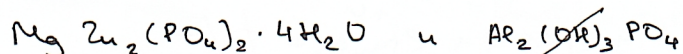


1	2	3	4	5	6	7	8	9	10
6	6	7	1	2	6	10	8	6	2

54

Алсу

5.1.1.



$N(O) = \frac{m(\text{минерала})}{M} \cdot n(O) \Rightarrow n(O) = 4 + 8 + 7 = 19$; x моль в серпентинит.
19-х - в ауцените.

$M(Mg_2Zn_2(PO_4)_2 \cdot 4H_2O) = 416$

$M(Al_2(OH)_3PO_4) = 200$

$M = 616$ г/моль.

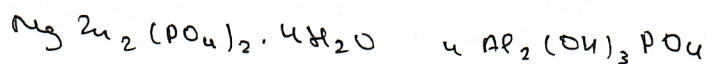
$n(P) = 2 + 1 = 3$

x моль в серпентинит.

3-х моль - в ауцените

$m(\text{минерала}) = \frac{M \cdot N(O)}{n(O) \cdot Na} = \frac{616 \cdot 7,6454 \cdot 10^{23}}{19 \cdot 6,022 \cdot 10^{23}} = 41,16$ ✓

5.1.1.



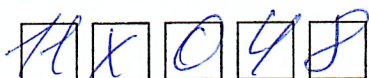
$n = \frac{N}{Na}$; $\frac{m}{M} = \frac{N}{Na} \Rightarrow m = \frac{N \cdot M}{Na} \Rightarrow m = \frac{N(P) \cdot (416x + 200y)}{(2x + y) \cdot Na}$

$m = \frac{N(O) \cdot (416x + 200y)}{(12x + 7y) \cdot Na} \Rightarrow \frac{1,2642 \cdot 10^{23} \cdot (416x + 200y)}{(2x + y) \cdot 6,022 \cdot 10^{23}} = \frac{0,2099(416x + 200y)}{2x + y}$

$m = \frac{1,27 \cdot (416x + 200y)}{2x + y}$; $0,21(416x + 200y) = 1,27(416x + 200y)$



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5.2.1

Всего 1 моль; $n(\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}) = x \text{ моль}$; $n(\text{C}_3\text{H}_8\text{O}_3) = 1-x \text{ моль}$

$$\frac{20x + 8(1-x)}{382x + 92(1-x)} = 0,08 \Rightarrow x = 0,057 \text{ моль} \Rightarrow n(\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}) = 0,057 \text{ моль}$$

$$m(\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}) = 382 \text{ г/моль}$$

$$m(\text{C}_3\text{H}_8\text{O}_3) = 92 \text{ г/моль}$$

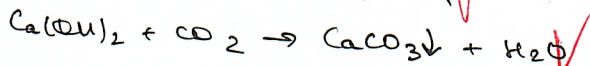
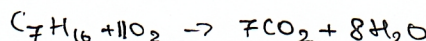
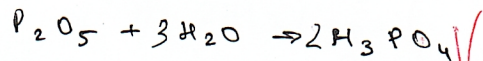
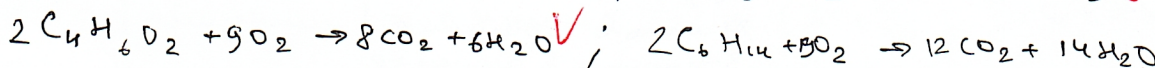
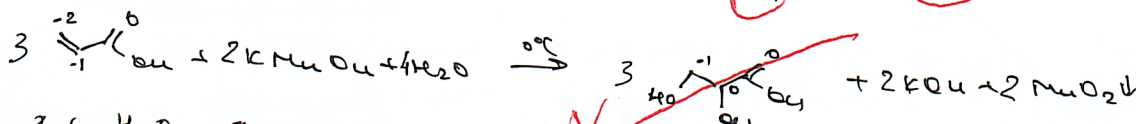
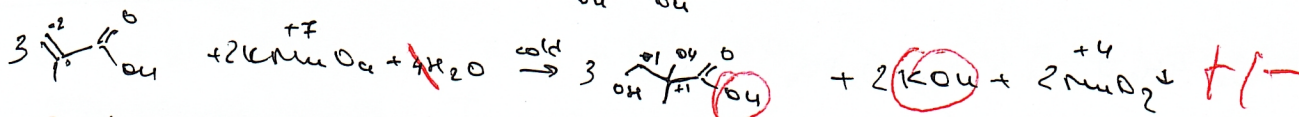
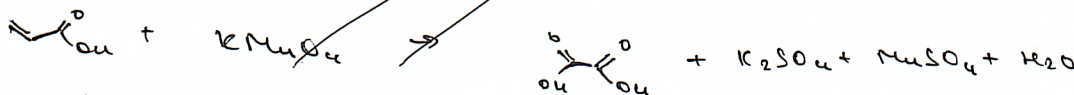
$$m(\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}) = 0,057 \cdot 382 = 21,774 \text{ г}$$

