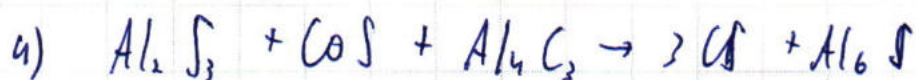
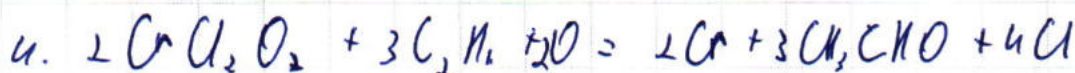
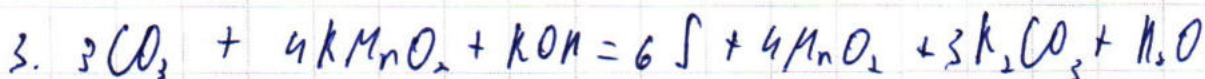
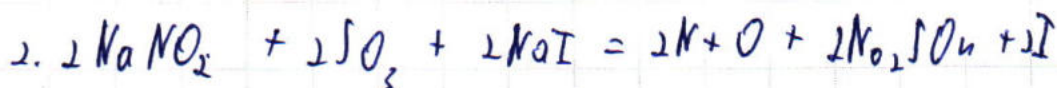
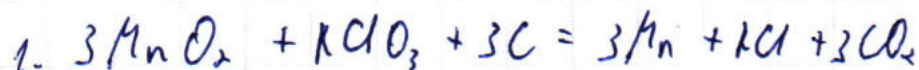


2)



Al - 52,0%

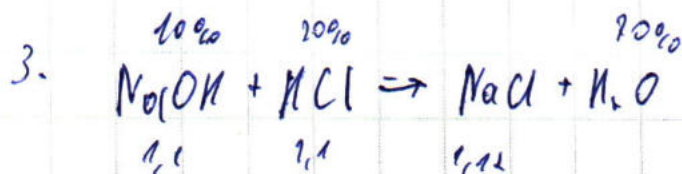
S - 31,61

Ca - ?

S - ?

Al - 37,52

C - ?



NaCl - p = 1,12

~~pH~~

pH = 30%

pH → 0

H₂O ↑суу артығы көрен

1-тапсырма

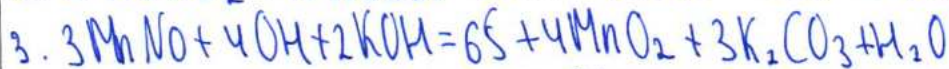
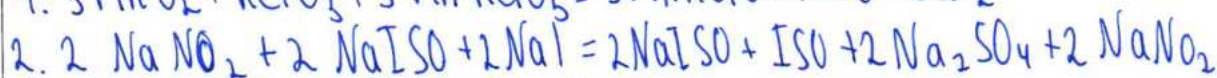
Т: массасы - 6,542

кристаллизатор - 93,46

еріген заттың мұ - 4,92%

$$M: \frac{6,54 \cdot 93,46}{4,92} = 124,2$$

2-тапсырма



3-тапсырма

1. Натрий гидроксиді ерітінді - 400мл

мұз қышқылы - 200мл

мыңауыра - 1,12

$$2. \frac{400 \cdot 1,12}{200} = 2,24$$

4-тапсырма

$$1. \frac{72,6 \cdot 31,36}{52,07\%} = 43,7$$

$$2. \frac{72,6}{31,36} \cdot 52,07\% = 120,544$$

Математика №1

Берілгені:

$$m = 6,542$$

$$m(\text{H}_2\text{O}) = 93,462$$

$$W = 4,92\% = 0,0492$$

Формула?

Кристаллизатор

Шешуі:

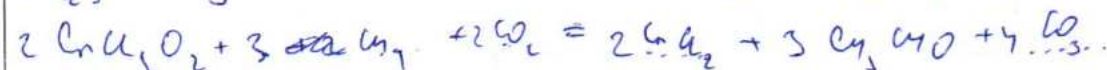
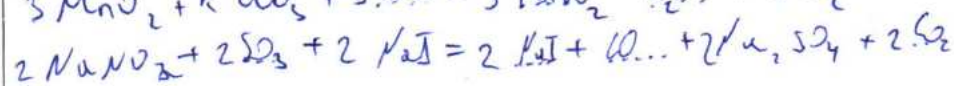
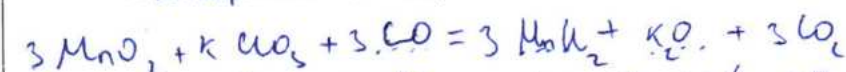
$$m(\text{crystal}) = W \cdot m + n = 160 \cdot 0,0492 = 7,872$$

$$m = 6,54 + 93,46 = 160,00$$

$$m = 160 \text{ г (сұйық)}$$

$$\frac{7,8}{x} = \frac{93,46}{y}$$

Математика №2



Математика №3

1) Берілгені:

$$V(\text{NaOH}) = 400 \text{ мл}$$

$$W(\text{NaOH}) = 10\%$$

$$\rho = 1,1 \text{ г/мл}$$

$$V = 200 \text{ мл}$$

$$W(\text{HCl}) = 20\%$$

$$\rho_{\text{HCl}} = 1,2 \text{ г/мл}$$

$$\rho = 1,12 \text{ г/мл}$$

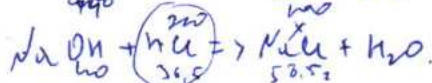
Шешуі:

$$m(\text{NaOH}) = \rho V = 1,1 \cdot 400 = 440 \text{ г}$$

$$m(\text{Na}) = m(\text{NaOH}) \cdot \frac{W}{100} = 440 \cdot 0,1 = 44 \text{ г}$$

$$m(\text{HCl}) = \rho V = 1,2 \cdot 200 = 240 \text{ г}$$

$$m(\text{Cl}) = m(\text{HCl}) \cdot \frac{W(\text{HCl})}{100} = 240 \cdot 0,2 = 48 \text{ г}$$



$$Mr(\text{NaCl}) = 23 + 35,5 = 58,5$$

$$Mr(\text{NaOH}) = 23 + 16 + 1 = 40$$

$$Mr(\text{HCl}) = 1 + 35,5 = 36,5$$

$$\rho_{\text{HCl}} = 1$$

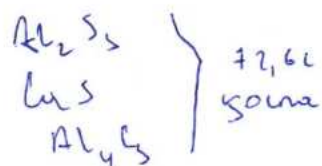
$$x = \frac{40 \cdot 58,5}{36,5} = 62,16$$

$$2) V(\text{HCl}) = 44 \cdot 2,1 = 92,4 \text{ мл}$$

$$\rho_{\text{HCl}} = 0$$

$$V_{\text{HCl}} = \frac{m}{\rho}$$

Мәселе №4



$$W(\text{Al}) = 52,01\%$$

$$77,6 - 52,01 = 25,59\%$$

1) мақаласы қос

$$\text{Ерітінді} = 77,6$$

$$77,6 - 100$$

$$52,01 - x$$

$$x = \frac{77,6 - 52,01}{77,6} \cdot 100 = 32,86\%$$

$$x = \frac{77,6 - 52,01}{100} = 25,59\%$$

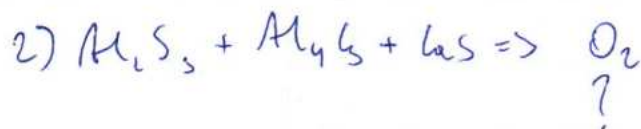
$$77,6 - 25,59 = 52,01$$

$$M_n(\text{S}_3) = 32 \cdot 3 = 96$$

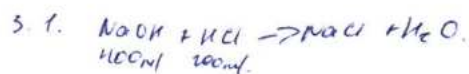
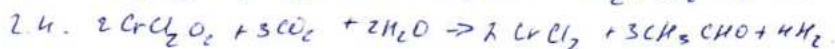
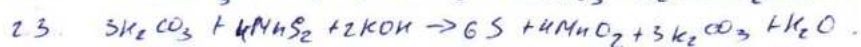
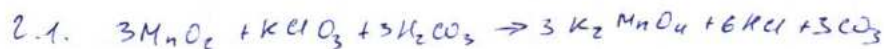
$$w = \frac{32}{96} = 0,3333 \text{ } 33,33\%$$

$$M_n(\text{Cu}) = 63,55$$

$$w = \frac{63,55}{127,1} = 0,5 \text{ } 50\%$$



1.1. —



$$\frac{0,46}{22,4} = 0,0205 \text{ моль}$$

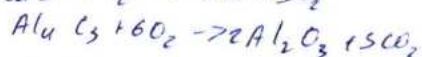
$$\frac{0,2}{22,4} = 0,0089 \text{ моль}$$

$$0,009 \cdot x \mid x = 0,009 \text{ моль}$$

$$0,009 \cdot 58,5 = 0,5265 \approx 0,6 \text{ г} \quad \text{рН} = 6$$

$$3.2. \frac{V}{22,4} = \text{рН} = 0$$

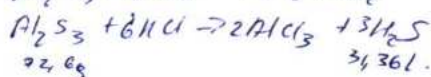
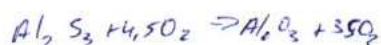
$$V = 22,4 \text{ л}$$



$$22,6 \text{ г}$$

$$\omega(\text{Al}) = 54,07\%$$

$$\omega(\text{S}) = 31,36\%$$



$$22,6 \text{ г}$$

$$31,36 \text{ л}$$



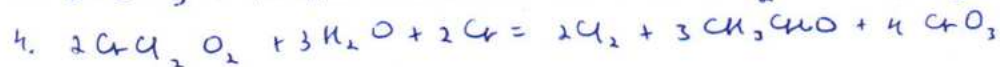
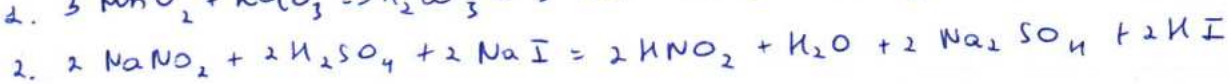
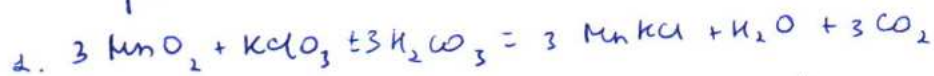
$$\omega(\text{Al}) = \frac{54}{150} \cdot 100 = 36\%$$

$$\omega(\text{S}) = \frac{98}{150} \cdot 100 = 65,3\%$$

$$4.2. \frac{31,36}{22,4} = 1,4 \text{ моль} \quad x \mid x = 2,1$$

$$4 \cdot 22,4 = 89,6 \text{ л} (\text{O}_2)$$

Планшета 2



Планшета 3

$$\begin{array}{|c|} \hline \text{H}_2\text{O} \\ \hline 6,542 \\ \hline \end{array} + \begin{array}{|c|} \hline \text{H}_2\text{O} \\ \hline 93,462 \\ \hline \end{array} = \begin{array}{|c|} \hline \\ \hline 4,82\% \\ 100 \\ \hline \end{array}$$

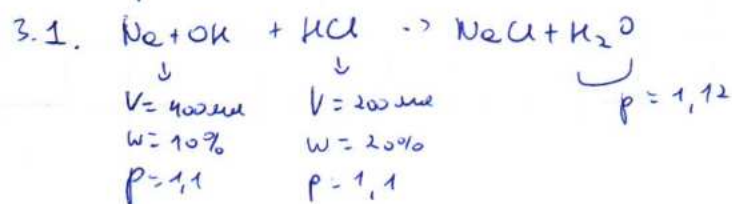
$$100 \cdot 0,0482 = 4,82$$

$$n(\text{H}_2\text{O}) = \frac{93,46}{18} = 5,192$$

$$5,192 = \frac{4,82}{x} \quad x = 0,94$$

$\text{FeSO}_4 \cdot 7 \text{H}_2\text{O}$ немір кыпоросы

Планшета 3



$$1,1 = \frac{x}{400} \quad x = 440,2 \quad 1,1 = \frac{x}{200} \quad x = 220,2$$

$$n = \frac{440,2}{40} = 11 \quad n = \frac{220,2}{36,5} = 6,027$$

$$C = \frac{n}{V} = \frac{m}{M \cdot V}$$

$$6,027 = \frac{x}{22,4} \quad x = 135,0048$$

$$C = \frac{6,027}{135,0048} = 0,044642857$$

$$\text{pH} = -\log [0,044642857]$$

$$\text{pH} = 1,3$$

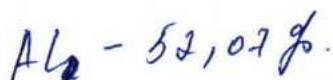
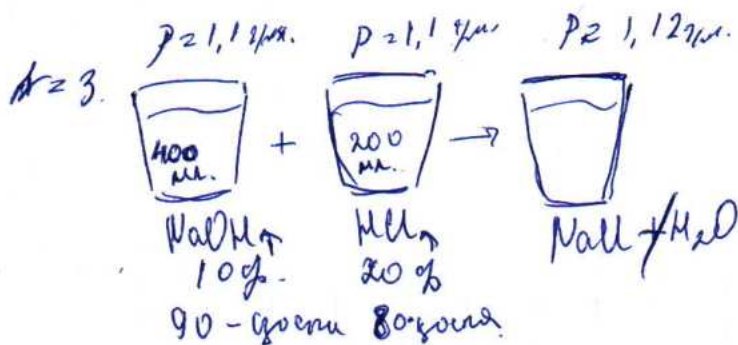
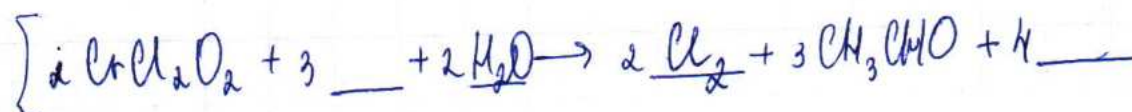
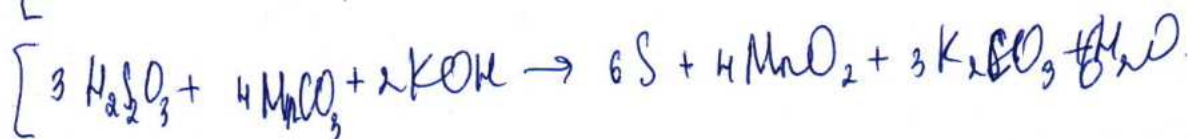
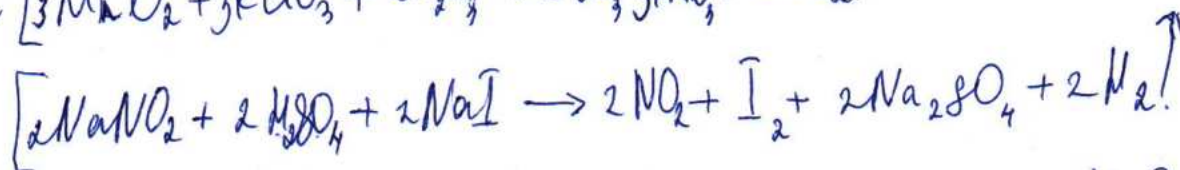
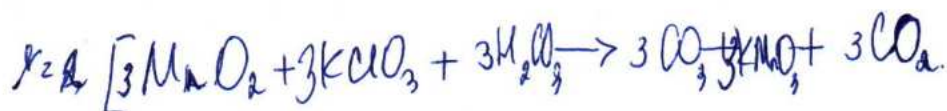
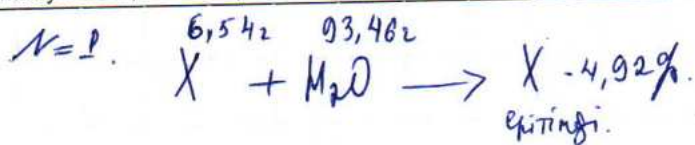
Тансырма 4



$$m = 72,62$$

$$+ \text{HCl} = \begin{matrix} \downarrow \uparrow \\ v = 34,36 \end{matrix}$$

$$W(\text{Al}) = 52,07\%$$



$100 - 52,07\% = 47,93\%$

$47,93\% - x = y$

$m(Al) = 37,82$

$72,62 - 37,82 = 34,8$ $\left\{ \begin{matrix} 34,8 - x = y \\ 34,8 = x + y \end{matrix} \right.$

~~$100\% - 72,62\%$~~
 ~~$72,62 - 52,07\%$~~

$100\% - 72,62\%$

$52,07\% - x$

$x = 37,82$

1) Берілгені

$$m_{\text{крист.}} = 6,54 \text{ г}$$

$$m_{\text{H}_2\text{O}} = 93,46 \text{ г}$$

$$\omega = 4,92\%$$

Т/и: кристалло-
гидрат форм.

Шешуі:

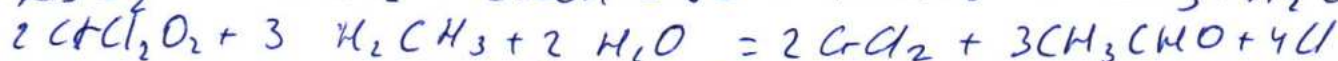
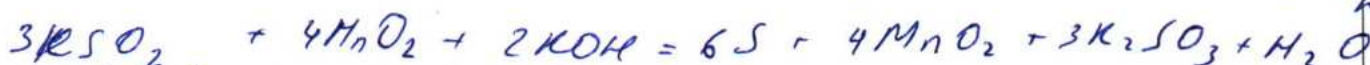
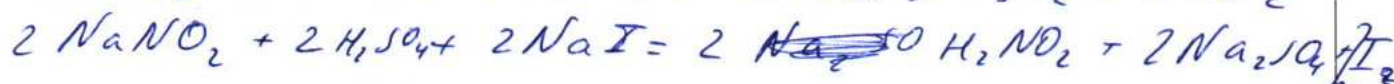
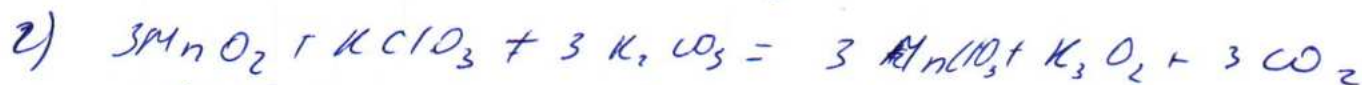
$$\frac{6,54}{x} = \frac{93,46}{16}$$

$$x = \frac{6,54 \cdot 16}{93,46} = \frac{104,64}{93,46} = \frac{2816}{25} = \frac{2616}{25} = \frac{100}{93,46}$$

$$2 \cdot \frac{10464}{9346} = \frac{5232}{4673}$$

$$\begin{array}{r} 2616 \\ 4 \\ \hline 10464 \end{array}$$

$$\begin{array}{r} 2616 \\ 4 \\ \hline 10464 \end{array}$$



3) Берілгені

$$V_{\text{NaOH}} = 200 \text{ мл}$$

$$\omega(\text{NaOH}) = 10\%$$

$$\rho_{\text{р-р}} = 1,1 \text{ г/мл}$$

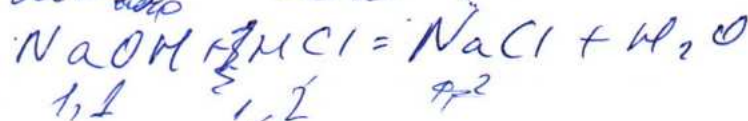
(HCl)

$$V_{\text{HCl}} = 100 \text{ мл}$$

$$\omega(\text{HCl}) = 20\%$$

$$\rho_{\text{р-р}} = 1,1 \text{ г/мл}$$

Шешуі: 200 рм



$$1,1 \quad 1,1 \quad 1,1$$

Р/и: рН, рН=0

Бою үшін 0,0-1

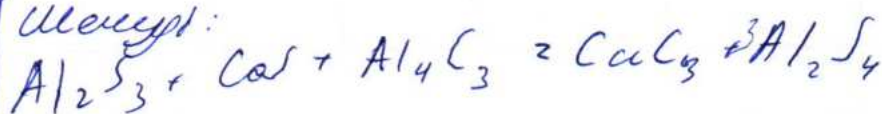
4) Берілгені

$$m_{\text{г.}} = 72,6 \text{ г}$$

$$M_{\text{м.ч.дес.}} = 52,0790$$

$$V = 31,36 \text{ мл}$$

Шешуі:



$$\frac{72,6}{31,36} \cdot 100\% = 20,7\%$$

$$\frac{31,36}{72,6} \cdot 100\% = 20,06\%$$

Т/и: Al_2S_3 , CaS , Al_4C_3 м.ч.дес.?

$$V_{\text{O}_2} = ?$$

4-есеп



$$m_{\text{хосна}} = 72,62$$

$$w(Al) = 52,07\%$$

$$m(Al) = 37,82$$

$$\frac{150,14x}{}$$



$$\frac{72,14y}{}$$



$$\frac{143,95z}{}$$



$$\begin{cases} 3x + y + 6z = \frac{37,82}{22,5} \end{cases}$$

 $\Rightarrow$

$$3x + y + 6z = 1,4$$

$$y = 1,4 - 3x - 6z$$

$$\begin{cases} 150,14x + 72,14y + 143,95z \end{cases}$$

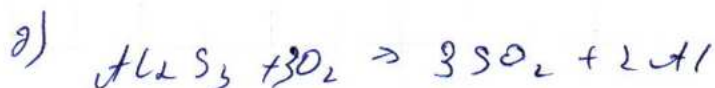
$$150,14x + 72,14(1,4 - 3x - 6z) + 143,95z = 72,62$$

$$150,14x + 100,996 - 216,42x - 432,84z + 143,95z = 72,62$$

$$-66,28x - 288,89z = -28,386$$

$$66,28x + 288,89z = 28,386$$

$$23,86y + 216,67y = 28,386$$



$$7O_2 \rightarrow 7 \cdot 22,4 \frac{л}{моль}$$



$$V(O_2) = 156,8 \frac{л}{моль}$$

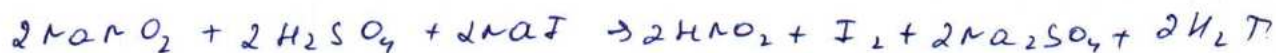


2 - сеп.

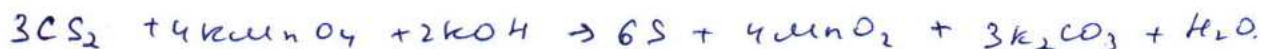
2.1.



2.2.



2.3.



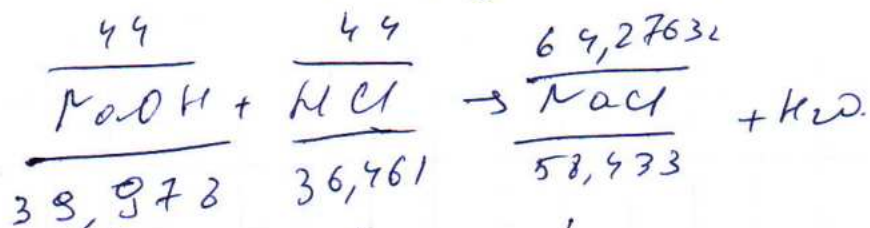
2.4.



