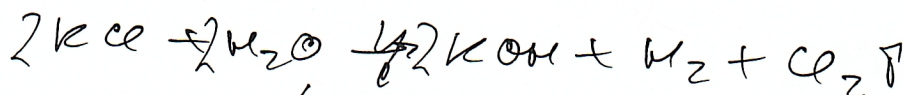
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11х024

Задача 9.2:



$$n(\text{KCl}) = \frac{444 \cdot 0,05}{39 + 35,5} = 0,3 \text{ моль}$$

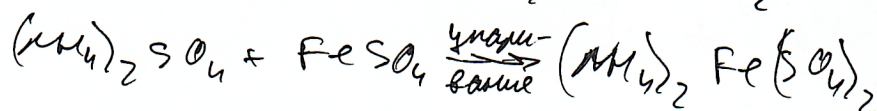
$$n(\text{Cu}) = \frac{100}{63,546} = 1,57 \text{ моль}$$

$$n(\text{H}_2\text{O}_{10}) = \frac{7,81}{2 \cdot 4 + 16 \cdot 10} = 0,0245 \text{ моль}$$

$$m(\text{O}) = 0,1763 \cdot (63,546 \cdot 2 + 16) = 18,078(2)$$

Задача 10.2:

Соль Мога: $(\text{NH}_4)_2\text{Fe}(\text{SO}_4)_2$



$$n(\text{KMnO}_4) = 0,015 \cdot 0,5 = 7,5 \cdot 10^{-3} \text{ моль}$$

$n(\text{анализ. в-ва})$ в 5 раз больше $n(\text{Fe}) \rightarrow \text{Fe}^{+2} \rightarrow \text{Fe}^{+3}$

$$\text{тогда } n(\text{анализ. в-ва}) = 7,5 \cdot 10^{-3} \cdot 5 = 0,0375 \text{ моль}$$

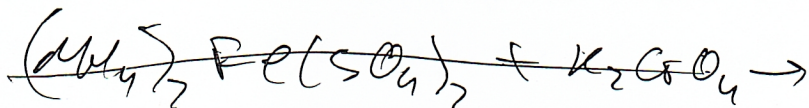
$$n((\text{NH}_4)_2\text{Fe}(\text{SO}_4)_2) = 0,02 \cdot 2,25 = 0,045 \text{ моль}$$



$$M(K_2SO_4) = M \cdot n$$

$$n(K_2SO_4) = C \cdot V$$

~~$$C(K_2SO_4) =$$~~



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$$C(K_2SO_4) = 0,0345 \cdot \frac{0,015}{0,02} = 0,028125 \text{ M}$$

$$n(K_2SO_4) = 0,028125 \cdot 0,25 = 7,03125 \cdot 10^{-3} \text{ моль}$$

$$m = 7,03125 \cdot 10^{-3} \cdot (39 \cdot 2 + 52 + 16 \cdot 4) = 1,369 (2)$$