$$m(\text{C}_3\text{H}_8\text{O}_3) = (1-0,057) \cdot 92 = 86,756 \text{ г}$$

$$\omega(\text{C}_3\text{H}_8\text{O}_3) = \frac{86,756}{21,774 + 86,756} = 0,7994 \text{ или } 79,94\%$$

ответ: 79,94% или 0,7994.

5.3. 2.



$$m(\text{CaCO}_3) = 710 \text{ г}; n(\text{CaCO}_3) = 7,1 \text{ моль}; n(\text{CO}_2) = 7,1 \text{ моль}; \text{ } 3x + 4y = 7,1$$

$$m(\text{H}_2\text{O}) = 136,8 \text{ г}; n(\text{H}_2\text{O}) = 7,6 \text{ моль} \Rightarrow 2x + 3y = 7,6$$

$$\begin{cases} 3x + 4y = 7,1 \\ 2x + 3y = 7,6 \end{cases} \Rightarrow \begin{cases} x = 0,6833 \text{ моль} \\ y = 0,5 \text{ моль} \end{cases}$$

$$m(\text{H}_2\text{O}) = 136,8 \text{ г}; n(\text{H}_2\text{O}) = 7,6 \text{ моль} \Rightarrow 6x + 8y = 7,6$$

$$\begin{cases} 6x + 8y = 7,6 \\ 6x + 7y = 7,1 \end{cases} \Rightarrow \begin{cases} x = 0,6833 \text{ моль} \\ y = 0,5 \text{ моль} \end{cases}$$

$$n(\text{KMnO}_4) = 0,08333 \cdot 1,2 = 0,0999 \text{ моль} \approx 0,1 \text{ моль}$$

$$\text{ } n(\text{C}_3\text{H}_4\text{O}_2) = x \text{ моль}$$

$$n(\text{C}_4\text{H}_6\text{O}_2) = y \text{ моль}$$

$$\begin{cases} \frac{3x}{2} + \frac{3y}{2} = 0,1 \\ 72x + 86y + 0,6833 \cdot 84 + 43 = 111,9 \end{cases} \Rightarrow$$



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$$m(C_6H_{12}) = 0,6 \cdot 84 = 50,4 \text{ г.}$$

$$\omega(C_6H_{12}) = \frac{50,4}{111,9} = 0,4504 \text{ или } 45,04\%$$

$$m(C_7H_{16}) = 0,5 \cdot 100 = 50 \text{ г.}; \omega = \frac{50}{111,9} = 0,4468 \text{ или } 44,68\%$$

$$\begin{cases} \frac{2}{3}x + \frac{2}{3}y = 0,1 \\ 72x + 86y + 0,6 \cdot 84 + 0,5 \cdot 100 = 111,9 \end{cases} \Rightarrow \begin{cases} x = 0,1 \text{ моль} \\ y = 0,05 \text{ моль} \end{cases}$$

$$n(C_3H_4O_2) = 0,1 \text{ моль}; m = 0,1 \cdot 72 = 7,2 \text{ г.}; \omega = 0,0643 \text{ или } 6,43\%$$

$$n(C_4H_6O_2) = 0,05 \text{ моль}; m = 0,05 \cdot 86 = 4,3 \text{ г.}; \omega = 0,0384 \text{ или } 3,84\%$$