3 - сеп

$$m(\text{KOH}) = w(\text{KOH}) \cdot \rho \cdot V(\text{KOH}) = 400 \cdot 0,1 \cdot 1,1 = 442$$

$$m(\text{HCl}) = w(\text{HCl}) \cdot \rho \cdot V(\text{HCl}) = 200 \cdot 0,2 \cdot 1,1 = 442$$



$$\downarrow$$

$$n = 1,1$$

$$\downarrow$$

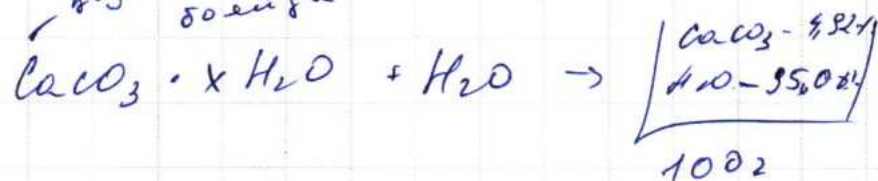
$$n = 1,206$$

$$V = \text{const.}$$

$$V = 1,12 \text{ л/мл; } m = 64,27632$$

$$\rho(\text{HCl}) =$$

1-сипат
қосынды және кірпіш түсі
болмайды



$$\text{CaCO}_3 - 4,922$$

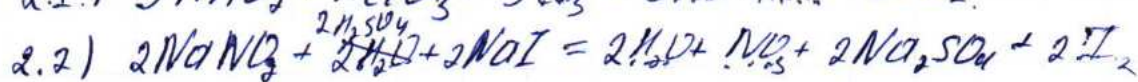
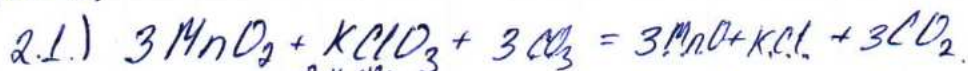
$$w(\text{CaCO}_3) = \frac{4,922}{6,542} \approx 0,7523\%$$

$$w(\text{H}_2\text{O}) \approx 0,2477\%$$

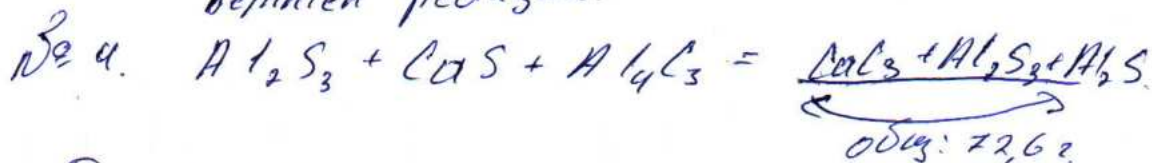
$$m(\text{H}_2\text{O}) = 1,622$$

$$x = 0,08 \text{ су бар. болса да.}$$

№ 2.



берінген реакция:



Берінгені:

$$\omega(\text{Al}) = 52,07\%$$

Газ қоспасы - 31,36%

Тік: Бастанғы қоспадағы заттардың массалық үлесі - ?

$$\omega(\text{Al}) = 52,07\%$$

~~271~~

$$\omega(\text{S}) = 44,4\%$$

$$\omega(\text{Ca}) = 12,85\%$$

$$\omega(\text{C}) = 11,57\%$$

№ 3 Берінгені:

$$m(\text{NaOH}) = 400 \text{ мм.}$$

$$\omega(\text{NaOH}) = 10\%$$

$$\text{пер-гі} = 1,12 \text{ мм.}$$

$$\omega(\text{HCl}) = 20\%$$

$$\text{пер-гі} = 1,12 \text{ мм.}$$

Тік: pH - ?

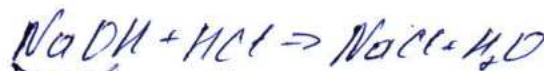
Егер тараздығы - 1,12 мм.

$$\text{pH} = ?$$

натрий гидроксиді - 400 мм.

$$m(\text{HCl}) = 200 \text{ мм.}$$

тұз қоспасының 200 мм ерітіндісі



10%	20%	2,2 мм.
1,12 мм	1,12 мм	тараздығы - 1,12 мм.

$$N^o 2. m(\text{кристаллогидрат}) = 6,542.$$

$$m(H_2O) \rightarrow 93,46.$$

Еріген заттың массалық үлесі - 4,924%.

Тк: кристаллогидраттың формуласы - ?

Жосалыма: Жеманның түсіні кіртілеті өзгеше түрде
болса және оның құрамындағы бейорганикалық
анион дерлік көз қараған катиондармен
тұнба түзіп арапастайда бірікпестейді;

Б1

Бер:

$$n_e = 6,542$$

$$m_{ay} = 93,462$$

Кристаллограф доп

Б2.



3)

31

$$V_{NaOH} = 400 \text{ мл}$$

$$\omega(NaOH) = 10\%$$

$$\rho_{ср} = 1,12 \text{ г/мл}$$

$$V_{HCl} = 200 \text{ мл}$$

$$\omega(HCl) = 20\%$$

$$\rho_{ср} = 1,1 \text{ г/мл}$$

10% - 20%



$$1,1 \quad 1,1$$

$$n = 440 \quad = 220$$

$$1,12 \text{ г/мл}$$

$$\rho = \frac{m}{V}$$

$$m = \rho \cdot V$$

$$= 1,1 \cdot 400 = 440$$

$$\rho = \frac{m}{V}$$

$$m = \rho \cdot V$$

$$1,1 \cdot 200 = 220$$

у.

4) Al_2S_3 , CaS мкс Al_4C_3 мұратын. $m = 42,6$ г. қоспа.

Қоспада алюминийдің массалық үлесі $W = 52,04\%$.

Тұз қанықтан. мәңгерімен өкделгенде. $V = 31,36$ л газ қоспасы пайда болды.

4.1 Бастапқы қоспадағы заттардың массалық үлестері

$$m = 42,6 \text{ г.}$$

$$W = 52,04\%$$

$$V = 31,36 \text{ л.}$$

$$W = \frac{m}{M} = \frac{42,6}{150} = 28,4\%$$

$$M(Al_2S_3) = 150 \text{ г.}$$

$$m = V \cdot M = 31,36 \cdot 150 = 4704 \text{ г.}$$

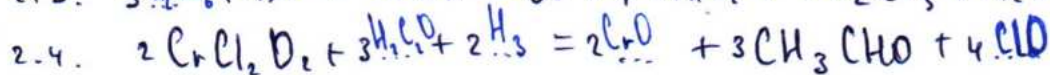
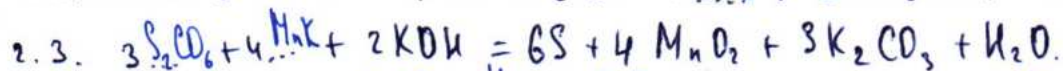
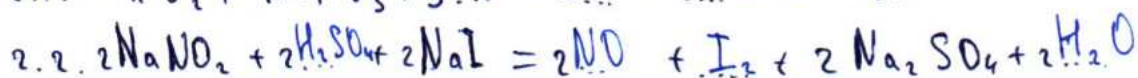
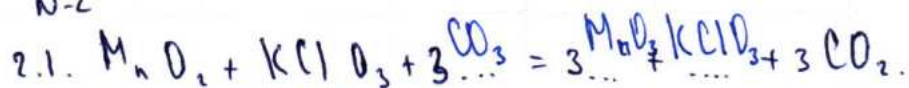
$$W = \frac{m}{M} = \frac{4704}{144} = 32,7\%$$

$$m = V \cdot M = 31,36 \cdot 144 = 4515 \text{ г.}$$

$$W = \frac{m}{M} = \frac{4515}{72} = 62,7\%$$

$$m = V \cdot M = 31,36 \cdot 144 = 4515 \text{ г.}$$

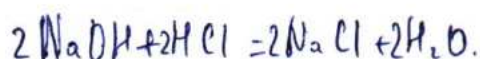
4.2. $V =$

$$\sum_{i=2}^{\infty}$$


$$\sum_{i=3}^{\infty}$$

$$\text{NaOH} = 400 \text{ мл.} \quad 10\% \quad \angle 1.12 \text{ мл.}$$

$$\text{HCl} = 200 \text{ мл.} \quad 20\% \quad \angle 1.12 \text{ мл.}$$



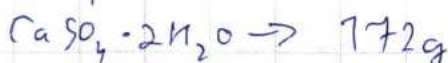
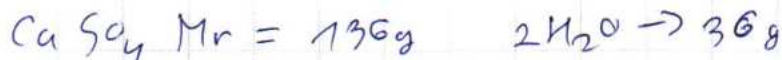
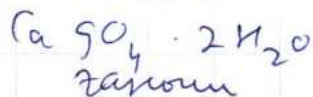
$$0.1 \quad 0.2 \quad 0.2$$

$$2(46 + 16 + 1) = 92 + 32 + 2 = 126$$

$$1.1 \cdot 10^3$$

N1 есеп.

$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ - кристаллогидрат. Ca^{+2} ионы пассивті түрде
 кірмейтін қозғалысқа түскендіктен. Анион SO_4^{-2} күшті
 қосынды қалдырады. Көп пассивтіге түрде түрдегі.
 Бірақ Ca^{+2} реакциямен әрекеттессе Ca^{+2} түрде
 түрде түрдегі.



$$172 - 100\%$$

$$136 \text{ g} - x$$

$$x = \frac{136 \cdot 100}{172}$$

$$6.54 \text{ g} - 100\%$$

$$x - 79\%$$

$$x = \frac{79 \cdot 6.54}{100} = 5.1 \approx 4.92 \text{ g}$$

$$x = 79\%$$

$$93.46 + 6.54 = 100 \text{ g}$$

$$100 \text{ g} - 100\%$$

$$5.1 - 5.1\%$$

$$5.1 \approx 4.92 \text{ g}$$

N2 есеп.



Нз есеп



$$m = \omega \cdot \rho \cdot V$$

$$m(\text{NaOH}) = 400 \cdot 0.1 \cdot 1.1 = 44 \text{ g}$$

$$m(\text{HCl}) = 200 \cdot 0.2 \cdot 1.1 = 44 \text{ g}$$

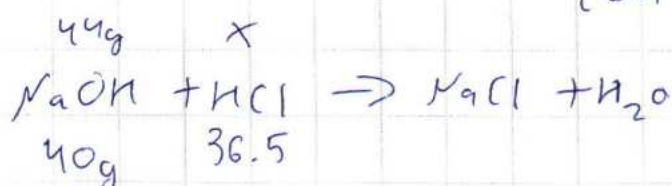
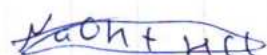
$$n = \frac{m}{M_r}$$

$$M_r(\text{HCl}) = 1 + 35.5 = 36.5 \text{ g}$$

$$M_r(\text{NaOH}) = 23 + 1 + 16 = 40 \text{ g}$$

$$n(\text{NaOH}) = \frac{44}{40} = 1.1 \text{ mol}$$

$$n(\text{HCl}) = \frac{44}{36.5} = 1.2 \text{ mol}$$



HCl - артықпен әрекеттескен.
сөйсе, себебі $\text{pH} < 7$.

$$m(\text{HCl}) = \frac{36.5 \cdot 44}{40} = 40.15 \text{ g}$$

$$m = \omega \cdot \rho \cdot V$$

$$V = \frac{m}{\omega \cdot \rho}$$

~~$$40.15$$~~

$$V(\text{HCl}) = \frac{40.15}{0.2 \cdot 1.1} = 182.5 \text{ l}$$

Мүсеш.

$$Mn(H_2S_3) = 27 \cdot 2 + 32 \cdot 3 = 150g$$

$$Mr(CaS) = 40 + 32 = 72g$$

$$Mr(Al_4C_3) = 3 \cdot 12 + 27 \cdot 4 = 144g$$

$$Mr_{total} = 150 + 72 + 144 = 366g.$$

$$366g - 72.6g$$

$$150g - 29.75g \text{ } Al_2S_3$$

$$366 - 72.5$$

$$72 - 14.2g \text{ } CaS$$

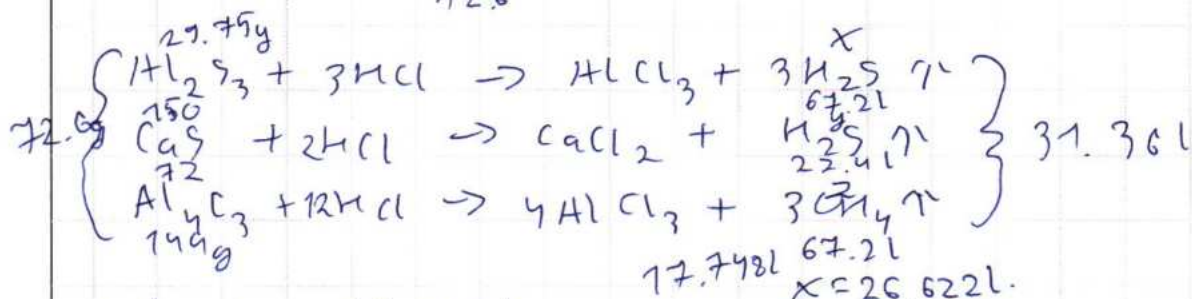
$$366g - 72.6$$

$$144g - 28.5g$$

$$w(Al_2S_3) = \frac{29.75g}{72.6} \cdot 100\% = 40.97\%$$

$$w(CaS) = \frac{14.2g}{72.6} \cdot 100\% = 19.56\%$$

$$w(Al_4C_3) = \frac{28.5}{72.6} \cdot 100\% = 39.25\%$$



$$V(H_2S) = 13.328l$$

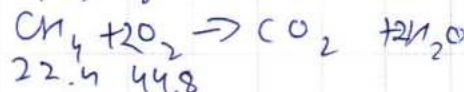
$$V(H_2S) = 4.42l$$

$$V(CH_4) = 13.3l$$



$$22.4 \quad 33.6$$

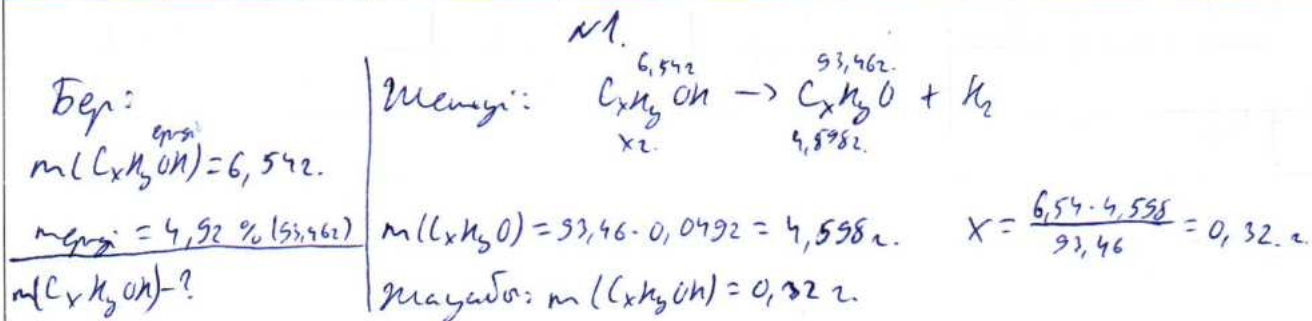
$$13.3l \text{ } y = 26.6l$$



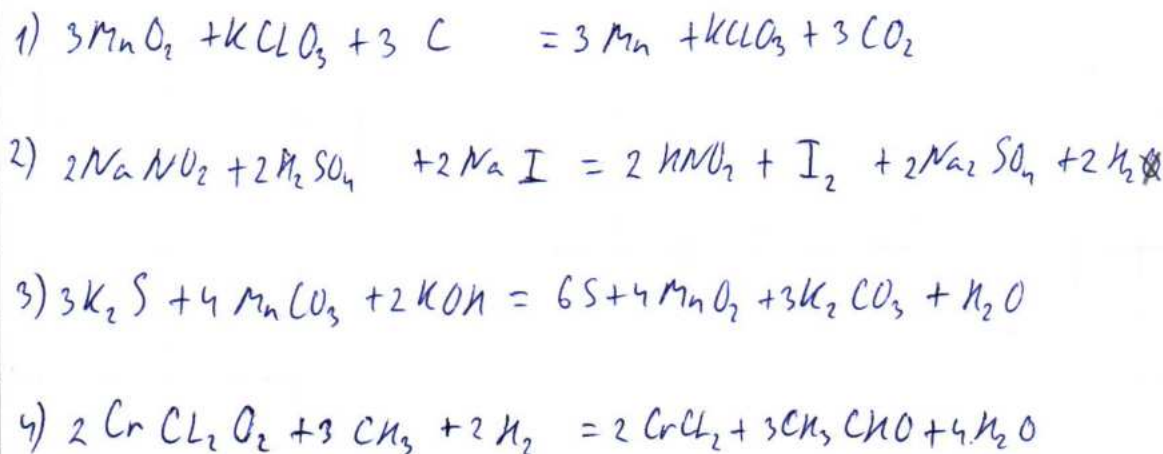
$$22.4 \quad 44.8$$

$$V(H_2S) = 13.328 + 4.42 = 17.748l$$

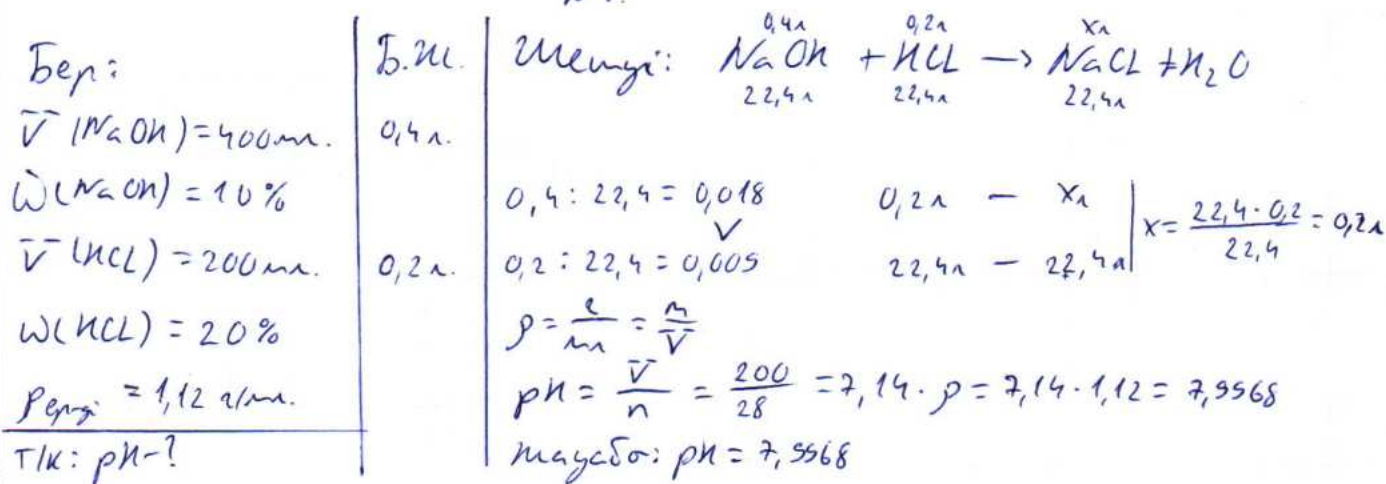
$$x + y \\ 26.622 + 26.6 = 53.222$$



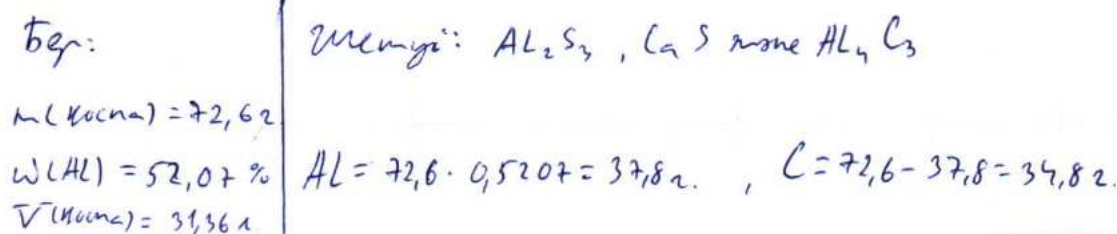
№2.



№3.

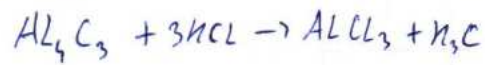
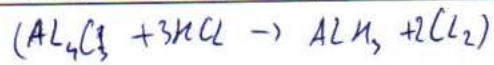


№4.



T/K: массалық үлес ω -?

$V(O_2)$ - ?



мағсбс: $\omega(H_3) = 21\%$, $\omega(Cl) = 79\%$.

$$V(O_2) = 1,14 л$$

Талқылама 1

$$M_{\text{крист}} = \text{~~100~~ } 6,542$$

$$M_{\text{H}_2\text{O}} = 93,452$$

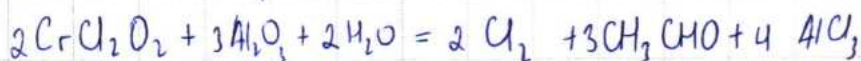
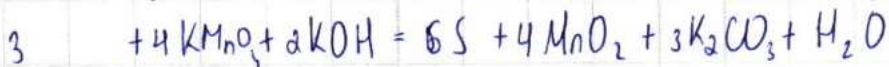
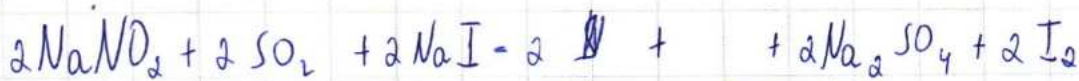
$$\omega_{\text{еріген зат}} = 4,92\%$$



$$M_{\text{общий}} = 6,54 + 93,45 = 1002$$

$$M_{\text{еріген зат}} = 100 \cdot 0,0492 = 4,922$$

Талқылама 2



Талқылама 3



$$V(\text{NaOH}) = 400\text{ мл} \quad (\omega(\text{NaOH}) = 10\%, \quad \rho = 1,12\text{ г/мл})$$

$$V(\text{HCl}) = 200\text{ мл} \quad (\omega(\text{HCl}) = 20\%, \quad \rho = 1,14\text{ г/мл})$$

$$m(\text{NaOH}) = \rho V = 400 \cdot 1,1 = 440 \cdot 10\% = 44\text{ г}$$

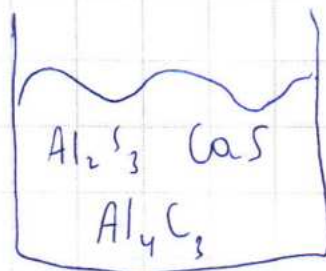
$$m(\text{HCl}) = \rho V = 200 \cdot 1,1 = 220 \cdot 20\% = 44\text{ г}$$

$$n(\text{NaOH}) = \frac{44}{40} = \frac{M}{m} = 1,1\text{ моль}$$

$$n(\text{HCl}) = \frac{44}{36,5} = 1,2\text{ моль}$$

$$V(\text{HCl}) = 1,1 \cdot 22,4 = 24,64 \text{ л}$$

Планшурма 4



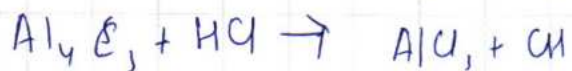
$$72,62.$$

$$\omega(\text{Al}) = 52,04\%$$

$$m(\text{Al}) = 72,6 \cdot 52,04\% = 37,82.$$

$$V(\text{HCl}) = 31,36 \text{ л}$$

$$n(\text{HCl}) = \frac{31,36}{22,4} = 1,4 \text{ моль.}$$



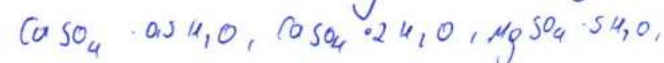
№1

$$m = 6,54$$

$$m_{H_2O} = 93,46$$

$$w = 0,0492$$

Тік: кристаллография формуласы?