Ответ: $\omega(C_6H_{12}) = 45,04\%$; $\omega(C_7H_{16}) = 44,68\%$; $\omega(C_3H_4O_2) = 6,43\%$

$$\omega(C_4H_6O_2) = 3,84\%$$

Р.С. 1

$$n(NH_4NO_3) = \frac{0,4}{80} = 5 \cdot 10^{-3} \text{ моль}; n(CO_2) = \frac{0,249}{24,84} = 0,01 \text{ моль}; n(NO_2) = \frac{0,746}{24,84} = 0,03 \text{ моль}$$

$$V_m = \frac{nRT}{p} = \frac{8,314 \cdot 298}{99,725} = 24,84; n(H_2O) = \frac{0,252}{24,84} = 0,01 \text{ моль}$$

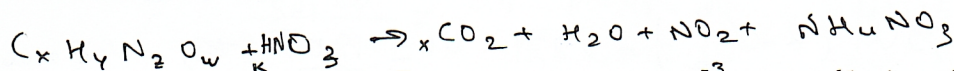
$$n(C) : n(H) : n(N) : n(O) =$$

$$n(C) = 0,01 \text{ моль}; n(H) = 5 \cdot 10^{-3} \cdot 0,01 \cdot 2 = 0,0002 \text{ моль}; n(N) = 0,005 \text{ моль}; n(O) = 0,004 - 0,0035 = 0,0005 \text{ моль}$$

$$n(HNO_3) = 5 \cdot 10^{-3} + 0,03 = 0,035 \text{ моль}; n(H) = 0,0002 \text{ моль}; n(O) = 0,0005 \text{ моль}$$

$$= 0,03985 \text{ моль}; n(O) = 0,267 - 12 \cdot 0,01 - 0,03985 = 0,00515; n(O) = 0,0195$$

$$n(O) = 0,267 - 12 \cdot 0,01 - 0,03985 - 0,00515 = 0,13715; n(O) = 0,0195$$



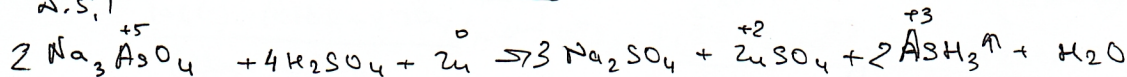
$$C : H : N : O = 0,01 : 0,0002 : 0,005 : 0,0195 = 2 : 1 : 1 : 4 = C_2HNO_4$$

$$M(C_2HNO_4) = 103,2 \text{ г/моль}$$

$$n(e) = 0 + 6 + 6 + 10 + 10 + 10 + 10 + 10 = 62 e^-$$

$$N(e) = 62 \cdot N_A = 3,7324 \cdot 10^{25}$$

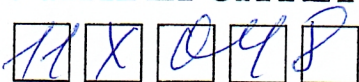
Р.С. 1



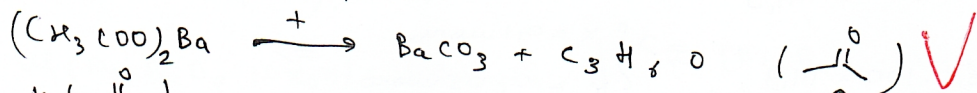
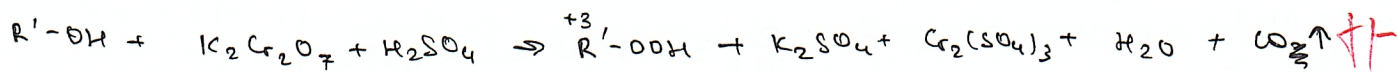
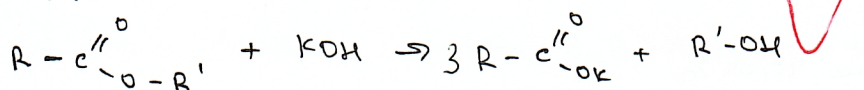
$$M(\text{смеси}) = 48,6682 \text{ г/моль}$$