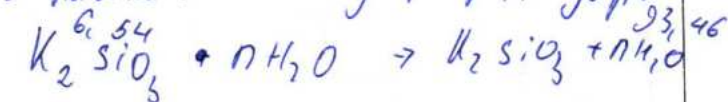


шешуі:

кристаллография - түз сен

сурыз 5 осьтерден мысалы:

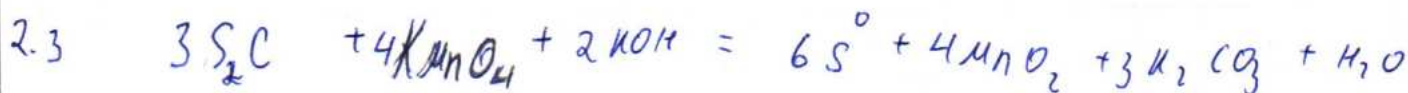
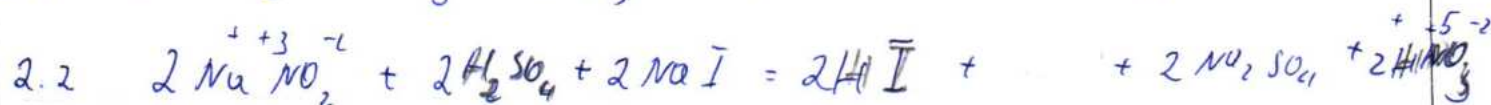
мирадалит, металл кудорангидрат, Гладер.



$$m_{gr} = 6,54 + 93,46 = 100$$

$$m_{H_2O} = 100 \cdot 0,0492 = 4,922$$

№2



№3

№3.1

NaOH

$$400 \text{ мл} = 0,4 \text{ л}$$

$$w = 100\% \quad p = 1,12$$

+HCl

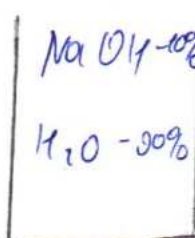
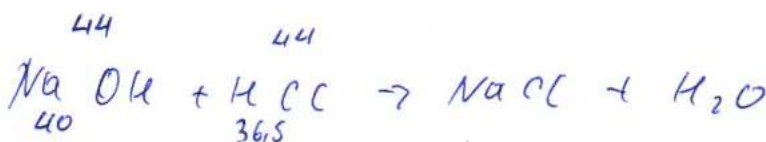
↓

$$200 \text{ мл} = 0,2 \text{ л}$$

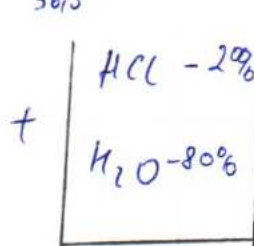
$$w = 20\%$$

$$p = 1,12$$

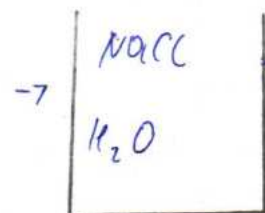
Тік: pH



400 мл



200 мл



600 мл

p = 1,12

$$m(NaOH) = 442$$

$$m(HCl) = 442$$

$$m.p.g. = p \cdot V = 1,12 \cdot 600 = 672$$

pH < 7 - бейтәріс

pH = 7 - нейтрал

pH > 7 - сілтілік

02-00001

Парақтың артқы жағын толтырмаңыз / Обратную сторону листа не заполнять

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ОҚУ-АҒАРТУ МИНИСТРЛІГІНІҢ
"ДАРЫН" РЕСПУБЛИКАЛЫҚ ҒЫЛЫМИ-ПРАКТИКАЛЫҚ ОРТАЛЫҒЫ
РЕСП. ДИКАЛЫҚ МЕМЛЕКЕТТІК ҚАЗЫНАЛЫҚ КӘСІПОРНЫ

$$n(\text{NaOH}) = 1,1 \quad \angle \quad n(\text{HCl}) = 1,2$$

$$n(\text{NaOH}) = n(\text{HCl})$$

$$m(\text{NaCl}) = 63,35$$

$$w(\text{NaCl}) = 10,7\%$$

3.2

$$pH = 0$$

$$n = 7$$

$$V(\text{HCl}) = ?$$

$$V = 7 \cdot 22,4 = 156,8 \text{ л}$$

$$V = 22,4$$

№ 4

$$m(\text{Al}_2\text{S}_3 + \text{Al}_4\text{C}_3 + \text{CaS}) = 72,62$$

$$w(\text{Al}) = 52,07\%$$

71к:

$$4.1: w$$

$$4.2: V(\text{O}_2)$$

$$3x + y = 1,4$$

$$Mr(\text{Al}_2\text{S}_3) = 54 + 96 = 150$$

$$Mr(\text{Al}_4\text{C}_3) = 144$$

$$Mr(\text{CaS}) = 72$$

№ 4.2

$$n(\text{H}_2\text{S}) = 1,4$$

$$2 \rightarrow 3$$

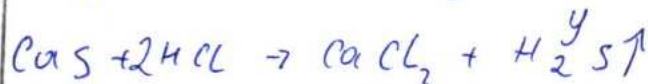
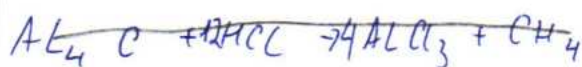
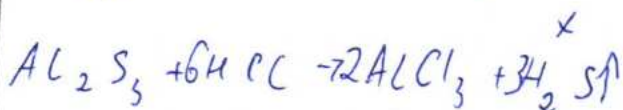
$$1,4 \rightarrow x$$

$$x = 2,1 \text{ м}$$

$$V(\text{O}_2) = 47,04 \text{ л}$$

Аб жауабы: Сілтілік7²

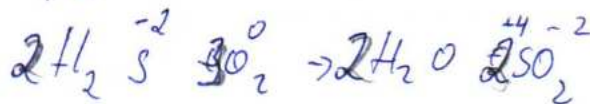
мүмкін болатын р-9



$$n(\text{H}_2\text{S}) = \frac{31,36}{22,4} = 1,4 \text{ м}$$

$$150x + 72y = 72,6 - m(\text{Al}_4\text{C}_3)$$

№ 4.2



$$\begin{pmatrix} \text{S}^{-2} & -6\bar{e} & \rightarrow & \text{S}^{+4} \\ 0^0 & +8\bar{e} & \rightarrow & 2\text{O}_2^{-2} \end{pmatrix} \quad \begin{array}{l} 48 \\ 8 \\ 6 \end{array}$$

$$Mr \text{ Al}_2\text{S}_3 + \text{Al}_4\text{C}_3 + \text{CaS} = 366$$

$$m(\text{Al}) = 37,82$$

жалғыз :
нөс. 1

$$m(\text{Al}_2\text{S}_3) = 150 \cdot 0,7 = 105,2 \Rightarrow w = 70\%$$

$$m(\text{Al}_4\text{C}_3) = 144 \cdot 0,35 = 50,4 \Rightarrow w =$$

$$w = \begin{cases} m(\text{Al}_2\text{S}_3) = 150 \cdot 0,233 = 35,2 & w = 48,16\% \\ m(\text{Al}_4\text{C}_3) = 144 \cdot 0,175 = 25,2 & w = 35,7\% \\ m(\text{CaS}) = 72 \cdot 0,1714 = 12,342 & w = 17\% \end{cases}$$

$$1) m(\text{кристаллоиды}) = 6,542$$

+ H₂O

$$m_{\text{до}}(93,46) = 100$$

$$\omega_{\text{кристаллоиды}} = 4,92\%$$

$$n(\text{H}_2\text{O}) = \frac{93,46}{18} = 5,19 \text{ моль}$$

$$\frac{5,19}{x} = \frac{100}{95,08} \quad x = 4,93 \text{ моль}$$

$$m = 4,93 \cdot \text{Ca}(\text{OH})_2 = 364,82 \text{ г}$$

$$\omega = \frac{6,54}{364,82} \cdot 100 = 1,79\%$$

$$\frac{6,54}{4,92x} \cdot 100 = ? \quad 492x = 6,54$$

$$x =$$

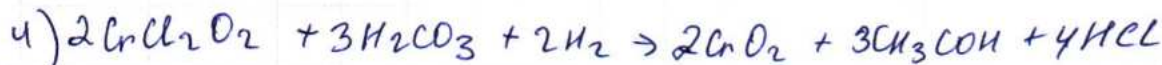
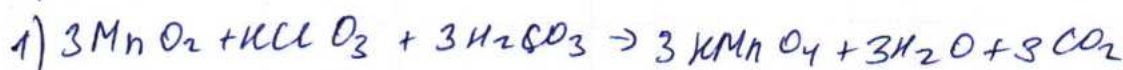
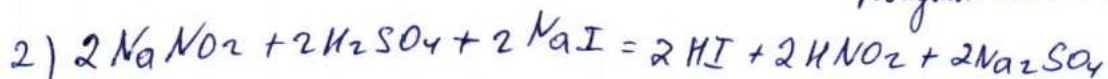
$$\frac{492}{6,54} = 75,2 \text{ г}$$

$$75,2 - M(\text{OH})_2 = 75,2 - 34 =$$

$$\approx 40 (M - \text{Ca})$$

Мағалат: Ca(OH)₂.

2.



$$3) V(\text{NaOH}) = 400 \cdot 10^{-3} \text{ л}$$

$$\omega(\text{NaOH}) = 10\%$$

$$\rho = 1,12 \text{ г/мл}$$

$$\omega(\text{HCl}) = 20\%$$

$$V(\text{HCl}) = 200 \cdot 10^{-3} \text{ л}$$

pH - ?

$$\rho = 1,12 \text{ г/мл}$$



$$n(\text{NaOH}) = \frac{0,4}{22,4} = 0,166 \text{ моль}$$

$$n(\text{HCl}) = \frac{0,2}{22,4} = 0,0089 \text{ моль}$$

$$n(\text{NaOH}) > n(\text{HCl})$$

$$\frac{0,166}{x} = \frac{100}{90} \quad x = 0,15 \text{ моль}$$

$$\frac{0,0089}{x} = \frac{100}{80} \quad x = 0,00712 \text{ моль}$$

$$m(\text{NaCl}) = 0,0071 \cdot 58,5 = 0,412$$

$$V = \frac{m}{\rho} = \frac{0,412}{1,12} = 0,366 \text{ мл}$$

$$0,366 \text{ мл}$$

Мағалат:

pH < 7. Кисл.

$$4) m(\text{қоспа}) = 72,62$$

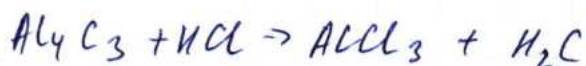
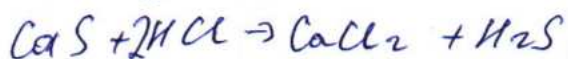
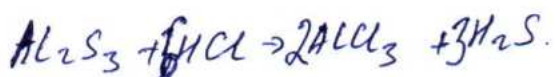
$$\omega(\text{Al}) = 52,07\%$$



$$V(\text{CO}_2) = 31,36\%$$

$$\omega(\text{Al}_2\text{S}_3) = ? \quad \omega(\text{CaS}) = ?$$

$$\omega(\text{Al}_4\text{C}_3) = ? \quad V(\text{O}_2) = ?$$



$$n = \frac{31,36\%}{22,4 \text{ л/моль}} = 1,4 \text{ моль}$$

$$m(\text{Al}) = \frac{27 \cdot 52,07}{100} = 14,052$$

$$m(\text{қоспа}) - m(\text{Al}) = 72,6 - 14,05 = 58,552$$

$$M = \frac{2}{1+4} \cdot 224 = 44,8 \text{ л}$$

$$\omega(\text{Al}_2\text{S}_3) =$$

$$\text{қоспадан: } V(\text{O}_2) = \frac{44,81}{22,6}$$

$$\omega(\text{Al}_2\text{S}_3) = \frac{1,4 \cdot M_r(\text{Al}_2\text{S}_3)}{72,6} = 2,89\%$$

$$\omega(\text{CaS}) = 1,38\%$$

N1.

Бер.

$$m(\text{кристаллоид}) = 6,54 \text{ г.}$$

$$m(\text{су}) = 93,46$$

$$\omega = 4,92\%$$

m/k формул?

Менші:

$$m_{\text{крист}} = 6,54 + 93,46 = 100 \text{ г.}$$

$$4,9\% \rightarrow x \text{ г.} \Rightarrow x = 4,9 \text{ г.}$$

$$100\% \rightarrow 100 \text{ г}$$

$$m(\text{крист}) = 4,9 \text{ г.}$$

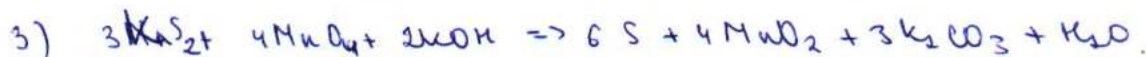
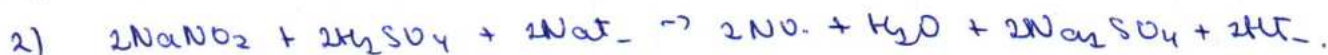
$$4,9 \text{ г} \rightarrow x\% \Rightarrow x = 4,92\%$$

$$6,54 \rightarrow 100\%$$

кристаллоид: $\text{NH}_4 \cdot \text{NH}_2\text{O}$.

Крім того, в даній задачі мен NH_4 (амоні) және 1 амонімен кристаллоид.

N2



N3.

$$V(\text{NaOH}) = 400 \text{ мл.}$$

$$\omega(\text{NaOH}) = 10\%$$

$$\rho = 1,1 \text{ г/мл.}$$

$$\omega(\text{HCl}) = 20\%$$

$$\rho(\text{HCl}) = 1,1 \text{ г/мл.}$$

$$V(\text{HCl}) = 200 \text{ мл.}$$

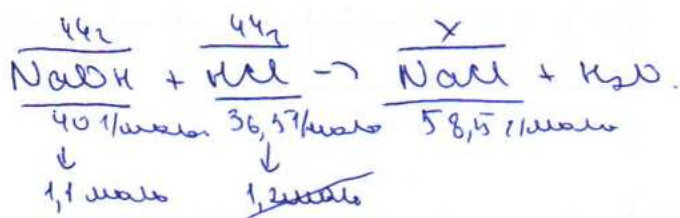
$$m_{\text{NaOH}} = \rho \cdot V = 1,1 \cdot 400 = 440 \text{ г}$$

$$m_{\text{HCl}} = 440 \cdot 0,1 = 44 \text{ г (NaOH)}$$

$$m_{\text{HCl}} = \rho \cdot V = 1,1 \cdot 200 = 220 \text{ г}$$

$$m_{\text{H}_2\text{O}} = 220 \cdot 0,2 = 44 \text{ г}$$

$$C = \frac{p \cdot \omega \cdot 10}{Mr} = \frac{1,12 \cdot 9,45\% \cdot 10}{58,5} = 1,84 \text{ M}$$



$$x = 58,5 \text{ г/моль} \cdot 1,1 \text{ моль} = 64,35 \text{ г}$$

$$m_{\text{сумм}} = 440 + 220 = 660 \text{ г}$$

$$\omega = \frac{64,35}{660} \cdot 100\% = 9,75\%$$

$$n(NaOH) = \frac{64,35}{58,5} = 1,1 \text{ моль}$$

$$pK =$$

N4.

$$m(Al_2S_3; CaS; Al_4C_3) = 42,6 \text{ г}$$

$$\omega(Al) = 52,04\%$$

$$\left[\begin{array}{l} Al \cdot N = Al \cdot 6 = 24 \cdot 6 = 162 \rightarrow 52,04\% \\ 42 \rightarrow x\% \end{array} \right] \Rightarrow 23,14\%$$

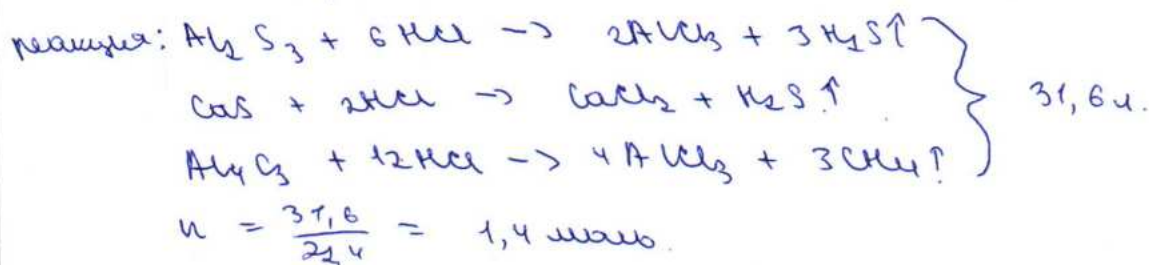
$$Mr(CaS) = 42 \text{ г/моль}$$

$$Mr(Al_2S_3 + CaS + Al_4C_3) = 366 \text{ г/моль} \rightarrow 100\% \Rightarrow 44,26\% \\ 162 \rightarrow x\%$$

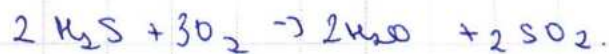
$$2,6 \text{ г} \rightarrow 100\%$$

$$x \text{ г} \rightarrow 52,04\%$$

$$\Rightarrow x = 34,8 \text{ г (Al)}$$



CO_2 қоспасы $[\text{CH}_4; \text{H}_2\text{S}]$

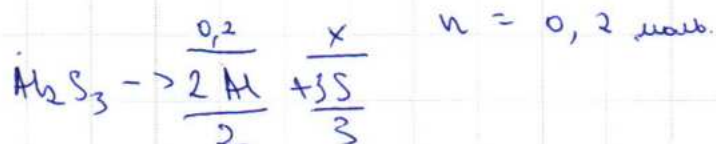


Пример: $n = \text{моль}$

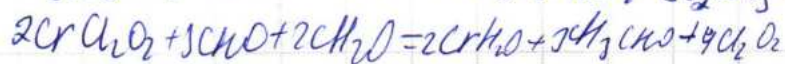
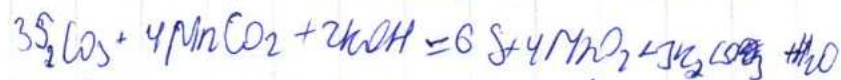
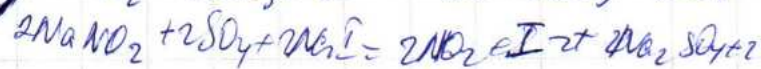
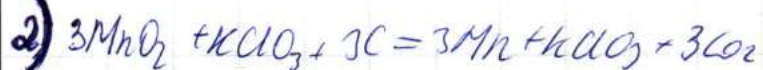
$$162 \cdot n \rightarrow 52,07\%$$

$$42,6 \rightarrow 100\%$$

$$162n = 37,8$$



$$x = 0,15 \text{ моль} \cdot 40 = 6$$



3) 2) $x_{\text{алкоголь}} = 1000$

$200 - 20$

$x - 100 ; x = 1000$

$\text{H}_2\text{O} : 800 \text{ мл}$

$$1) \text{pH} = \frac{10}{20} = 0,5$$

$$\text{pH} = \frac{20}{10} = 2$$

S1

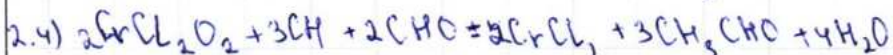
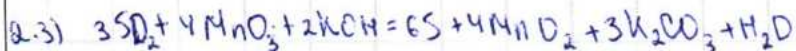
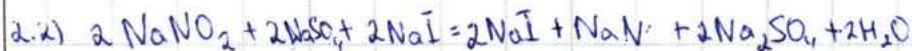
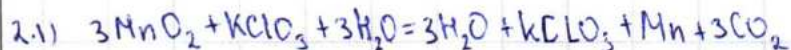
$$m = 6,54$$

$$\text{Шешуі: } \frac{6,54 \cdot 93,46}{4,92\%} \cdot 100\%$$

$$n = 93,46$$

$$Mr = 4,92\%$$

S2



S3

3.1) Натрий - 400 мм

$$\frac{400 \cdot 1,1}{20\%} \cdot 100\% =$$

туз қосындысы 200 мм

$$(W(\text{HCl})) = 20\%, \rho_{\text{р-г}} = 1,12/\text{мл}$$

$$\frac{200 \cdot 11}{20\%} \cdot 100\% =$$

$$W(\text{NaOH}) = 10\%, \rho_{\text{р-г}} = 1,12/\text{мл}$$

$$\rho_{\text{р-г}} = 1,12/\text{мл}$$

PH-?

S4

$$4.1) \frac{72,6 \cdot 31,36}{52,0\%} \cdot 100\%$$

Задача №1

Дано:

$$m = 6,54 \text{ г}$$

$$m_b = 93,46 \text{ г}$$

$$m_{\text{д.к.}} = 4,92\%$$

цвет матовый - карминно-крас.

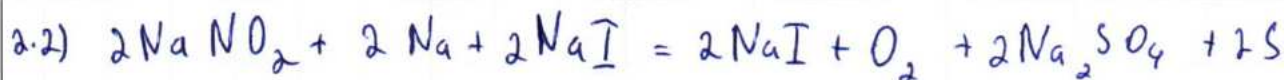
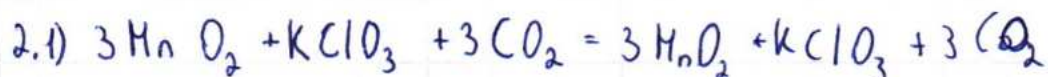
неорганич. Относк - практически не

образует осадок.