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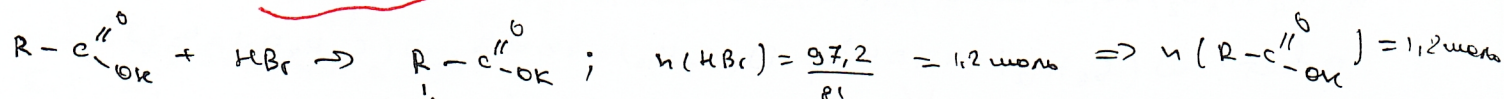


2.8.1



$$n\left(\begin{array}{c} O \\ || \\ -CH_2-CH_2-CH_3 \end{array}\right) = n((CH_3COO)_2Ba) = \frac{204}{255} = 0,8 \text{ моль} \Rightarrow R' = \begin{array}{c} O \\ || \\ -CH_2-CH_2-CH_3 \end{array}$$

$$n(R'-COOH) = 0,8 \text{ моль}$$



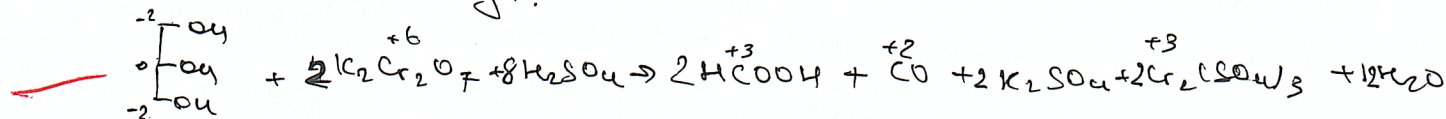
$$n(R'-OH) = n(R-C(=O)OH) = 1,2 \text{ моль} \quad \checkmark$$

$$n(CO_2) = 1,2 - 0,8 = 0,4 \text{ моль} \quad \checkmark$$

$$n(R-C(=O)O-R') = \frac{92,4}{1,2} = 77$$

$$M(R+R') = 33; \quad \text{т.к. } n(R'-COOH) : n(CO) = 2:1 \Rightarrow \text{смысл не имеет.}$$

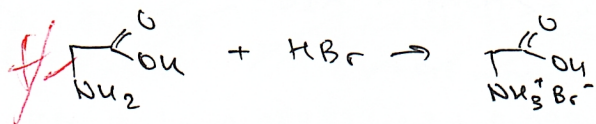
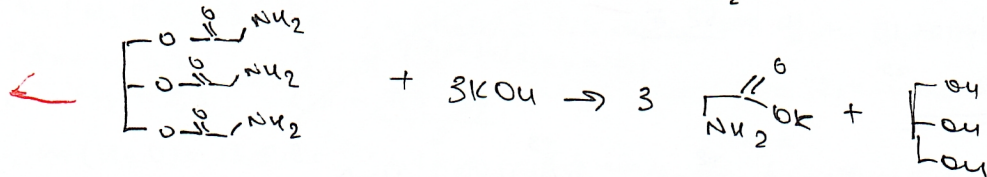
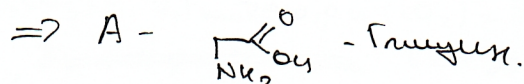
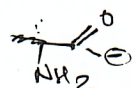
$$77 - 32 - 12 - 14 = 19 \quad \text{Тогда:}$$



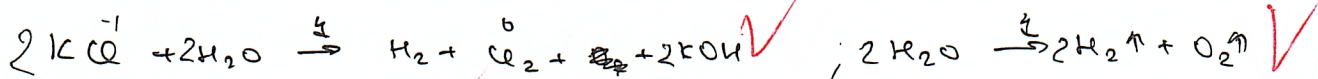
$$n(\text{глицерин}) = 0,4 \text{ моль} \Rightarrow n(R-C(=O)O-R') = 0,4 \text{ моль}$$

$$M = 2312 / \text{моль} \quad \checkmark; \quad 231 = n(R-C(=O)OK) = 1,2 \text{ моль} \Rightarrow$$

$$\Rightarrow 3(R-C(=O)OK); \quad 3M(R-C(=O)OK) = 231 - 41 = \frac{190}{3} = 63,3 = 45 \text{ моль}$$

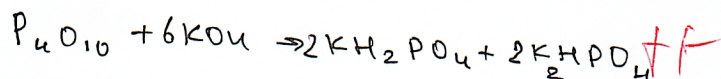


5.9.)



$$m(\text{KCl}) = 447 \cdot 0,05 = 22,35 \text{ г} ; m(\text{H}_2\text{O}) = 424,65 \text{ г}.$$

$$n(\text{KCl}) = 0,3 \text{ моль} ; n(\text{H}_2\text{O}) = 23,5 \text{ моль}$$



$$n(\text{P}_4\text{O}_{10}) = \frac{7,81}{284} = 0,0275 \text{ моль}.$$

$$n(\text{KOH}) = 0,0275 \cdot 6 = 0,165 \text{ моль}$$

$$n(\text{KCl}) = 0,165 \text{ моль пропорционально}.$$

$$n(\text{Cl}_2) = \frac{0,165}{2} = 0,0825 \text{ моль} ; n(\text{CuCl}_2) = 0,0825 \text{ моль} ; m(\text{CuCl}_2) = 11,1375 \text{ г}$$

$$\text{CuCl}_2 \cdot \text{Cu} \cdot \text{CuO} ; n(\text{O}_2) = n(\text{Cl}_2) = 0,0825 \text{ моль}.$$

$$0,0825 \text{ моль} ; n(\text{CuO}) = 0,165 \text{ моль}.$$

$$16 : 0,1263 = 127 ; 127 - 16 = 111 ; m(\text{O}) = 0,165 \cdot 16 = 2,64 \text{ г}$$

$$m_{\text{р-ра}} = 447 - 0,0825 \cdot 71 - 0,0825 \cdot 2 - 0,0825 \cdot 32 = 438,17 \text{ г}$$

$$m(\text{K}_2\text{HPO}_4) = \frac{m(\text{K}_2\text{HPO}_4) \cdot 0,055}{438,17} = \frac{0,055 \cdot (79 + 64 + 31)}{438,17} = 0,02184 \approx 2,184 \%$$

Ответ: 2,184%.

5.10.)

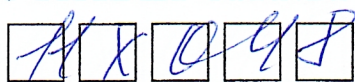
$$n(\text{AgNO}_3) = 0,1 \cdot 0,06 = 0,006 \text{ моль} \checkmark$$

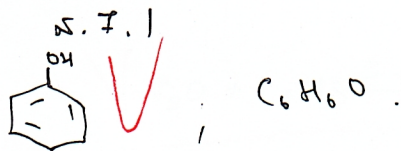
$$n((\text{NH}_4)\text{SCN}) = 0,015 \cdot 0,1 = 0,0015 \text{ моль} \checkmark$$