Решение.

Записаны формулы

Задача №2



Задача №3

3.1) Дано:

$$V = 400 \text{ мл (ш (NaOH))} = 10\%$$

$$\rho_{\text{р-ра}} = 1,1 \text{ г/мл.}$$

$$V = 200 \text{ мл (ш (HCl))} = 20\%$$

$$\rho_{\text{р-ра}} = 1,1 \text{ г/мл.}$$

$$\rho = 1,12 \text{ г/мл.}$$

pH-?

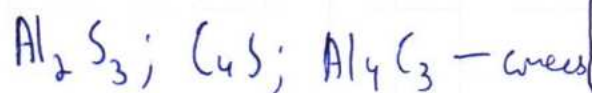
Решение:

3,1)

3,2)

Задача №4

Дано:



$$m_{\text{смеси}} = 72,6 \text{ г}$$

$$\text{Al} = 52,07\%$$

$$V = 31,36 \text{ л}$$

V(O) - ?

Решение

4,1)

4,2)

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Парақтың артқы жағын толтырмаңыз / Обратную сторону листа не заполнять

1

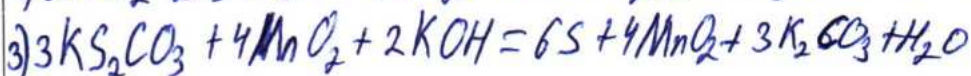
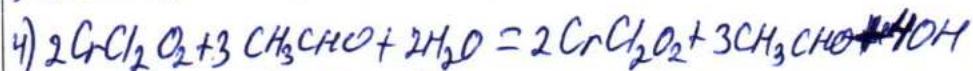
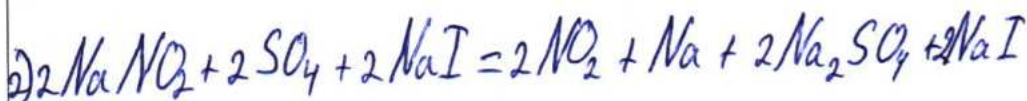
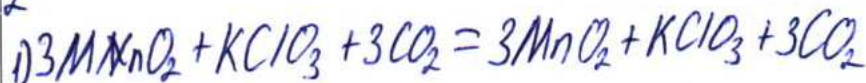
$$K. \approx 6.572$$

$$C_1 = 93.462$$

$$\text{Масса } y = 4.92\%$$

$$\frac{93.46}{6.54} \cdot 4.92 = \frac{458.1232}{6.54} \approx 70$$

2



3

$$1) 400 = cu(NaOH) = 10\% \quad \text{Рег-ге} = 1.12/\text{мл}$$

$$200 = cu(HCl) = 20\% \quad \text{Рег-ге} = 1.12/\text{мл}$$

$$600 =$$

$$cu = ?$$

$$\text{Рег-ге} = 1.12$$

$$\frac{600 \cdot 20}{200} = 60\%$$

$$\frac{600 \cdot 10}{400} = 15\%$$

$$\frac{60 + 15}{2} = 37.5\%$$

4

$$Al_2S_3; CaS; Al_4C_3 = 72.62$$

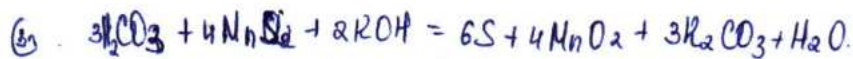
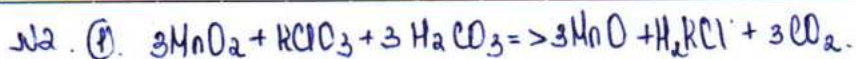
$$\text{бүтін } 52.07\% = \text{алтыншы}$$

$$\frac{72.6 \cdot 52.07}{100} = \frac{3780.282}{100} = 37.80282$$

2)

$$(37.8) \quad \begin{matrix} 31.36 = x \\ 72.6 = 100 \end{matrix}$$

$$\frac{31.36 \cdot 100}{72.6} = \frac{3136}{72.6} \approx 43.19\%$$



13. $V(\text{NaOH}) = 400\text{мл}$ ~~$0,4\text{л}$~~

$\omega(\text{NaOH}) = 10\%$

$V(\text{HCl}) = 200\text{мл}$ ~~$0,2\text{л}$~~

$\omega(\text{HCl}) = 20\%$.

$\rho = 1,12\text{г/мл}$

$m(\text{NaOH}) = 41,2\text{г}$ ~~$64,97\text{г}$~~

$m(\text{HCl}) = 64,97\text{г}$.

400мл 200мл



рН шөкі:

$M(\text{NaOH}) = 23 + 16 + 1 = 40\text{г/моль}$.

$M(\text{HCl}) = 35,5 + 1 = 36,5\text{г/моль}$.

$V(\text{NaOH}) = 400\text{мл}$

$n(\text{NaOH}) = 1,78\text{моль}$

$V(\text{HCl}) = 200\text{мл}$.

$n(\text{HCl}) = 1,78\text{моль}$..

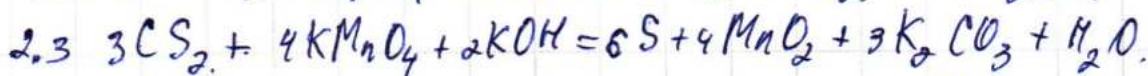
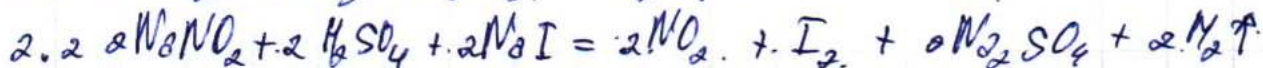
$\rho\text{H} = 1,1$. $\frac{41,2}{64,97} = 1,1$.

$m(\text{NaCl}) = 63,4\text{г}$

$\frac{63,4}{64,97} = 0,9$.

$\rho\text{H}(\text{NaCl}) = 0,9$.

Задача №2.



Задача №3.

3.1. Дано:

$$V_{\text{р-ра } 1} = 400 \text{ мл.}$$

$$\omega(\text{NaOH}) = 10\%$$

$$\rho_{\text{р-ра } 1} = 1,1 \frac{\text{г}}{\text{мл}}$$

$$V_{\text{р-ра } 2} = 200 \text{ мл.}$$

$$\omega(\text{HCl}) = 20\%$$

$$\rho_{\text{р-ра } 2} = 1,1 \frac{\text{г}}{\text{мл}}$$

$$\rho_{\text{р-ра } 3} = 1,12 \frac{\text{г}}{\text{мл}}$$

$$\rho_{\text{H}} = ?$$

Решение:

$$m_{\text{р-ра } 1} = 400 \cdot 1,1 = 440 \text{ г.} \quad m(\text{NaOH}) = 44 \text{ г.}$$

$$m_{\text{р-ра } 2} = 200 \cdot 1,1 = 220 \text{ г.} \quad m(\text{HCl}) = 44 \text{ г.}$$



$$n(\text{NaOH}) = \frac{44}{40} = 1,1 \text{ моль}$$

$$n(\text{HCl}) = \frac{44}{36} \approx 1,2 \text{ моль}$$

$$\left. \begin{array}{l} n(\text{NaOH}) = 1,1 \text{ моль} \\ n(\text{HCl}) = 1,2 \text{ моль} \end{array} \right\} \Rightarrow \text{HCl в избытке} \Rightarrow p < 7$$

3.

400 мл 200 мл



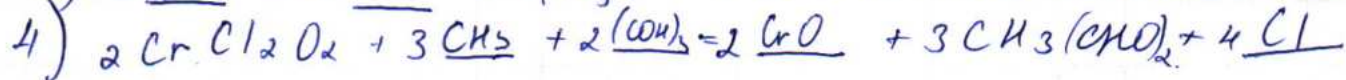
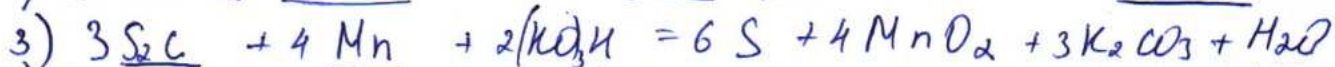
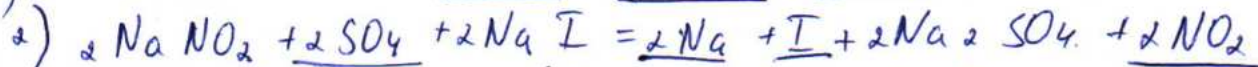
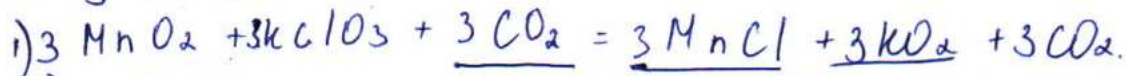
$$\omega(\text{NaOH}) = 10\%$$

$$\rho(\text{NaOH}) = 1,12 \text{ г/мл}$$

$$\omega(\text{HCl}) = 20\%$$

$$\rho(\text{HCl}) = 1,12 \text{ г/мл}$$

Задача 2



Задача 3.

Дано:

$$V_{\text{NaOH}} = 400 \text{ мл}$$

$$\omega(\text{NaOH}) = 10\%$$

$$\rho_{\text{р.р.}} = 1.1 \text{ г/мл}$$

$$V_{\text{HCl}} = 200 \text{ мл}$$

$$\omega(\text{HCl}) = 20\%$$

$$\rho_{\text{р.р.}} = 1.1 \text{ г/мл}$$

$$\rho_{\text{раств}} = 1.12 \text{ г/мл}$$

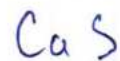
Найти: pH

Ответ: _____

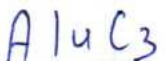
Решение:

Задача 4.

Решение:



$$m = 72,62$$



$$M_{\text{Al}} = 52,07\%$$

$$V = 31,36 \text{ л}$$

$$M - ?$$

$$V_{\text{ок}} - ?$$

Ответ: _____

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$X \cdot H_2O - 6,542$

$Cu - 93,462$

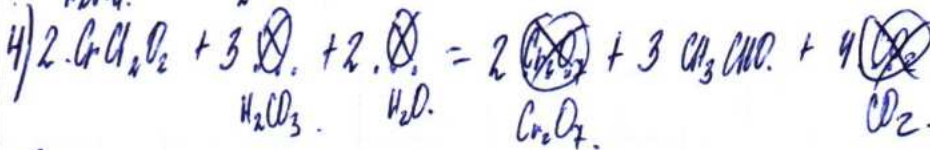
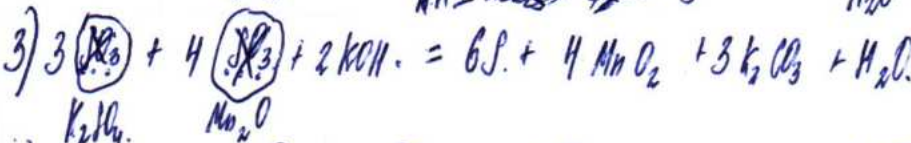
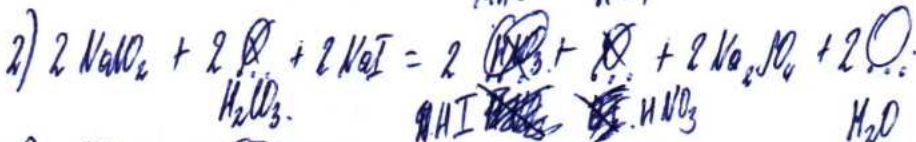
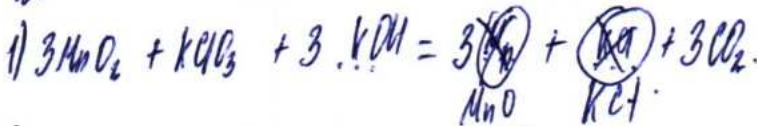
Сұйық заттың массалық үлесі - 4,92%

Кристалл гидрат формуласы -?



(Осы қалыңды қиып шығарып тастаса, оның қалыңдығын дейтіндігінен алынған сұйық көп тарапты қалыңдығынан тараптың қалыңдығына тең.

2.



3.



$NaOH \quad 400ml \cdot 10\% = 40ml$ тапса болған сұйықты.

$HCl \quad 200ml \cdot 20\% = 40ml$

Рес. екеуінде - 1,1 г/мл.

1) $NaCl$ pH мәні -? $\rightarrow (1,1)$

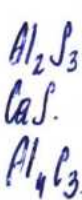
Титрленген - 1,12 г/мл.

$40 \cdot 1,1 = 44ml$

2) $NaCl$ г/л pH мәнін 0-ге көтеруге үшін қосымша қосын -?

4.

366 г/мл



$72,6 \text{ г}$ (қоспа).

Қоспадан Al үлесі 52,07%

$CaCO_3 + NaCl \rightarrow CaO + Na_2CO_3$
 (өндерде) $\frac{31,36}{22,4} = 1,4n$

1) $\frac{6Al}{366} = \frac{108}{366} = 44,2\%$

$\frac{48S - 96}{366} = \frac{34,8}{366} = 9,5\%$

$\frac{3C - 36}{366} = \frac{9,8}{366} = 9,8\%$

$\frac{Ca - 40}{366} = \frac{10,9}{366} = 10,9\%$

$$4. 2) \frac{1,4}{0,198} = 7,07. \quad 7,07 = \frac{X}{22,4} \quad X = 7,07 \cdot 22,4 = 158,41 (0_2).$$

Задача 3.

3.1 Дано:

$$V(\text{NaOH}_{\text{р-р}}) = 400 \text{ мл}$$

$$\omega(\text{NaOH}) = 10\%$$

$$\rho_1 = 1,1 \text{ г/мл} (\text{NaOH})$$

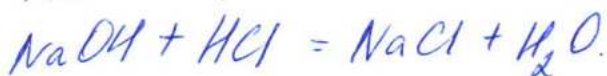
$$V(\text{HCl}_{\text{р-р}}) = 200 \text{ мл}$$

$$\omega(\text{HCl}) = 20\%$$

$$\rho_2 = 1,12 \text{ г/мл}$$

$$\rho_3 = 1,12 \text{ г/мл}$$

Решение:



$$m(\text{NaOH}_{\text{р-р}}) = 440 = 400 \cdot 1,1 = \rho \cdot V$$

$$m(\text{NaOH}) = 440 \cdot 0,1 = 44$$

$$n(\text{NaOH}) = \frac{44}{40} = 1,1 \text{ моль (недостаток)}$$

$$m(\text{HCl}_{\text{р-р}}) = 220 \text{ г} = 200 \cdot 1,1$$

$$m(\text{HCl}) = 220 \cdot 0,2 = 44 \text{ г}$$

$$n(\text{HCl}) = \frac{44}{36,5} = 1,2 \text{ моль (избыток)}$$

таким образом в растворе останется 0,1 моль HCl, значит раствор кислой и его $\text{pH} < 7$.

$$V_{\text{р-раз}} = 400 + 200 = 600 \text{ мл}$$

$$m_{\text{р-раз}} = 600 \cdot 1,12 = 672 \text{ г}$$

$$m_2(\text{HCl}) = 0,1 \cdot 36,5 = 3,65 \text{ г}$$

$$\omega_2(\text{HCl}) = \frac{3,65}{672} \cdot 100\% \approx 0,5\% \quad \text{pH} \approx 6$$

3.2 pH 1-6 кислое; 7 - нейтральное, 8-12 щелочное.

pH = 0 не существует.

Ответ: кислого не добавляет

Задача 1.

$$m(\text{кристал}) = 6,54 \text{ г}$$

$$m(\text{H}_2\text{O}) = 93,46 \text{ г}$$

$$\omega(\text{соль}) = 4,92\%$$

сначала всего солю будет CaCl_2 .

так как Ca^{+2} дает кирпичный цвет,

а Cl^- растворим почти со всеми катионами.

$$m(\text{CaCl}) = 4,92 \text{ г} = 100 \cdot \frac{4,92}{100}$$

$$m(\text{H}_2\text{O в кристале}) = 1,62$$

$$M_r(\text{CaCl}_2) = 40 + 35,5 \cdot 2 = 111 \quad n(\text{H}_2\text{O в крист}) = 0,09 =$$

$$\frac{111}{1} = \frac{4,92}{x} \quad x = 0,4 \text{ моль} \quad = \frac{1,6}{18}$$

$$0,4 \cdot 0,09 \approx 4,5 \quad \text{Ответ: } 2\text{CaCl} \cdot 9\text{H}_2\text{O}$$

N 2



N 3

3.1

$$pH < 7, \quad n(HCl) > n(NaOH)$$

$$pH \sim 4-5$$

3.2

$$\begin{aligned} n(HCl) &= n(NaOH) \Rightarrow n(HCl) = \frac{44}{40} \Rightarrow V(HCl) = n \cdot V_m = \\ &= \frac{44}{40} \cdot 22,4 = 24,64. \end{aligned}$$

$$n(HCl) = n(NaOH) \Rightarrow n(HCl) = \frac{44}{40}$$

$$m(HCl) = n \cdot M = \frac{44}{40} \cdot 36,5 = 40,15$$

$$V = \frac{m}{\rho} = 40,15 : 1,1 = 36,5 \text{ мл}$$

N1

$$m_{\text{кристаллогидрат}} = 6,542$$

$$m(\text{H}_2\text{O}) = 93,462$$

$$\omega_{\text{р-р}} = 4,92\%$$

В кристалл - кристалл улет
аммоний не образует осадка с катионами, кроме
катионами кроме одного

аммоний, который не образует
осадка с катионами, кроме
одного - скорее всего - NO_3
т.к. NO_3 образует со всеми р-ще
в-ва, кроме Cr_2^{2+})

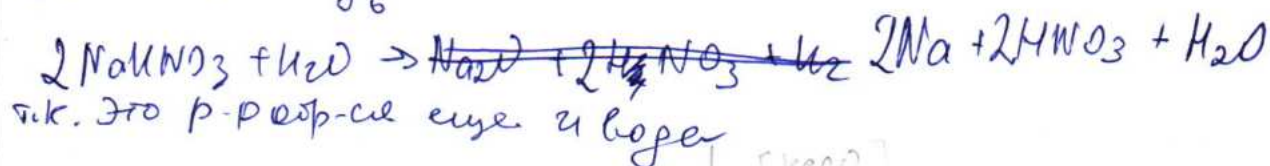
$$\text{определим } n(\text{H}_2\text{O}) = \frac{93,46}{18} = 5,192 \text{ моль}$$

$$m(\text{H}_2\text{O}) = 2+16 = 18 \text{ г/моль}$$

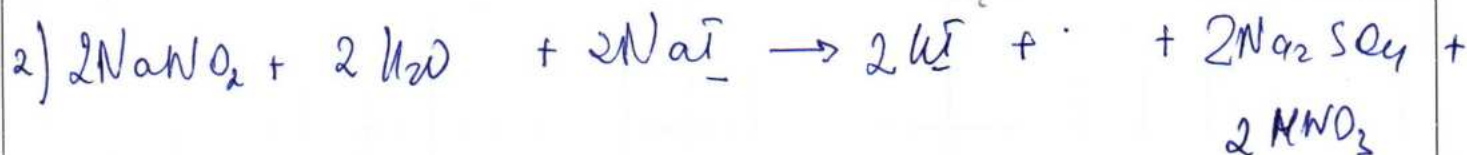
скорее всего это Na , а именно NaNO_3 , тогда
найдем $n(\text{NaNO}_3)$

$$m(\text{NaNO}_3) = 86 \text{ г/моль}$$

$$n(\text{NaNO}_3) = \frac{6,54}{86} = 0,076 \text{ моль}$$



N2



O, Mn, Cr, H

$$3) V(\text{NaOH}) = 400 \text{ мл}$$

$$\omega(\text{NaOH}) = 10\%$$

$$\rho_1 = 1,12 \text{ г/мл}$$

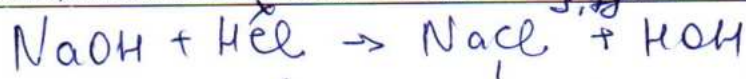
$$V(\text{HCl}) = 200 \text{ мл}$$

$$\omega(\text{HCl}) = 20\%$$

$$\rho_2 = 1,12 \text{ г/мл}$$

$$\rho_3 = 1,12 \text{ г/мл}$$

$$\rho_H - ?$$



1) т.к. NaOH - ерікпей көмір → шешім (сильная)
а HCl - қышқыл (сильная) ұярт реакцияне
нейтрализация, а шешім өзгеруіне
сәйкес (NaCl) и вода (H₂O) → сәйкес, шешім
рН ережа бүрөт нейтральнай, а шешім
рН = 0

$$\rho_1 = \frac{m}{V} \quad \rho_2 = \frac{m}{V}$$

$$1,1 = \frac{m(\text{NaOH}) \cdot 0,1}{400} \quad | \cdot 400$$

$$440 = 0,1 m(\text{NaOH}) \quad | \cdot 10$$

$$m(\text{NaOH}) = 4400 \text{ г}$$

$$n(\text{NaOH}) = \frac{4400}{40} = 11 \text{ моль}$$

$$M(\text{NaOH}) = 23 + 16 + 1 = 40 \text{ г/моль}$$

$$1,1 = \frac{m(\text{HCl}) \cdot 0,2}{200} \quad | \cdot 200$$

$$220 = 0,2 m(\text{HCl}) \quad | \cdot 5$$

$$m(\text{HCl}) = \frac{220}{0,2} = 1100 \text{ г}$$

$$M(\text{HCl}) = 35,5 + 1 = 36,5 \text{ г/моль}$$

$$n(\text{HCl}) = \frac{1100}{36,5} = 30,14 \text{ моль}$$

$$\rho(\text{р-р NaCl + H}_2\text{O}) = 1,12 \text{ г/мл}$$

$$\text{кайгем } V_{\text{р-ра}} = V(\text{NaOH}) + V(\text{HCl}) \rightarrow V_{\text{р-ра}} = 400 + 200 =$$

$$= 600 \text{ мл (по условию } V_{\text{р-ра}} \text{ не менее)} \rightarrow$$

кайгем шешім р-ра, а тақиме $V_{\text{р-ра}} \rightarrow$ по формуле

$$\rho = \frac{m}{V}, \text{ кайгем } m_{\text{р-ра}}$$

$$m_{\text{р-ра}} = \rho V = 1,12 \cdot 600 = 672 \text{ г} - m_{\text{р-ра}}$$

$$M_{\text{р-ра}} = M(\text{NaOH}) + M(\text{HCl}) = 58,5 + 18 = 76,5 \text{ г/моль}$$

(продуктов р-ра)

$$M(\text{NaCl}) = 23 + 35,5 = 58,5 \text{ г/моль}$$

$$M(\text{H}_2\text{O}) = 2 + 16 = 18 \text{ г/моль}$$

$$\text{сәйкес, шешім } n_{\text{р-ра}} = \frac{m_{\text{р-ра}}}{M_{\text{р-ра}}}$$

$$n_{\text{р-ра}} = \frac{672}{76,5} = 8,78 \text{ моль, т.к. отношение } 1:1 \rightarrow$$

$$n = 8,78 \text{ (} n(\text{HCl}) \text{) гел тою шөбөт кайтм } V = nV_0$$

используя формулу

$$n = \frac{V}{V_0}, \text{ где } V_0 = 22,4$$

$V = 8,78 \cdot 22,4 = 196,672$ л (HCl) необходимо для того, чтобы образовался р-р стал нейтральным

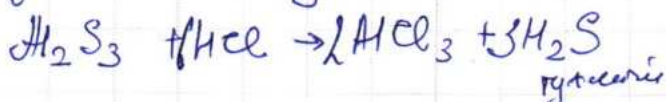
N4

$$m(H_2S_3 + CaS + H_4C_3) = 72,62$$

$$w(H) = 52,07\%$$

$$V_{\text{газов. смеси}} = 31,36 \text{ л}$$

р.м. 3 реакции, используя условие задачи



зная то, что $w(H) = 52,07\%$
находим остальные w

$$w = \frac{M(H)}{M_{\text{в-ва}}} = \frac{162}{366}$$

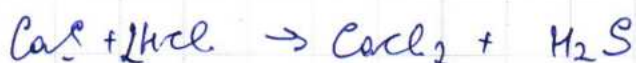
$$w(S) = \frac{3 \cdot 32 + 32}{366} = \frac{128}{366} = 34,97\%$$

$$w(C) = 9,8\% = \frac{36}{366}$$

$$w(Ca) =$$

$$w_{\text{остаточн}} x = 100\% - 52,07\% = 47,93\%$$

$$\begin{aligned} & x = 47,93\% \\ & 366 - 100\% \\ & x = 175,42 \\ & 175,42 - \end{aligned}$$



тогда найдем

$$w = \frac{M_{\text{в-ва}}}{M_{\text{всего в-ва}}}$$

$$M_{\text{всего в-ва}} = 366 \text{ г/моль}$$

$$M(H) = 162 \text{ г/моль}$$

$$M(S) = 128 \text{ г/моль}$$

$$M(Ca) = 40 \text{ г/моль}$$

$$M(C) = 36 \text{ г/моль}$$

$$w = \frac{162}{366} = 52,07\% - H$$

$$w = \frac{128}{366} = 34,97\% - S$$

$$w = \frac{40}{366} = 10,92\% - Ca$$

$$w = \frac{36}{366} = 9,8\% - C$$

Задача 1.