$$n(\text{цианата натрия}) = n(\text{AgNO}_3) = 0,006 \text{ моль}.$$



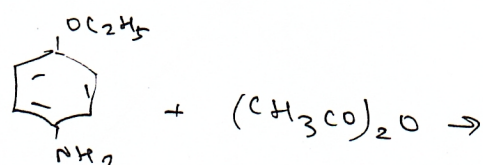
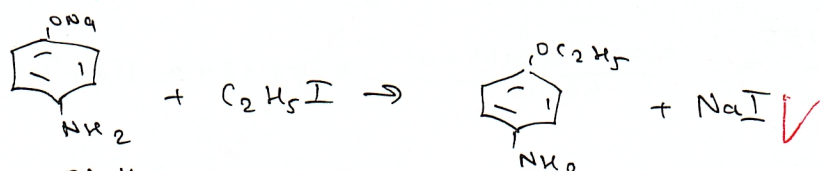
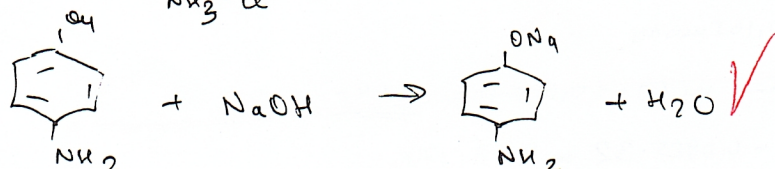
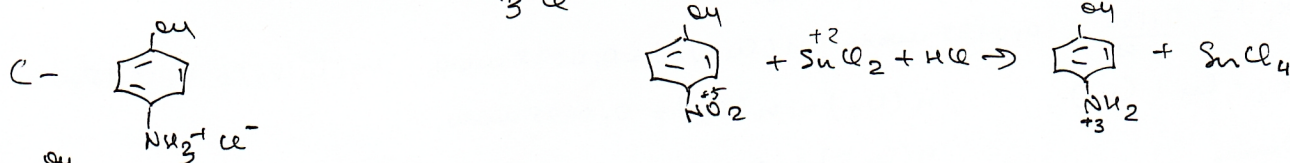
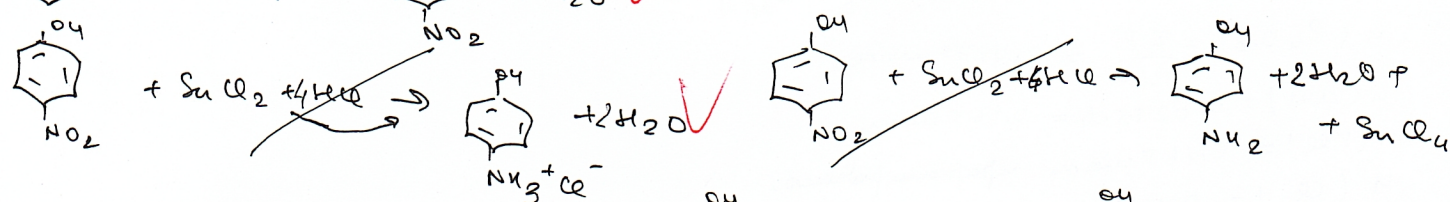
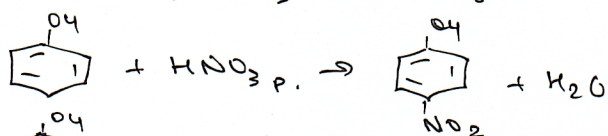
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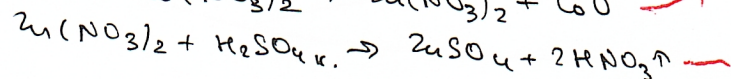
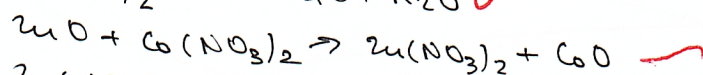
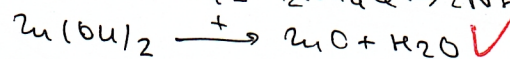
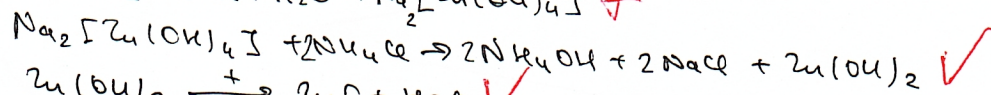
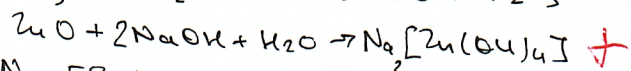
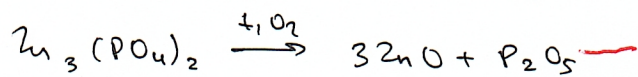


$$n(p) = 8 + 36 + 6 = 50$$

$$50 : 0,53192 = 94 \Rightarrow C_6H_6O.$$



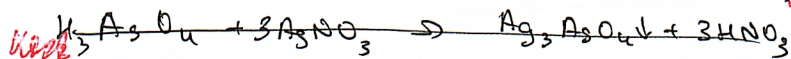
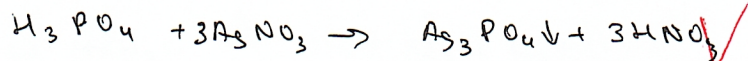
5.6.1



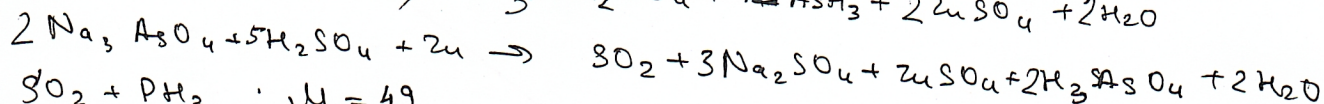
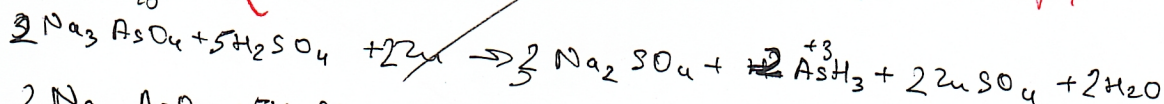
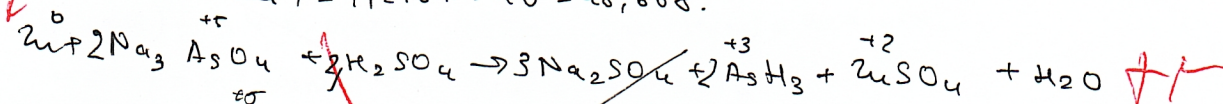
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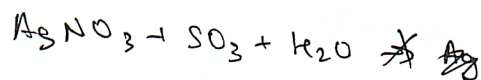
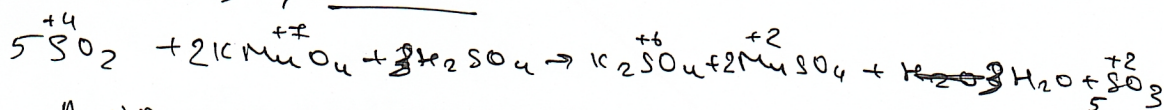
д.с.1



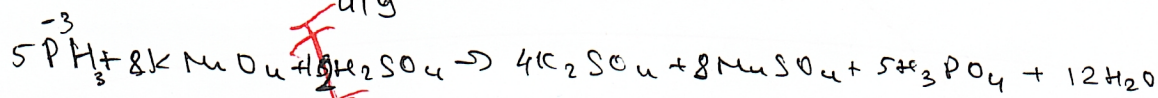
$$M(\text{смеси}) = 1,2167 \cdot 40 = 48,668.$$



$$\text{SO}_2 + \text{PH}_3; M = 49$$

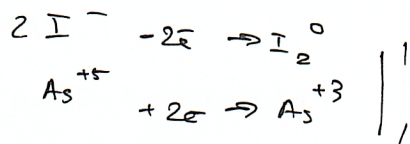
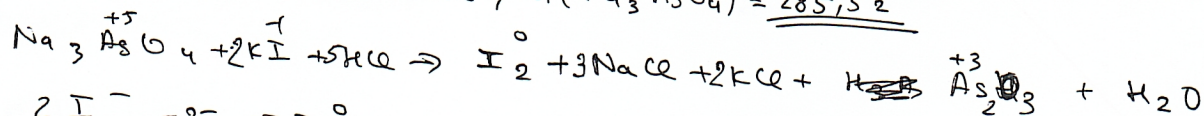


$$n(\text{H}_3\text{PO}_4) = \frac{130,1}{419} = 0,3105 \text{ моль}$$



$$n(\text{PH}_3) = 0,3105 \text{ моль}; n(\text{SO}_2) = 0,6895 \text{ моль}.$$

$$n(\text{Na}_3\text{AsO}_4) = 1,379 \text{ моль}; m(\text{Na}_3\text{AsO}_4) = 285,52$$



$$n(\text{I}_2) = 1,379 \text{ моль}; m(\text{I}_2) = 350,3 \text{ г}$$

д.)

$$Mg_2\text{Zn}_2(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O} = x \text{ моль}$$

$$\text{As}_2(\text{OH})_3\text{PO}_4 = y \text{ моль}.$$

$$\frac{12x + 7y}{82}$$



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