Дано:

$$m_{\text{крист.}} = 6,542$$

$$m_{\text{вод.}} = 93,462$$

$$\omega = 4,92\%$$

р- кристаллогидрат - ?

Решение:

окрашивает цвет пламени в

красный $\Rightarrow$ кристаллогидратсодержит Ca^{2+}

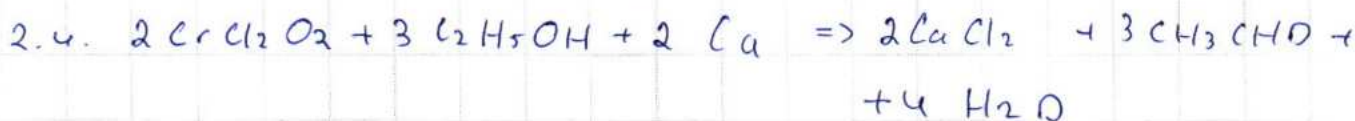
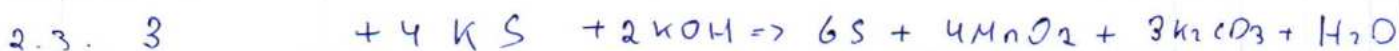
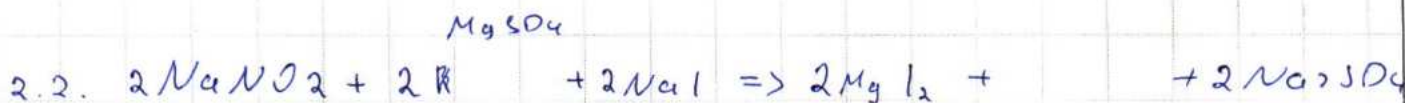
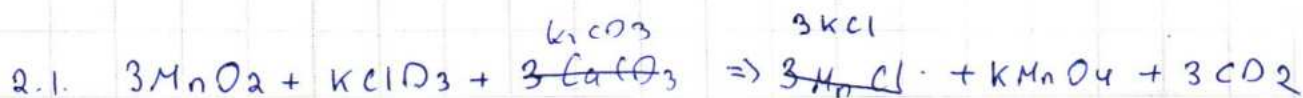
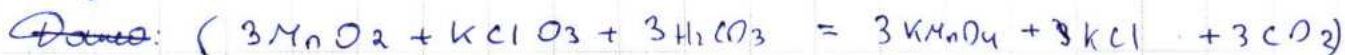
$$m_{\text{продукта (р-ра)}} = 6,54 + 93,46 = 100 \text{ гр.}$$

$$m_{\text{в-ва}} = 100 \cdot 0,0492 = 4,92 \text{ гр.}$$

Ответ: Ca - окрашил пламя в красный

$$m_{\text{в-ва}} = 4,92 \text{ гр.}$$

Задача 2.



Задача 3

Дано:

$$V_{\text{(NaOH)}} = 400 \text{ мл}$$

$$\omega_{\text{(NaOH)}} = 10\% = 0,1$$

$$\rho_{\text{р-ра (NaOH)}} = 1,12 \text{ гр.}$$

$$V_{\text{(HCl)}} = 200 \text{ мл}$$

$$\omega_{\text{(HCl)}} = 20\% = 0,2$$

$$\rho_{\text{(HCl)}} = 1,12 \text{ гр.}$$

Решение

$$m = \rho \cdot V$$

$$m_{\text{(NaOH)}} = 400 \cdot 1,1 = 440 \text{ гр.}$$

$$m_{\text{(HCl)}} = 200 \cdot 1,1 = 220 \text{ гр.}$$

$$m_{\text{в-ва}} = m \cdot \omega = 440 \cdot 0,1 = 44 \text{ гр. (NaOH)}$$

$$m_{\text{в-ва (HCl)}} = m_{\text{(HCl)}} \cdot \rho \cdot \omega =$$

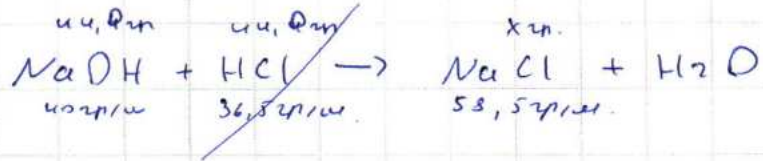
$$= 220 \cdot 0,2 = 44 \text{ гр.}$$

02-00001

Парақтың артқы жағын толтырмаңыз / Обратную сторону листа не заполнять

$$\rho_{\text{продукта}} = 1,122 / \text{мл}$$

pH продукта = ?



$$M_r(\text{NaOH}) = 23 + 16 + 1 = 40 \text{ г/м}$$

$$M_r(\text{HCl}) = 1 + 35,5 = 36,5 \text{ г/м}$$

$$M_r(\text{NaCl}) = 23 + 35,5 = 58,5 \text{ г/м}$$

$$\frac{44,4}{40} < \frac{44,4}{36,5} \text{ избыток}$$

$$\frac{44,4}{40} = \frac{x}{58,5}$$

$$x = 64,35 \text{ г. (m(NaCl))}$$

$$m_{\text{меш}} = 44,4 + 44 = 88,4 \Rightarrow$$

$$\Rightarrow m(\text{H}_2\text{O}) = 88,4 - 64,35 = 24,05 \text{ г.}$$

$$\omega(\text{NaCl}) = \frac{64,35}{88,4} \cdot 100\% = 72,79\%$$

$$V(\text{NaCl}) = \frac{m}{\rho} = \frac{64,35}{1,12} = 57,46 \text{ мл}$$

Ответ:

$$\rho_{\text{H}} = 57,46$$

$$V(\text{H}_2\text{O}) = 24,05 / \rho = 24,05 \text{ мл} \cdot 10$$

$$\rho(\text{H}_2\text{O}) = 1000 \text{ кг/м}^3 \quad V_{\text{об}} = 57,46 + 24,05 = 81,51$$

$$\rho_{\text{H}} = \frac{57,46}{81,51} = 0,705$$

Задача 4.

Решение:

мешок Al_2S_3 , CaS , Al_4C_3

$$m_r(\text{Al}) = 72,6 \cdot 0,52,07 = 37,6 \text{ г.}$$

$$m_{\text{меш}} = 72,62$$

$$\omega(\text{Al}) = 52,07\%$$

$$V_{\text{пр}} = 31,36 \text{ л}$$

$$\omega(\text{S}) = ? \%$$

$$\omega(\text{Ca}) = ? \%$$

$$\omega(\text{C}) = ? \%$$

$$V(\text{O}_2) = ? \text{ л}$$

02-00001

Парақтың артқы жағын толтырмаңыз / Обратную сторону листа не заполнять

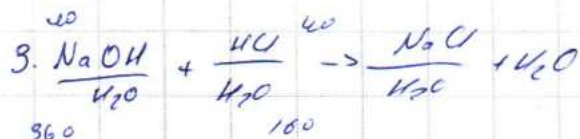
$$1. \frac{6,54}{83,46} = 4,92\%$$

$$100 - 100\%$$

$$y = 95,08\%$$

$$\frac{118,72 \cdot 4,92}{95,08} = \frac{6,14}{22,4} = 0,274$$

$$\frac{6,54}{0,274} = 23,87 \approx (LiOH)$$



$$\frac{40}{1,1} = \frac{36,4}{40}$$

$$0,91$$

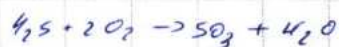
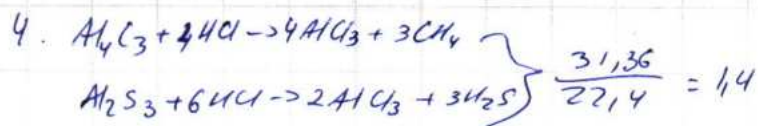
$$0,93$$

$$0,91 \cdot 58,5 = 53,235 \cdot 1,12 = 59,621$$

$$\frac{0,91}{59,62} = 0,015 M$$

$$3.1. pH = -\lg 0,015 = 1,8$$

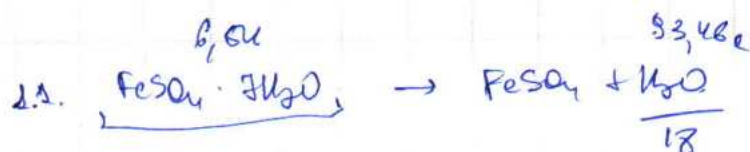
$$3,2 \quad 22,4 L + \frac{1}{22,4} = 0,0446 M \quad -\lg 0,0446 \approx 1,4$$



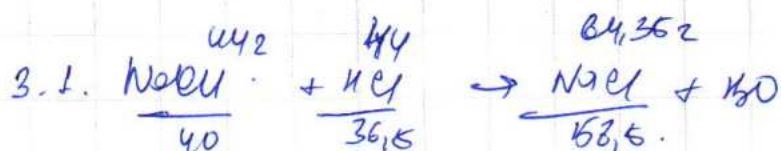
02-00001

Парақтың артқы жағын толтырмаңыз / Обратную сторону листа не заполнять

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ОҚУ-АҒАРТУ МИНИСТРЛІГІНІҢ
"ДАРЫН" РЕСПУБЛИКАЛЫҚ ҒЫЛЫМИ-ПРАКТИКАЛЫҚ ОРТАЛЫҒЫ
РЕСП. ЛИКАЛЫҚ МЕМЛЕКЕТТІК ҚАЗЫНАЛЫҚ КӘСІПОРНЫ



2 топсының:



NaCl - керіткі қосынды
керіткі сілті

$$m(\text{NaOH}) = 100 \cdot 0,1 \cdot 1,1 = 11$$

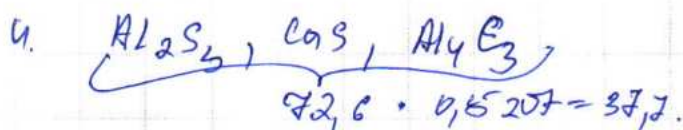
$$m(\text{HCl}) = 200 \cdot 0,2 \cdot 1,1 = 44$$

$$n(\text{NaOH}) = 1,1 \quad p = \frac{m}{V} \quad 1,12 = \frac{64,35}{V}$$

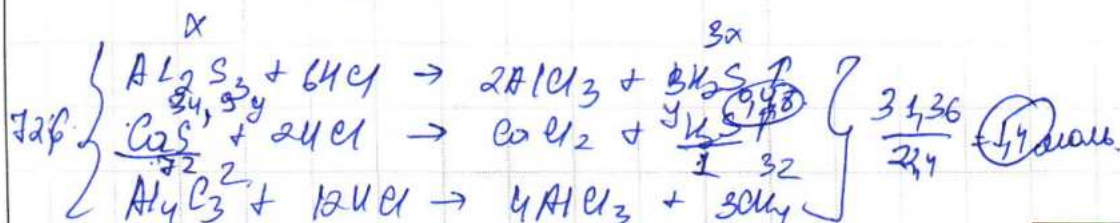
$$n(\text{HCl}) = 1,2$$

$$V = 57,45 \text{ mL}$$

шүршізгендігі:

Дейтұрып дұрыс = $\text{pH} = 7$ 

$$72,6 \cdot 0,5207 = 37,7$$



02-00001

Парақтың артқы жағын толтырмаңыз / Обратную сторону листа не заполнять

$$\begin{cases} 160x + 72y + 144z = 72,62 \\ 3x + y + 32 = 1,4 \cdot 50 \\ 160x + 160y + 160z = 2,6 \end{cases}$$

$$\underline{3x + y + 32 = 1,4 \cdot 50}$$

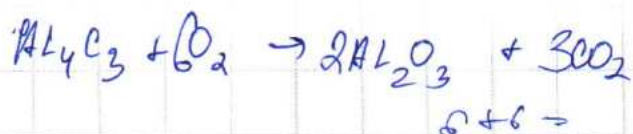
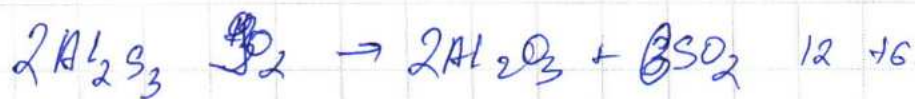
$$\underline{160x + 160y + 160z = 2,6}$$

$$22y - 62 = 2,6$$

$$10,56 - 62 = 2,6$$

$$7,96 = 62$$

$$(2 - 1,3) \cdot 144 = 101,04$$



Задача-1

$$m_K = 6,542$$

$$m_B = 93,462$$

$$w = 4,92\%$$

цвет - кирпично-красный

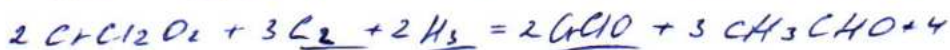
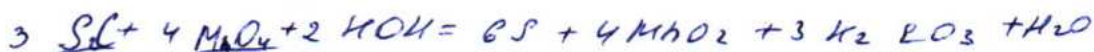
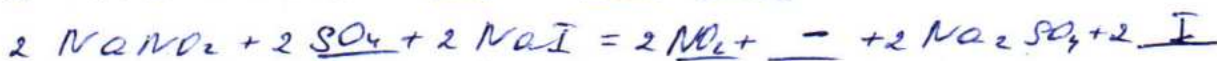
$$w = \frac{m_B + m_K}{M_B + M_K} = \frac{93,46 + 6,54}{12 \cdot 10 + x} = 4,92$$

$$33 + x = 100 \cdot 4,92$$

$$x = 459$$

Re

Задача-2



Задача-3

$$V(\text{NaOH}) = 400 \text{ мл}$$

$$w(\text{NaOH}) = 10\%$$

$$\rho = 1,12 \text{ г/мл}$$

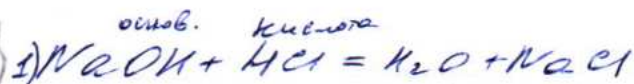
$$V(\text{HCl}) = 200 \text{ мл}$$

$$w(\text{HCl}) = 20\%$$

$$\rho = 1,12 \text{ г/мл}$$

$$\rho = 1,12 \text{ г/мл}$$

$$\rho \text{H} - ?, V - ?$$



$$\rho = \frac{m}{V}$$

$$m = \rho V = 400 \cdot 1,1 = 440 \text{ г}$$

$$m = \rho V = 200 \cdot 1,1 = 220 \text{ г}$$

$$w = \frac{m}{M}$$

рН кислотный, кислотный из-за HCl

$$2) \rho = \frac{m}{V} \Rightarrow V = \frac{m}{\rho} = \frac{440 + 220}{1,12} = 589,2$$

Задача - 4



(смеси)
 $m = 72,6$

$$w(Al) = 52,07\%$$

обработка
 $(HCl) \Rightarrow V(\text{смеси}) 31,36$

$w(CaS), w(Al_4C_3), w(CaS) - ?$
 $V(O_2) - ?$ *аттықта*

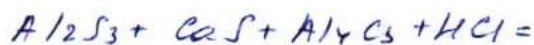


$$6(Al) = 52,07\% \quad 100 - 52,07 = 47,93\%$$

$$4(S) = 34,77 \cdot 24\% \quad 4x + 3x + 1x = 47,93\%$$

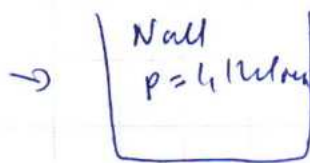
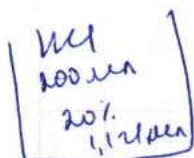
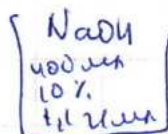
$$3(C) = 26,7 \cdot 18\% \quad 8x = 47,93\%$$

$$1(Ca) = 8,76 \cdot 6\% \quad x = 5,99 = 6$$



Задача 3

3.1



$$m(\text{NaOH})_{\text{р-р}} = 400 \cdot 1,1 = 440 \text{ г}$$

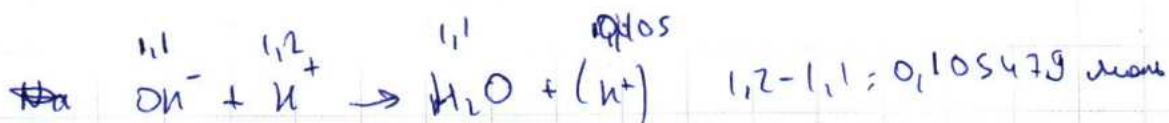
$$m(\text{NaOH}) = 440 \cdot 0,1 = 44 \text{ г}$$

$$n(\text{NaOH}) = \frac{44}{40} = 1,1 \text{ моль}$$

$$m(\text{HCl})_{\text{р-р}} = 200 \cdot 1,1 = 220 \text{ г}$$

$$m(\text{HCl}) = 220 \cdot 0,2 = 44 \text{ г}$$

$$n(\text{HCl}) = \frac{44}{36,5} = 1,2 \text{ моль}$$



$$\text{pH} = -\lg[\text{H}^+]$$



$$[\text{H}^+] = \frac{0,105}{1,000} = 0,105$$

$$1,2 - 1,1 = 0,105 \text{ моль}$$

$$\frac{550}{1,12} = 589,28 = 0,59$$

$$= \frac{0,105}{0,59} = 0,178 \text{ M}$$

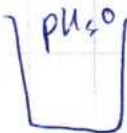
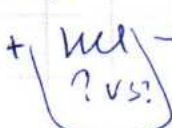
$$-\lg(0,178) = 0,75$$

$$\text{Answer: pH} = 0,75$$

3.2



$$\text{pH} = 9,45$$



$$\text{when pH} = 0, [\text{H}^+] \text{ given } 80 \text{ г} = 1$$

$$0,6 - 0,105 = 0,495 \text{ моль}$$

$$1 = \frac{n}{V}$$

$$1 \cdot 0,6 = 0,6 \text{ моль}$$

$$0,6 - 0,105 = 0,495 \text{ моль}$$

$$\text{Answer: } 0,495 \text{ моль}$$

$$n(\text{HCl}) = 0,495 \text{ моль}$$

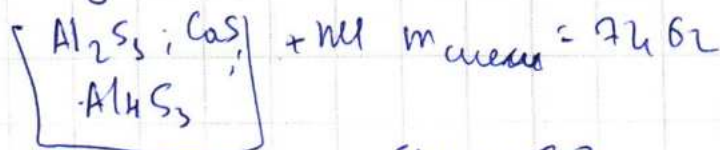
$$m = 0,495 \cdot 36,5$$

$$\frac{18}{92} = 90,322 \quad V = \frac{90,322}{1,1} = 82,125 \text{ мл}$$

02-00001

Парақтың артқы жағын толтырмаңыз / Обратную сторону листа не заполнять

Задача 4



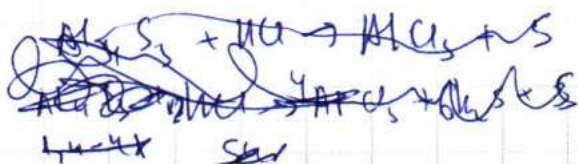
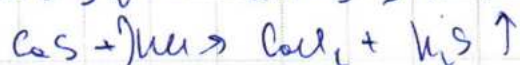
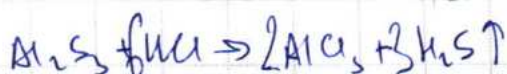
$$\frac{54x + 108z}{150x + 72y + 204z} = 0,5207$$

$$54x + 108z = 78,105x + 37,4904y + 106,2228z$$

$$1,7772z = 24,105x + 37,4904y$$

т.ч.

1,05



$$1,7772z = 24,105x + 37,4904y$$

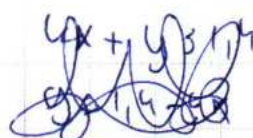
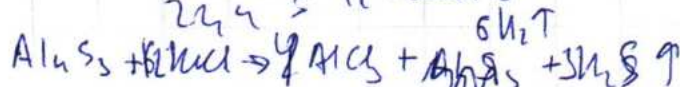
$$1,7772z = 24,105x + 37,4904y$$

$$1,78z = 24,105x + 37,4904y - 34,5x - 363,1z$$

с.ч.ч.

$$v(\text{H}_2\text{S}) = 31,36\text{ л}$$

$$n = \frac{31,36}{22,4} = 1,4 \text{ моль}$$

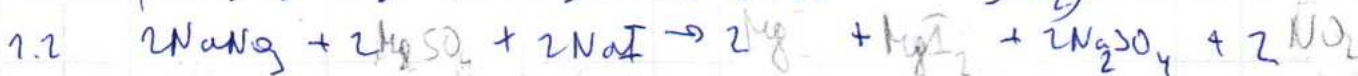
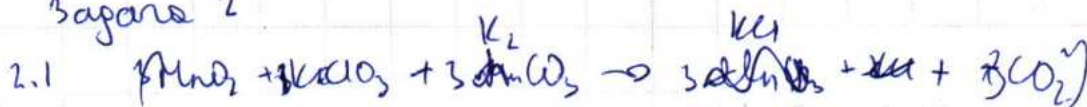


$$3x + y + 6z + 3z = 1,4$$

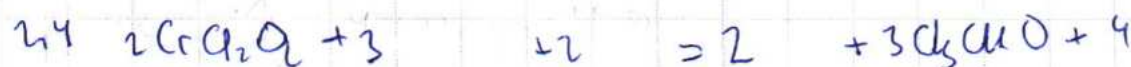
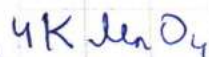
$$3x + y + 9z \leq 1,4$$

$$y \leq 1,4 - 3x - 9z$$

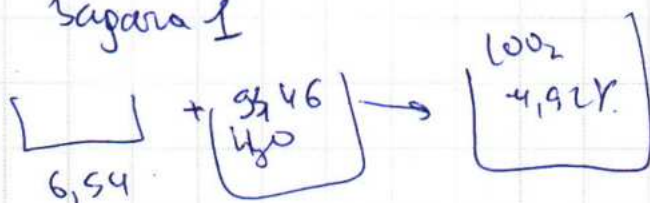
Задача 2



2.4



Задача 1



$$100 \cdot 0,0492 = 4,92\%$$

$$6,54 - 4,92 = 1,62 \rightarrow \text{H}_2\text{O}$$

$$n(\text{H}_2\text{O}) = 9,09$$

емі металл ок. және 1 керпіні - крапін үбел. го
 аорее металл - К

№3

Дано:

$$V(\text{NaOH}) = 400 \text{ мл.}$$

$$\omega(\text{NaOH}) = 10\%$$

$$\rho_{\text{ра}} = 1,12 \text{ г/мл}$$

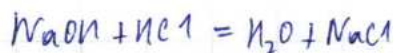
$$V(\text{HCl}) = 200 \text{ мл}$$

$$\omega(\text{HCl}) = 20\%$$

$$\rho_{\text{ра}} = 1,12 \text{ г/мл.}$$

$$\rho_{\text{ра}} = 1,122 \text{ г/мл.}$$

Шешене:



$$m(\text{NaOH}) = V(\text{NaOH}) \cdot \rho_{\text{ра}} \cdot \omega(\text{NaOH}) = 400 \text{ мл} \cdot 1,12 \text{ г/мл} \cdot 10\% = 448 \text{ г}$$

$$m_{\text{ра}}(\text{NaOH}) = 448 \text{ г}$$

$$m(\text{HCl}) = V(\text{HCl}) \cdot \rho_{\text{ра}} \cdot \omega(\text{HCl}) = 200 \text{ мл} \cdot 1,14 \text{ г/мл} \cdot 20\% = 442 \text{ г}$$

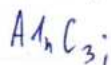
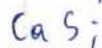
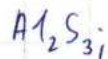
$$m_{\text{ра}}(\text{HCl}) = 220 \text{ г}$$

$$m_{\text{сұлыра}} = 220 \text{ г} + 440 \text{ г} = 660 \text{ г}; m_{\text{вещств}} = 442 \text{ г} + 442 \text{ г} = 884 \text{ г}$$

$$\omega_{\text{сұлыра}} = \frac{884 \text{ г}}{660 \text{ г}} \cdot 100\% = 133,3\%$$

№4

Дано:

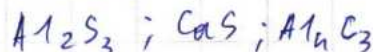


$$m_{\text{сұлыра}} = 42,6 \text{ г}$$

$$\omega(\text{Al}) = 52,04\%$$

$$V_{\text{газ сұлыра}} = 31,36 \text{ л}$$

Шешене:



$$m(\text{Al}) = m_{\text{сұлыра}} \cdot \omega(\text{Al}) = 42,6 \text{ г} \cdot 52,04\% = 22,17 \text{ г}$$

$$m_{\text{ра}}(\text{вещств}) = m_{\text{сұлыра}} \cdot (1 - \omega(\text{Al})) = 42,6 \text{ г} \cdot (1 - 52,04\%) = 20,43 \text{ г}$$

$$\left. \begin{array}{l} \text{Al}_2\text{S}_3 \\ \text{Al}_4\text{C}_3 \end{array} \right\} \Rightarrow m(\text{Al}) = 22,17 \text{ г}$$

$$M(\text{Al}_2\text{S}_3) = 27 \text{ г/моль} \cdot 2 + 32 \text{ г/моль} \cdot 3 = 150 \text{ г/моль}$$

$$M(\text{Al}_4\text{C}_3) = 27 \text{ г/моль} \cdot 4 + 12 \text{ г/моль} \cdot 3 = 144 \text{ г/моль}$$

$$Ar(\text{Al}_2) = 54 \text{ г/моль}$$

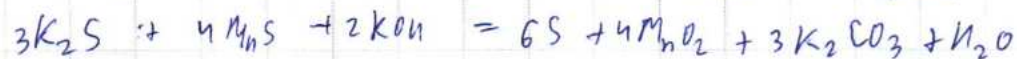
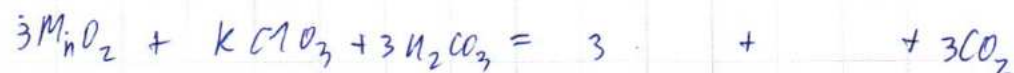
$$Ar(\text{Al}_4) = 108 \text{ г/моль}$$

$$\frac{m(\text{Al}_2\text{S}_3)}{54} = \frac{2}{3} \cdot \frac{m(\text{Al})}{54}$$

$$\frac{54 \text{ г/моль}}{54 \text{ г/моль}} \cdot \frac{150 \text{ г/моль}}{54 \text{ г/моль}} \Rightarrow 1:3$$

$$\frac{54 \text{ г/моль}}{54 \text{ г/моль}} \cdot \frac{108 \text{ г/моль}}{54 \text{ г/моль}} \Rightarrow 1:2$$

N2

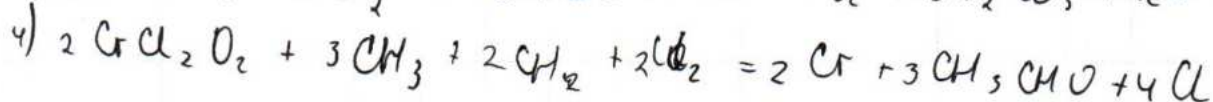
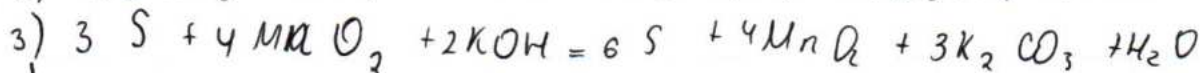
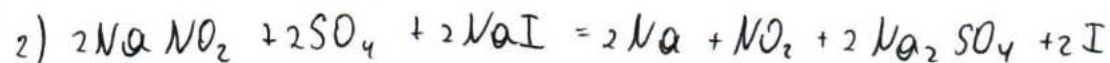


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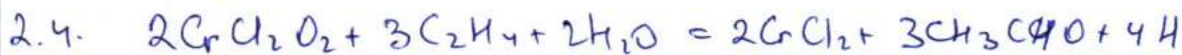
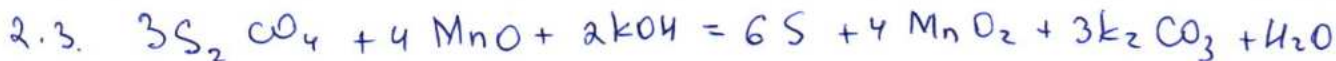
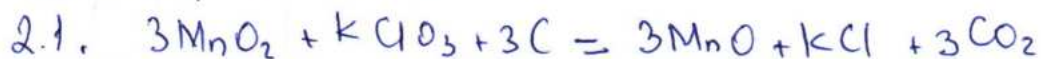
Парақтың артқы жағын толтырмаңыз / Обратную сторону листа не заполнять

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ОҚУ-АҒАРТУ МИНИСТРЛІГІНІҢ
"ДАРЫН" РЕСПУБЛИКАЛЫҚ ҒЫЛЫМИ-ПРАКТИКАЛЫҚ ОРТАЛЫҒЫ
РЕСПУБЛИКАЛЫҚ МЕМЛЕКЕТТІК ҚАЗЫНАЛЫҚ КӘСІПОРНЫ

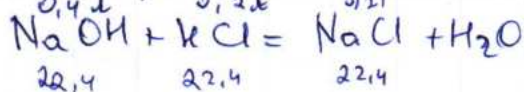
№2



Талансырма №2



Талансырма №3



$$m(\text{NaCl}) \frac{200 \text{ мм}}{1,12} \cdot 1,12 = 224 \text{ гр.} \quad pH = \frac{224}{14} \Rightarrow pH = 5$$

1 тапсырма

Бер:

$$m = 6,542$$

$$H_2O = 93,462$$

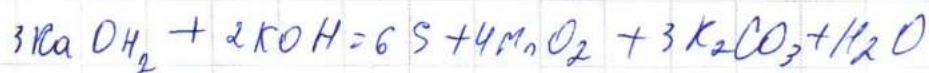
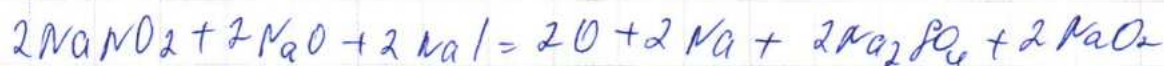
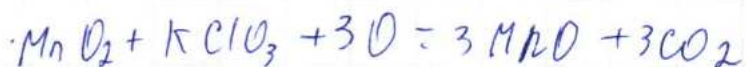
$$m\% = 4,92\%$$

Шешуі:

$$93,46 - 6,54 =$$

$$86,92.$$

2 тапсырма

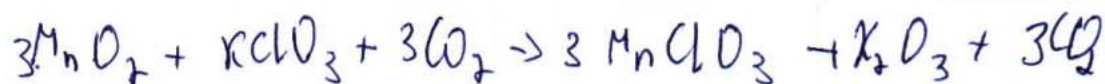


3 тапсырма.

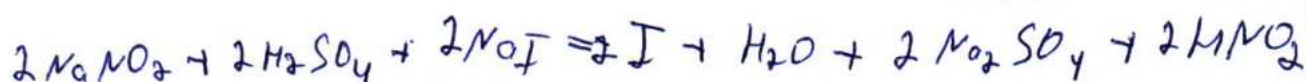
$$\text{шешім} \quad (w(NaOH) = 10\% \quad \text{пер-гі} = 1.1 \text{ дмш}$$

$$\text{200 шешім} \quad (w(HCl) = 20\% \quad \text{пер-гі} = 1.1 \text{ дмш}$$

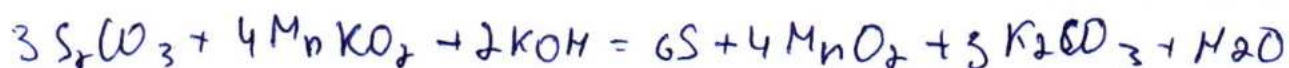
2.1



2.2.



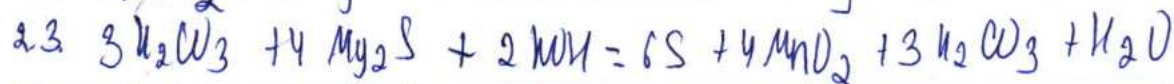
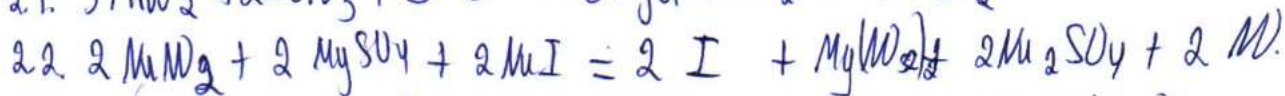
2.3



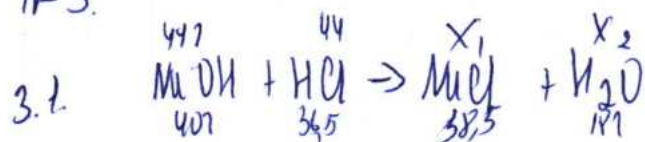
3.1 есеп



№ 2



№ 3.



$$w(\text{NaOH}) = 10\%$$

$$\rho_{\text{эф.г.}} = 1,12 \text{ г/см}^3$$

$$m(\text{NaOH}) = 400 \cdot 0,1 = 40$$

$$m(\text{NaOH}) = 40 \cdot 1,1 = 44$$

$$n(\text{NaOH}) = \frac{40}{40} = 1,1$$

$$X_2 = \frac{44 \cdot 1,8}{40} = 19,8$$

$$\rho_{\text{эф.г.}} = \frac{19,8}{1,12} = 17,6$$

$$w(\text{HCl}) = 20\%$$

$$\rho_{\text{эф.г.}} = 1,12 \text{ г/см}^3$$

$$m(\text{HCl}) = 200 \cdot 0,2 = 40$$

$$m(\text{HCl}) = 40 \cdot 0,1 = 44$$

$$n(\text{HCl}) = \frac{40}{36,5} = 1,1$$

$$X_1 = \frac{44 \cdot 58,5}{40} = 64,35$$

$$\rho_{\text{эф.г.}} = \frac{64,35}{1,12} = 57,4$$

3.2

$$57,4 \cdot 4 = 0$$

$$57,4 \cdot 22,4 = 1285,76$$

$$\frac{1285,76}{64,35} = 19,9 \approx 20$$

$$17,6 = 0$$

$$17,6 \cdot 22,4 = 394,24$$

$$\frac{394,24}{19,8} = 19,9 \approx 20$$

20 = 20
теңесті.

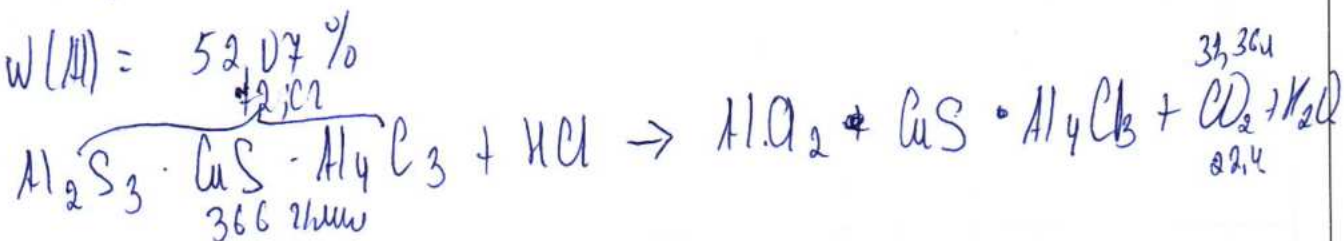
№ 4

$$4.1 \text{ Al}_2\text{S}_3 = 72,62$$

$$\text{CuS} = 72,62$$

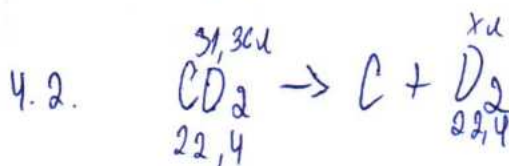
$$\text{Al}_4\text{C}_3 = 72,62$$

$$w(\text{Al}) = 52,07\%$$



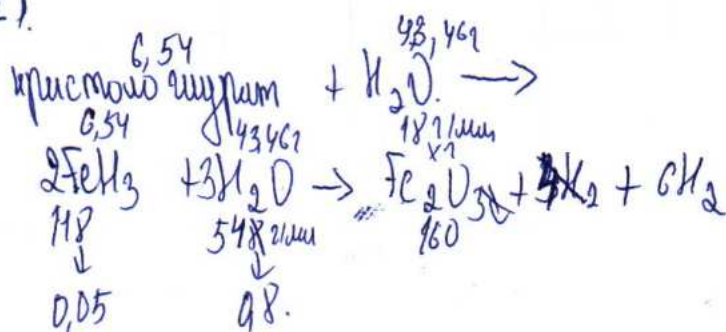
$$M(\text{Al}_2\text{S}_3 \cdot \text{CuS} \cdot \text{Al}_4\text{C}_3) = 27 \cdot 2 + 32 \cdot 3 + 40 + 32 + 27 \cdot 4 + 12 \cdot 3 = 366$$

$$M(\text{Al}_2\text{S}_3 \cdot \text{CuS} + \text{Al}_4\text{C}_3) = 366 \text{ г/ммм.}$$



$$X = \frac{31,36 - 22,4}{22,4} = 31,36 \text{ ч.}$$

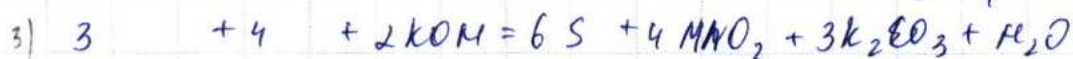
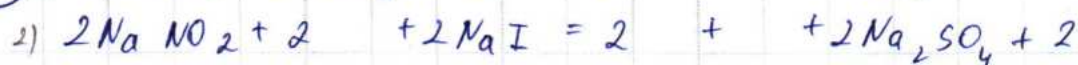
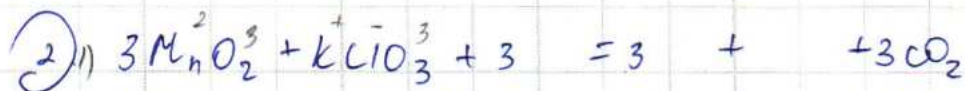
№ 1.



$$X = \frac{6,54 \cdot 160}{118} = 8,86 \text{ г.}$$

$$\begin{array}{l} 8,86\text{г} - 4,92\% \\ 6,54 - X \\ X = 4,8. \end{array}$$

① $m = 6,542 \quad 93,462 - \text{сү}$
 $\uparrow$
 $4,92\%$

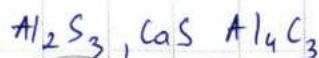


③ $w(\text{NaOH}) = 10\% \quad 400 \text{ мл} \quad w(\text{HCl}) = 20\% \quad 200 \text{ мл} \quad \rho = 1,12 \text{ г/мл}$
 $\rho = 1,12 \text{ г/мл}$



$\text{Al} = 6 \quad \text{S} = 4 \quad \text{C} = 3$

④ $\text{Al}_2\text{S}_3 - \text{қоспа}$



$\text{Al} = 52,07\% = 37,82$

$\text{Al} = 37,82$

Маған ①

$\text{Ca} + \text{S}_n + \text{C}_3 = 34,8$

$40,1 \quad 32,14 \quad 12 \cdot 3 \Rightarrow 204,5 - 100\%$

$40,1 - ? \quad 19,6\%$

$128,4 - ? \quad 62,78\%$

$36 - ? \quad 17,62\%$

$\text{Ca} = 6,82$

$\text{S} = 21,82$

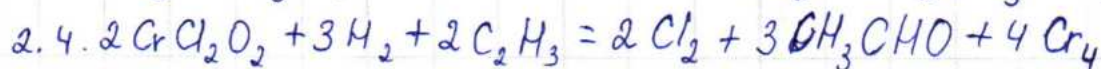
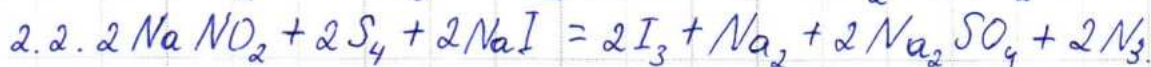
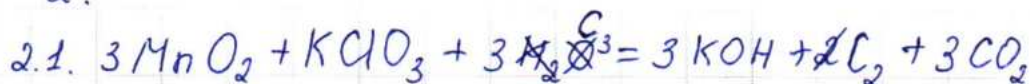
$\text{C} = 6,22$

15.

1.

1.1) Мег.

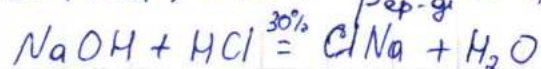
2.



3.

$$3.1. \omega(\text{NaOH}) = 10\% \quad \rho_{\text{р-р}} = 1,12 \text{ г/мл}$$

$$\omega(\text{HCl}) = 20\% \quad \rho_{\text{р-р}} = 1,12 \text{ г/мл}$$



$$1,1 \text{ г/мл} \cdot 1,12 \text{ г/мл} = 2,22 \text{ г/мл}$$

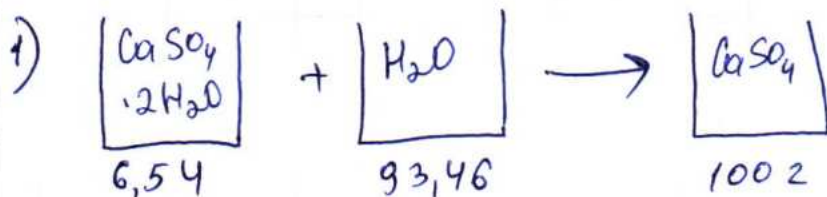
$$\rho_{\text{H}} = 1,12 \text{ г/мл} - 2,22 \text{ г/мл} = 1,8 \text{ г/мл}$$

3.2. pH мәнін 0-ге жеткізу үшін көп мөлшер қажет.

4.

$$4.1. A_1 = 38,51$$

$$4.2. \approx 71$$



кірпіш қозғалып - Ca
кристаллогидрат: $\text{CaSO}_4 \cdot n\text{H}_2\text{O}$

$$\frac{m(\text{CaSO}_4)}{100} \cdot 100\% = 4,92\%$$

$$m(\text{CaSO}_4) = 4,922 \quad 4,92$$

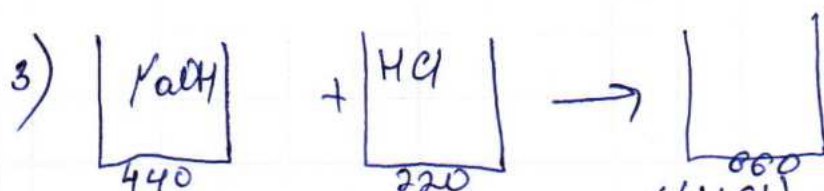
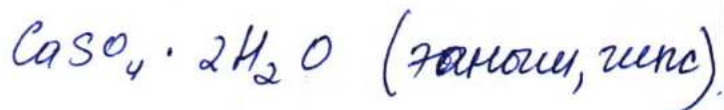
$$\text{CaSO}_4 \cdot n\text{H}_2\text{O} \rightarrow \text{CaSO}_4$$

$$136 + 18n \quad 136$$

$$889,44 = 669,12 + 88,56n$$

$$88,56n = 220,32$$

$$n \approx 2,5 = 2$$



$$V(\text{NaOH}) = 400 \text{ мл}$$

$$\omega(\text{NaOH}) = 10\%$$

$$\rho_{\text{р-р}} = 1,12 \text{ г/мл}$$

$$V(\text{HCl}) = 200 \text{ мл}$$

$$\omega(\text{HCl}) = 20\%$$

$$\rho_{\text{р-р}} = 1,12 \text{ г/мл}$$

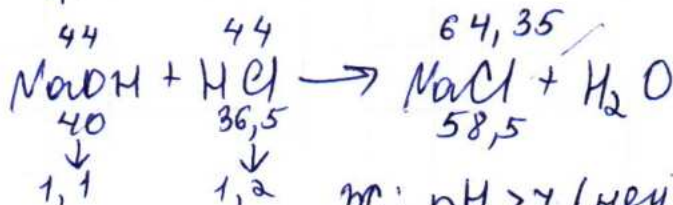
$$\rho_{\text{H}} = ? \Rightarrow \rho = 1,122 \text{ г/мл}$$

$$m(\text{NaOH}) = 400 \cdot 1,1 = 440 \text{ г}$$

$$m(\text{HCl}) = 200 \cdot 1,1 = 220 \text{ г}$$

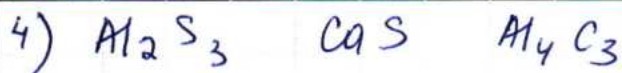
$$m_{\text{ер}} = 440 \text{ г} + 220 \text{ г} = 660 \text{ г}$$

$$V = \frac{m}{\rho} = \frac{660}{1,12} = 589,28 \text{ мл}$$



$$C = \frac{n}{V} = \frac{1,1}{0,58928} \approx 1,9 \text{ моль}$$

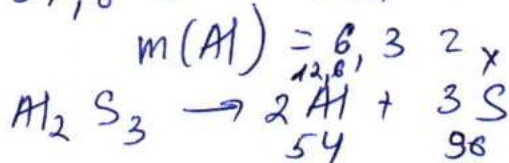
тс: $\rho_{\text{H}} > 7$ (нейтраль орта).



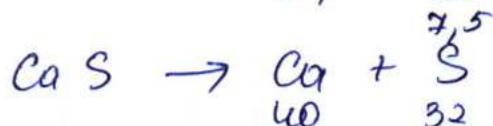
$$72,62 \rightarrow 100\%$$

$$37,82 \rightarrow 52,07\%$$

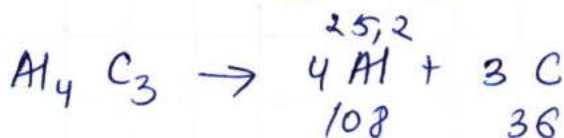
$$37,82 \rightarrow 6Al$$



$$x = 22,42$$



$$y = 9,3$$



$$z = 8,4$$

$$m(Al) = 37,82$$

$$\omega = 52,07\%$$

$$m(Ca) = 9,32$$

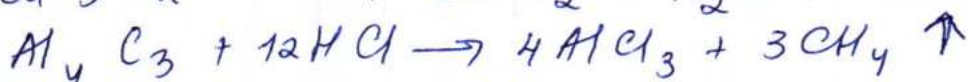
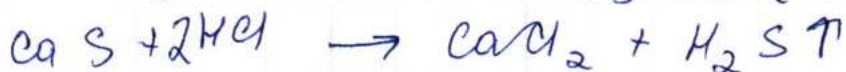
$$\omega = \frac{9,3}{72,6} \cdot 100\% = 12,8\%$$

$$m(C) = 8,42$$

$$\omega = \frac{8,4}{72,6} \cdot 100\% = 11,57\%$$

$$m(S) = 17,1$$

$$\omega = \frac{17,1}{72,6} \cdot 100\% = 23,55\%$$



$$\frac{31,367}{22,4} = 1,41$$



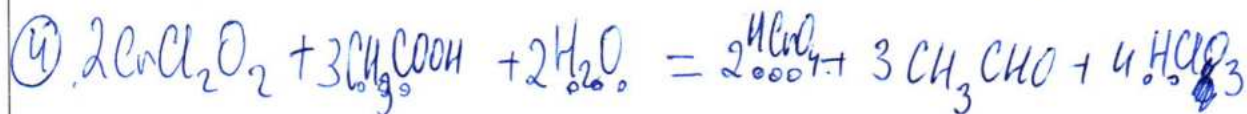
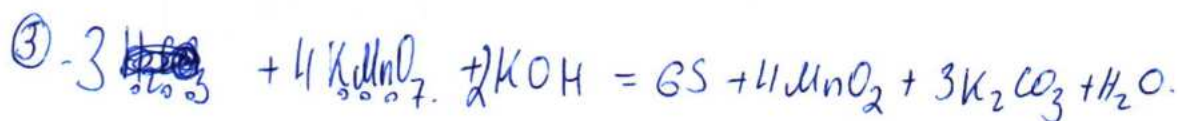
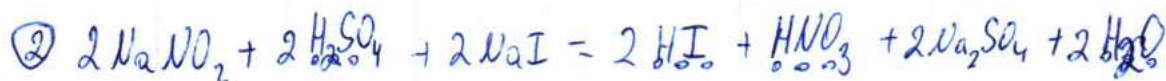
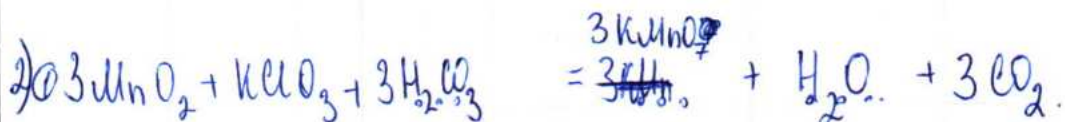
$$\begin{aligned}
 1) \quad m(\text{к. шғрат}) &= 6,54. \\
 m(\text{H}_2\text{O}) &= 93,16. \\
 m_{\text{қисес}} &= 4,92. \\
 m(\text{Ертілугі}) &= 100.
 \end{aligned}$$

$$m(\text{к. шғрат}) = 4,92.$$

$$m_{\text{қисес}} = 4,92.$$

$$m_{\text{қоспа}} = 100. \quad 4,92 \cdot 100 = 492 = M.$$

$$\text{қоспа} = \text{K}_3\text{PO}_4.$$



$$3) \quad m(\text{NaOH}) = 400 \text{ мм.}$$

$$m(\text{HCl}) = 200 \text{ мм.}$$

$$m(\text{HCl}) = 200\% \quad \rho(\text{HCl}) = 1,12 / \text{мм.}$$

$$w(\text{NaOH}) = 10\% \quad \rho(\text{NaOH}) = 1,12 / \text{мм.}$$

$$\rho_{\text{қоспа}} = 1,12 / \text{мм.} \quad \rho = \frac{m}{V}$$

$$1,12 = \frac{m}{400} \Rightarrow m(\text{NaOH}) = 440.$$

$$1,12 = \frac{m}{200} \Rightarrow m(\text{HCl}) = 220.$$



$$V_{\text{қоспа}} = 400 + 200 = 600 \text{ мм.}$$

$$\rho_{\text{қоспа}} = \frac{m}{V} \Rightarrow 1,12 = \frac{m}{600} \Rightarrow 672 = m(\text{NaCl} + \text{H}_2\text{O}).$$

$$m_{\text{қоспа}}(\text{HCl}) = 220 \cdot 20\% = 44.$$

$$m_{\text{қоспа}}(\text{NaOH}) = 440 \cdot 10\% = 44.$$

$$44 + 44 = 88.$$

$$w(\text{қоспа}) = \frac{88}{672} \cdot 100 = 13,09\%.$$

$$3) \textcircled{2} \quad \text{pH} \approx 20.$$

↓

$$4) \textcircled{1}. \quad \text{Ғарыс: } \text{Al}_2\text{S}_3, \text{CaS}, \text{Al}_4\text{C}_3. \quad m(\text{Ғарыс}) = 72,62.$$

$$V(\text{газ}) = 31,36 \text{ л.} \quad m_{\text{қуыс}}(\text{Al}) = 52,07$$



$$\begin{aligned} 72,6 - 100 \\ 7 - 52,07 \end{aligned}$$

$$m(\text{Al}) = 37,8.$$

$$n(\text{Al}) = \frac{37,8}{27,06} \approx 0,23.$$

$$72,6 - 37,8 = 34,8.$$

$$m_{\text{қуыс}}(\text{Ca}) = \frac{5,18}{72,6} \cdot 100 \approx 7,14$$

$$72,6 - 14.$$

$$\text{Ca} = 5,18.$$

$$m_{\text{қуыс}}(\text{S}) = \frac{20,7}{72,6} \cdot 100 \approx 28,5$$

$$\text{Ca} - 1$$

$$\text{S} = 20,7.$$

$$\text{S} - 4$$

$$\text{C} = 15,6.$$

$$\text{C} - 3$$

$$m_{\text{қуыс}}(\text{C}) = \frac{15,6}{72,6} \cdot 100 \approx 21,5$$



$$V(\text{газ}) = 31,36.$$

$$m(\text{газ}) = \frac{31,36}{22,4} \approx 1,4 \text{ моль.}$$

$$V(\text{O}_2) = 1,4 \cdot 2 \cdot 22,4 \approx 62,72$$

3-мәсәле.

$$V_{\text{NaOH}} = 400 \text{ мл.}$$

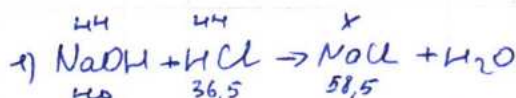
$$\omega_{\text{NaOH}} = 10\%$$

$$\rho = 1,1 \text{ г/мл.}$$

$$V_{\text{HCl}} = 200 \text{ мл.}$$

$$\omega_{\text{HCl}} = 20\%$$

$$\rho = 1,1 \text{ г/мл.}$$

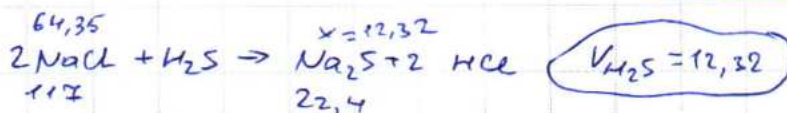
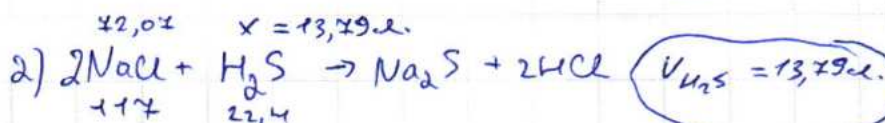


$$m_{\text{NaOH}} = \rho \cdot V = 400 \cdot 1,1 = 440 \cdot 10\% = 44 \text{ г.}$$

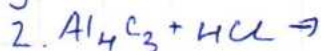
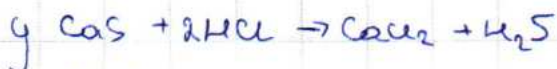
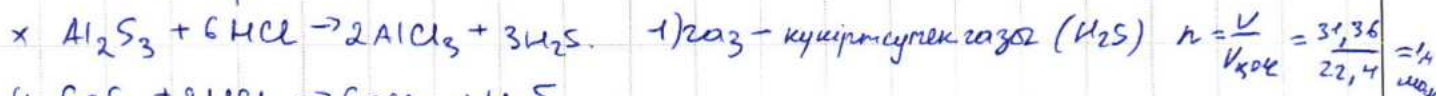
$$m_{\text{HCl}} = \rho \cdot V = 1,1 \cdot 200 = 220 \cdot 20\% = 44 \text{ г.}$$

$$n_{\text{NaOH}} = \frac{44}{40} = 1,1 \quad n_{\text{HCl}} = \frac{44}{36,5} = 1,2$$

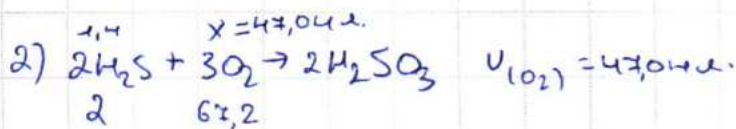
$$m_{\text{NaCl}} = \frac{44 \cdot 58,5}{40} = 64,35 \quad 64,35 \cdot 1,12 = 72,072$$



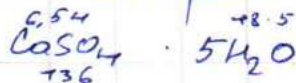
4-мәсәле.



$$\begin{cases} 150x + 72y + 144z = 42,6 \\ x + y = 1,4 \end{cases}$$



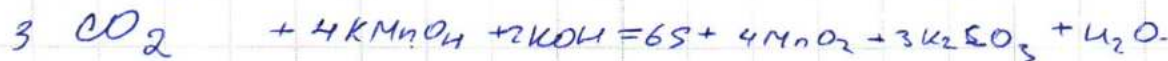
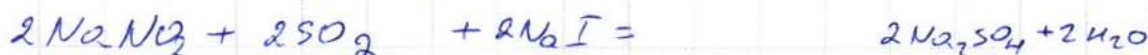
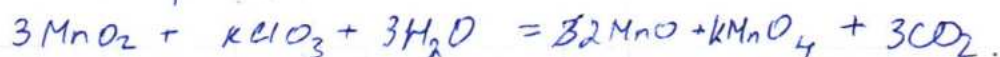
1-мәсәле.



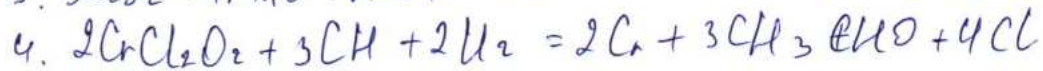
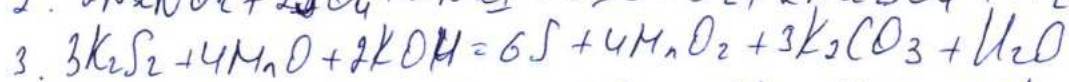
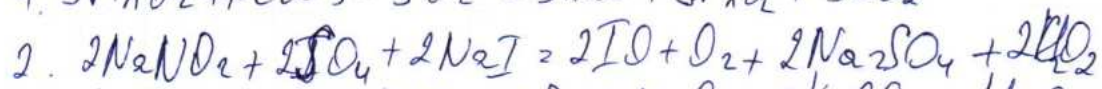
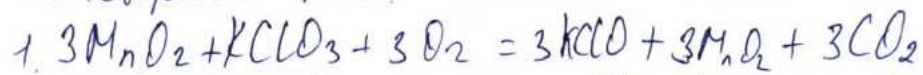
$$136 + 90 = 226$$

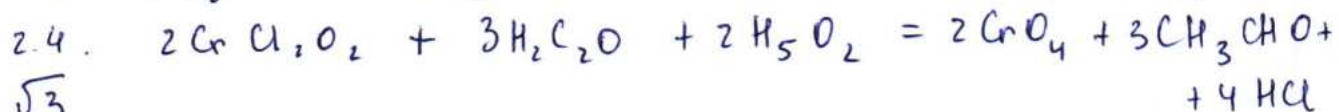
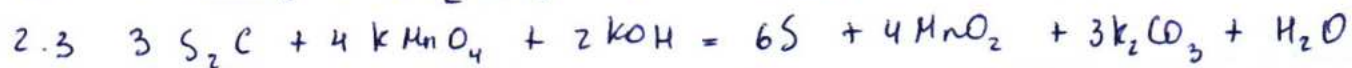
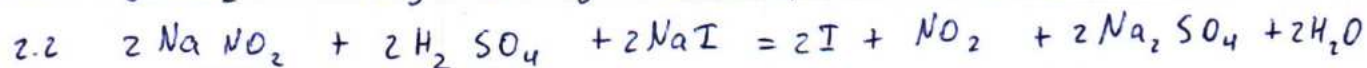
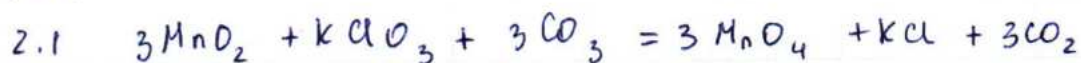
$$\frac{93,46}{226} = 41,3$$

2-мәсәле.



Тансырма №2.



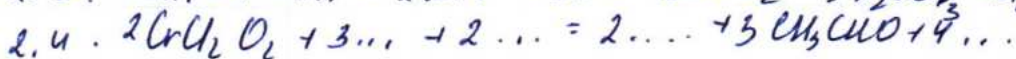
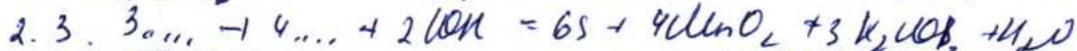
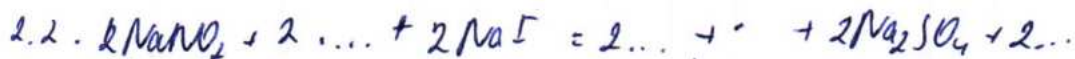
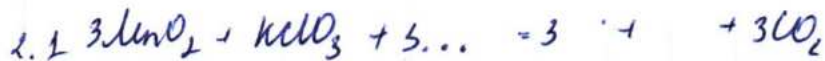
№2№3

№1

$$m(\text{кристаллы гидрат}) = 93,46 \text{ г}$$

$$w(\text{ериткіргі}) = 492\%$$

№2.



№3.

$$V(\text{NaOH}) = 400 \text{ мл}$$

$$w(\text{NaOH}) = 10\%$$

$$\rho_{\text{р-р}} = 1,12 \text{ г/мл}$$

$$+ \\ V(\text{HCl}) = 200 \text{ мл}$$

$$w(\text{HCl}) = 20\%$$

$$\rho_{\text{р-р}} = 1,12 \text{ г/мл}$$

рН?

рН: 2 белгісіз

рН > 7 қышқылдық

рН < 7 щелочность

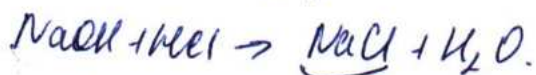
$$m = \rho V$$

$$m(\text{NaOH}) = 1,12 \text{ г/мл} \cdot 400 \text{ мл} = 448 \text{ г}$$

$$\begin{aligned} 448 \text{ г} &= 100\% \\ x &= 90\% \end{aligned} \quad x = 396 \text{ г}$$

$$m(\text{HCl}) = 200 \text{ мл} \cdot 1,12 \text{ г/мл} = 224 \text{ г}$$

$$\begin{aligned} 224 \text{ г} &= 100\% \\ x &= 80\% \end{aligned} \quad x = 179 \text{ г}$$



$$n(\text{NaOH}) = n(\text{HCl}) = \frac{396 \text{ г}}{40 \text{ г/моль}} = 9,9 \text{ моль}$$

$$n(\text{HCl}) = \frac{179 \text{ г}}{36,5 \text{ г/моль}} = 4,9 \text{ моль}$$

$$m(\text{NaCl}) =$$

✓1.

$$m(x) = 6,542$$

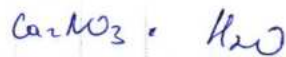
$$m(H_2O) = 83,462$$

$$w(x) = 4,82\%$$

$$x = ?$$

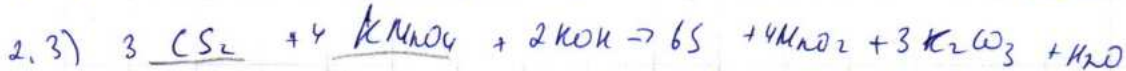
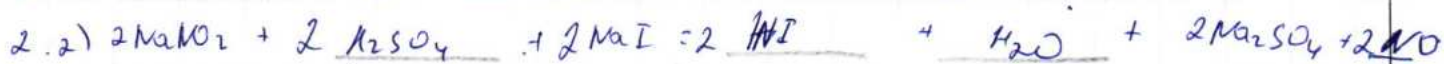
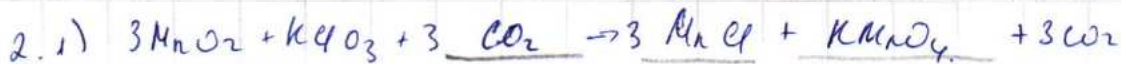
$$\begin{array}{|c|c|} \hline 15,22\% & 4,82\% \\ \hline x & H_2O \\ \hline \end{array}$$

$$6,542$$



$$\begin{array}{|c|c|} \hline x & \\ \hline H_2O & \\ \hline \end{array} = 4,82\% = 4,82\% \text{ зам.}$$

✓2



✓3

$$3.1) V(MaOH) = 400 \text{ мл}$$

$$w = 10\%$$

$$\rho = 1,12 \text{ г/мл}$$

$$V(HCl) = 200 \text{ мл}$$

$$w(HCl) = 30\%$$

$$\rho = 1,1 \text{ г/мл}$$

$$pH = ?$$

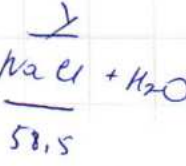
$$\rho_3 = 1,12 \text{ г/мл}$$

$$\begin{array}{|c|} \hline 44 \\ \hline NaOH \\ \hline 40 \\ \hline 1,1 \\ \hline \end{array}$$

$$48$$

$$36,5$$

$$1,2$$



$$x = 64,352 (NaCl)$$

$$10\% = \frac{44}{400}$$

$$20\% = \frac{48}{200}$$

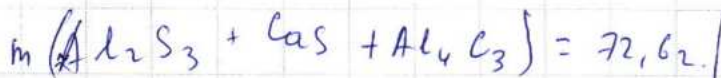
$$\begin{array}{|c|} \hline 40 \\ \hline H_2O \\ \hline 200 \\ \hline \end{array}$$

$$\begin{array}{|c|} \hline 40 \\ \hline H_2O \\ \hline 200 \\ \hline \end{array}$$

442 см³, 442 г/мл рн = 0
бейтарап

3.2) 100 мл

N4



$$\omega(\text{Al}) = 52,07\%$$

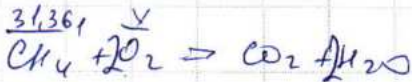
+ HCl

$$V(\text{H}_2) = 31,36 \text{ л}$$

$$4.1) \omega(\text{Al}_2\text{S}_3) = ? \quad \omega(\text{CaS}) = ?$$

$$\omega(\text{Al}_4\text{C}_3) = ?$$

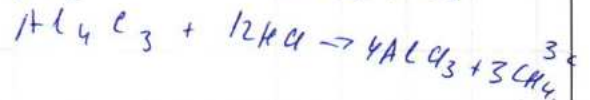
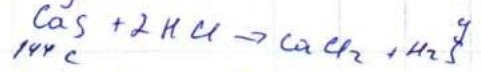
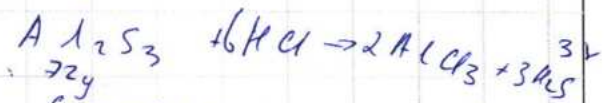
$$4.2) V(\text{O}_2) = ?$$



$$\frac{16}{22,4} \quad \frac{32}{44,8}$$

$$x = 0,2724$$

$$150x$$



$$72,6 - 100\%$$

$$x = 52,07\%$$

$$x = 37,80282$$

$$\begin{cases} 37,80282 + 96x + 72y + 36c = 72,62 \\ 3x + y + 3c = 1,4 \end{cases}$$

$$\begin{cases} 96x + 72y + 36c = 34,79718 \\ 3x + y + 3c = 1,4 \end{cases}$$

$$36x + 12y + 36c = 18,8$$

$$60x + 60y = 17,98718$$

$$60(x+y) = 17,98718$$

$$x+y = 0,299783$$

№1

$$(X)m = 6,542$$

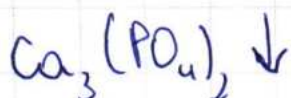
$$m(H_2O) = 93,462$$

$$\omega(\text{еріген зат}) = 4,92\%$$

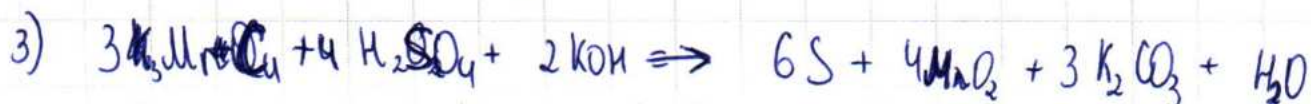
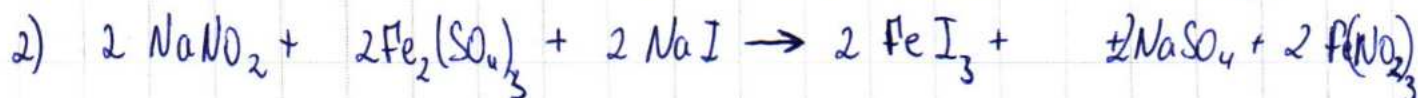
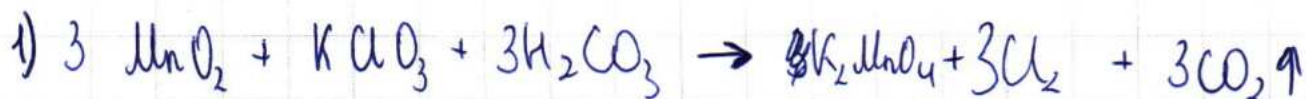
 $Ca^{2+} \rightarrow$ жауап кірпіш малон түрі

2) анион: кез Тарап катиондармен тұра түрін зерттейтін келе, онда ол PO_4^{3-}

Мағарба: $Ca_3(PO_4)_2$, себебі суға қосқанда да аз ерігі, және тұнда түзеді, ол Ca^{2+} катионна жауап кірпіш малон түрі береді.



№2



№3

$$\textcircled{1} \omega(NaOH) = 10\%$$

$$M(\text{сінгі}) = 400 \text{ мм}$$



$$V(NaOH) = 40 \text{ мм}$$

$$\omega(HCl) = 20\%$$

$$V(\text{сінгі}) = 200 \text{ мм}$$



$$V(HCl) = 40 \text{ мм}$$

$$\textcircled{2} \text{мәліметі}$$

$$V > 1000 \text{ мм}$$

дан

исад

сәуір

керек.

$$Ph = 0$$

сінгісін.

~~Ph = 7~~

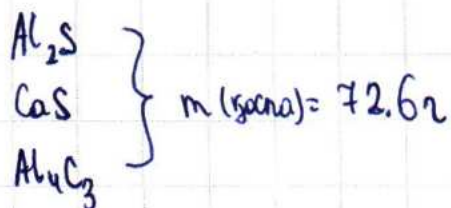
$$Ph = 7$$

[Бейтараптану]

02-00001

Парақтың артқы жағын толтырмаңыз / Обратную сторону листа не заполнять

№4



$$\omega(\text{Al}) = 52.07\%$$

$$1) \frac{72.62}{x} = \frac{100\%}{52.07\%}$$

$$x(\text{Al}) = 37.80282$$

$$\text{мол. масс. Al} = 6, \text{ онда } \underline{\text{Al}_1 = 6.30047}$$

$$2) M_r(\text{Al}_2\text{S}) = 86 \text{ г/мол}$$

$$1) \frac{(Al) 54}{(Mr) 86(\text{Al}_2\text{S})} \cdot \frac{12.60094}{x}$$

$$(\text{Al}_2\text{S})x = 20.0681372, \text{ сонда } S = 7.467197 \text{ г}$$

$$3) (Al_4C_3)Mr = 144$$

$$\frac{144}{108} = \frac{\cancel{12.60094} \cdot x}{\cancel{20.0681372} \cdot 25.20188}$$

$$x(\text{Al}_4\text{C}_3) = 33.60250667 \text{ г}$$

$$Mr/Ar(C_3) = 8.40062667 \text{ г}$$

$$Ar(C) = 2.80022889 \text{ г}$$

$$2) V = 31.36 \text{ л}$$



$$V(\text{O}_2) = 31.36 \text{ л}$$

$$4) m(\text{CaS}) = 18.92935633$$

$$72.6 - m(\text{Al}_4\text{C}_3) - m(\text{Al}_2\text{S}) = m(\text{CaS})$$

$$m(\text{Ca}) = 11.46215933$$

$$5) \omega(\text{Ca}) \approx 15.788\%$$

$$\omega(\text{Al}) \approx 52.07\%$$

$$\omega(\text{S}) \approx 20.57\%$$

$$\omega(\text{C}) \approx 11.571\%$$

Найдем:

$$\omega(\text{Al}_2\text{S}) \approx 27.642\%$$

$$\omega(\text{CaS}) \approx 26.073\%$$

$$\omega(\text{Al}_4\text{C}_3) \approx 46.284\%$$

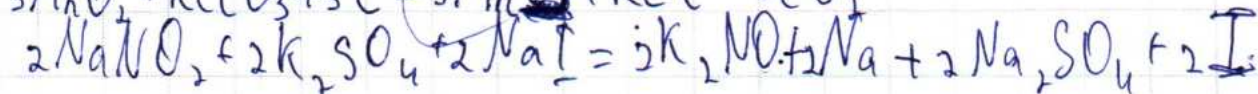
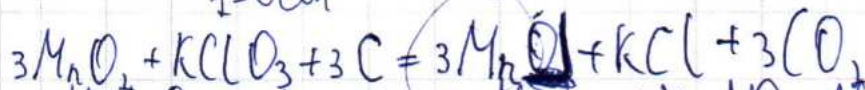
1-есеп

$$m = 6,542$$

$$m(H_2O) = 93,467$$

$$\omega = 9,92\%$$

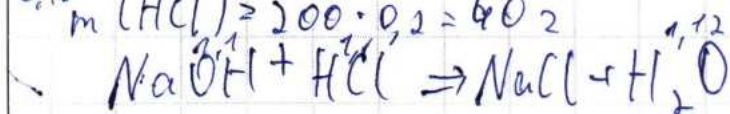
2-есеп



3-есеп

$$m(NaOH) = 400 \cdot 0,1 = 40$$

$$m(HCl) = 200 \cdot 0,2 = 40$$

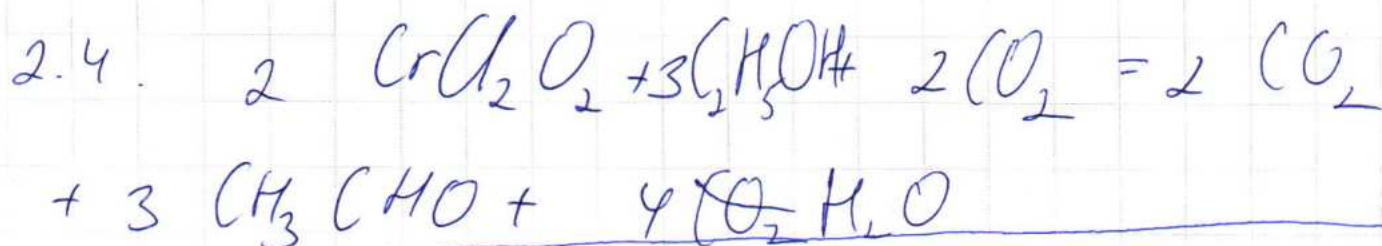
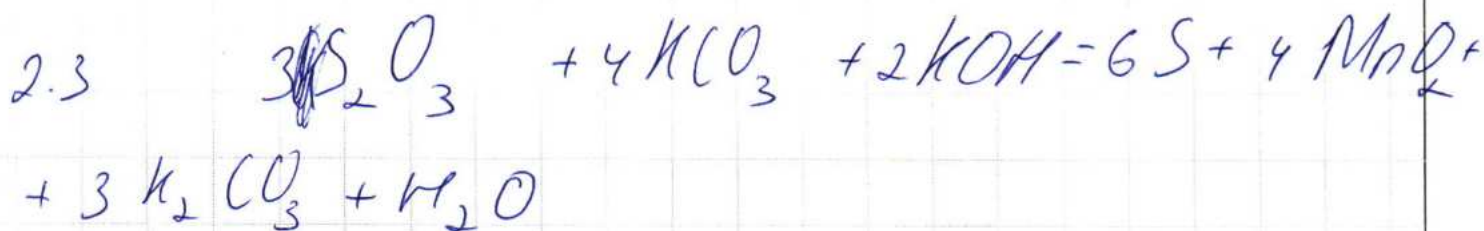
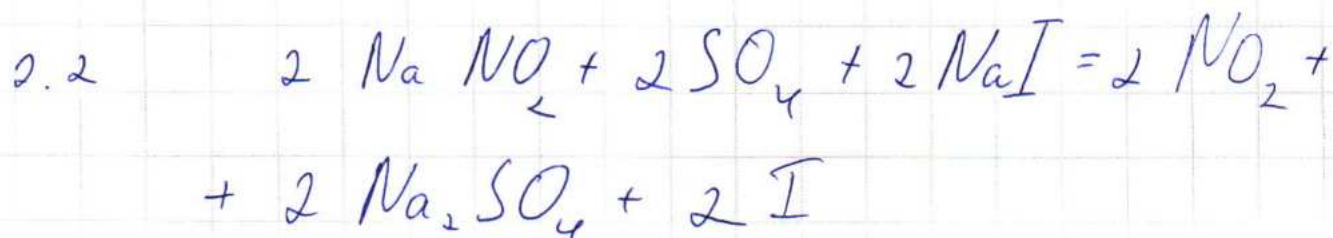
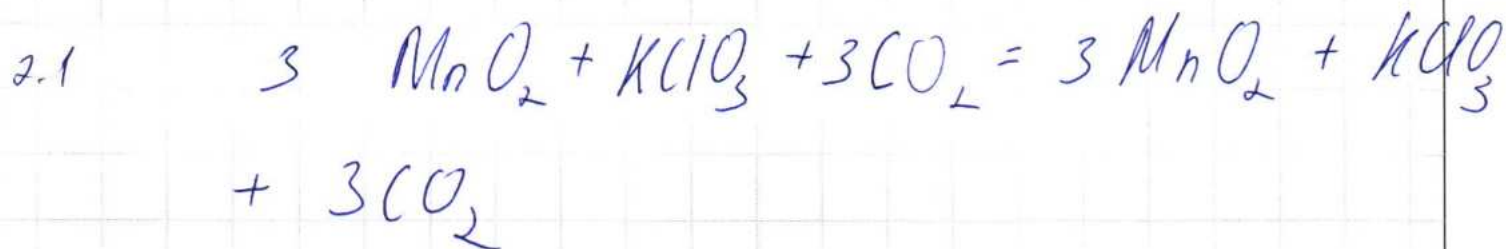
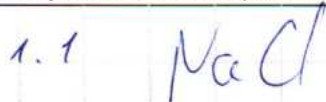


$$3.2.400 \text{ мм}$$

4-есеп

$$M = 72,62$$

$$\omega(KI) = 52,07\%$$



3.1 $400 \text{ мл } (\text{NaOH}) \times 10\% = 40 \text{ мл}$

$$\frac{40}{1.12} = 36.42$$

$$23 + 16 + 1 = 40$$

$$\frac{36.4}{40} = 0.91 \text{ моль } (\text{NaOH})$$

$$200 \text{ мл } (\text{HCl}) \times 20\% = 40 \text{ мл}$$

$$\frac{40}{1.1} = 36.42$$

$$1 + 35 = 36$$

$$\frac{36.4}{36.4} = 1 \text{ моль } (\text{HCl})$$

$$p = \log \frac{M^+}{M^-} = \log \frac{M \text{ NaOH}^+}{M \text{ Cl}^-} =$$

$$= \log \frac{0.91}{1} = -0.04 \text{ pH}$$

$$3.2. \quad \frac{x}{36} = 0.91 \quad x = 32.76 \text{ г.}$$

$$\frac{x}{1.1} = 32.76 \text{ г.} \quad x = 36.036 \text{ мл}$$

200 мл - 100%

36.036 мл - x

$$\frac{36.036 \cdot 100}{200} = 18.018 \% \text{ көлем HCl}$$

4.1. Al_2S_3 , CaS , Al_4C_3 - 72.6 г

Al - 52.07%

31.36 г газ

Al - 27

S - 32

Ca - 40

C - 12

$$\frac{31.36}{22.4} = 1.4 \text{ м}$$

$$(27 \cdot 6) + 40 + (32 \cdot 4) + (12 \cdot 3) = 366 \text{ г}$$

$$\frac{x}{366} = 1.4 \quad x = 512.4 \text{ г}$$

165.6 г cf

Al (52.07%) - ~~266.8 г~~ 266.8 г - 182

S (17.8%) - ~~124.6 г~~ ~~124.6 г~~ - 128 245.2

Ca (3.15%) - ~~40 г~~ 40 г 16.3 г

02-00001

Парақтың артқы жағын толтырмаңыз / Обратную сторону листа не заполнять

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ОҚУ-АҒАРТУ МИНИСТРЛІГІНІҢ
"ДАРЫН" РЕСПУБЛИКАЛЫҚ ҒЫЛЫМИ-ПРАКТИКАЛЫҚ ОРТАЛЫҒЫ
РЕСПУБЛИКАЛЫҚ МЕМЛЕКЕТТІК ҚАЗЫНАЛЫҚ КӘСІПОРНЫ

№1

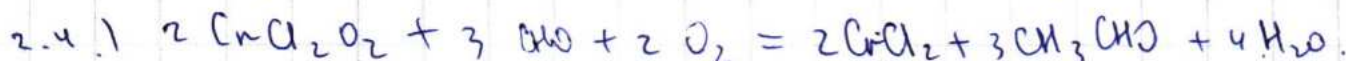
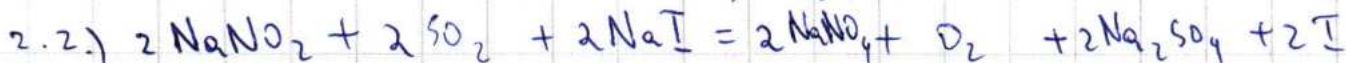
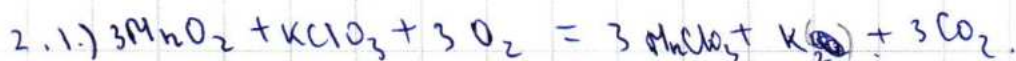
Берілгені

$$m = 6,542$$

$$n(H_2O) = 93,462$$

$$m(\text{серітіңгі}) = 4,92\%$$

№2.



№3. 3.1.

Берілгені

$$w(NaOH) = 10\%$$

$$\rho_{\text{ер-гі}} = 1,12 \text{ г/мл}$$

$$w(HCl) = 20\%$$

$$\rho_{\text{ер-гі}} = 1,12 \text{ г/мл}$$

$$\rho = 1,12 \text{ г/мл}$$

$$3.1. V - ?, pH - ?$$

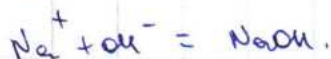
$$3.2. V - ?$$

Шешуі:

$$400 \text{ мл} \cdot 10\% = 400 \cdot \frac{1}{10} = 40$$

$$w(NaOH) = 40$$

$$w(HCl) = 100 \text{ мл} \cdot 20\% = 200 \cdot \frac{1}{5} = 40 \text{ мл}$$



$$pH =$$

N4.

Берілгені:

$$m(\text{Al}_2\text{S}_3 + \text{Ca}) + m(\text{H}_2\text{O}) = 72,62.$$

$$m(\text{Al}) = 52,04\%$$

$$V_{\text{газ}} = 31,36 \text{ л.}$$

$$T(\text{к}): 1.1) \text{ м} - ?$$

$$1.2) V(\text{O}_2) - ?$$

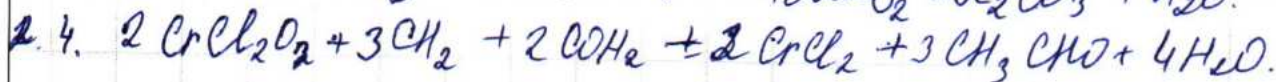
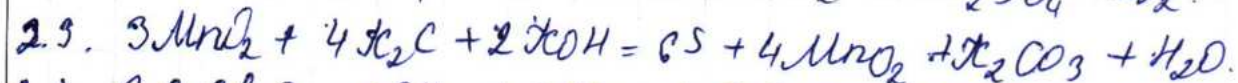
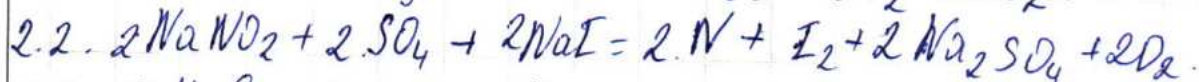
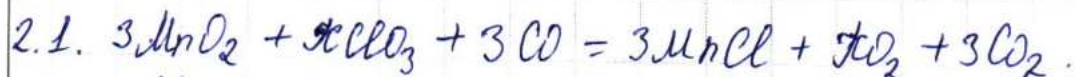
Шешуі:

кратан заттардың массалық үлесі

$$100\% - 52,04\% = (47,96\%) 47,93\%.$$

$$V(\text{O}_2) = \frac{72,62}{31,36} =$$

№2.



№4

$$Mr(\text{Al}_2\text{S}_3) = 150.$$

$$Mr(\text{CaS}) = 72.$$

$$Mr(\text{Al}_2\text{C}_3) = 144.$$

$$m = 72,62.$$

$$n = 52,07\%.$$

$$V = 31,36.$$

$$n = \frac{m}{Mr} = \frac{72,6}{150} = 0,48\%.$$

$$n = \frac{m}{Mr} = \frac{72,6}{72} \approx 1,008\%.$$

$$n = \frac{m}{Mr} = \frac{72,6}{144} \approx 0,5\%.$$

$$V(\text{O}) = ?$$

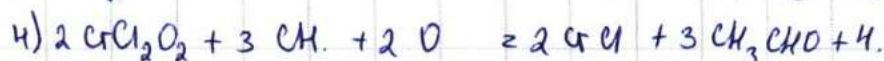
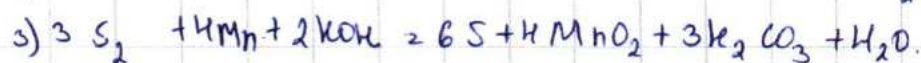
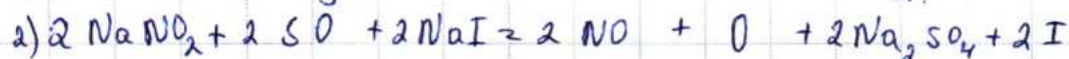
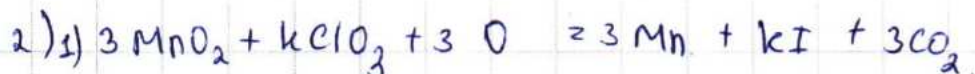
1)

$$6,542 \cdot 93,462 = 4,92\%$$

$$691,22 = 4,92\%$$

$$x = 100\%$$

$$x = 12423,17$$

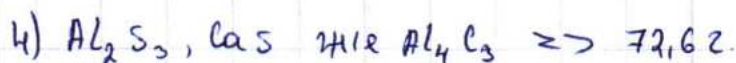


3)

$$\frac{200}{400} \times \frac{20\%}{10\%}$$

$$20 = 80 \quad 1,122/\text{мл} = \rho \text{H}$$

$$80 \cdot 1,122/\text{мл} = 89,6 \text{ мл/г}$$



$$\text{Al} = 52,07\%$$

$$\text{Al} = 26,03$$

$$\text{CaS} = 31,36\%$$

A.

$$72,62 = 100\%$$

$$x = 52,07\%$$

$$x = 1968,39 \Rightarrow \text{AL} \quad 1:6$$

$$x = 328,065.2$$

№1.

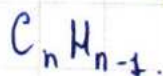
$$m = 6,54$$

$$m_{\text{су}} = 93,46$$

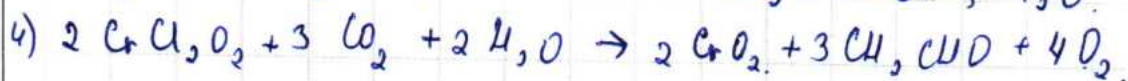
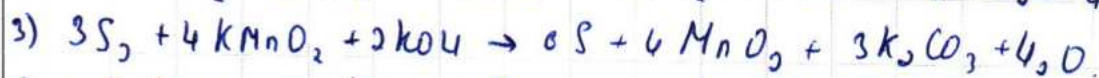
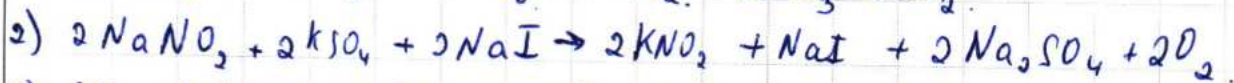
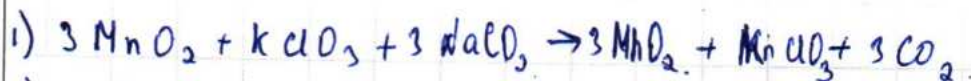
$$\omega = 4,92$$

$$\frac{m}{m_{\text{су}}} = \frac{6,54}{93,46} = 0,06 = 6\%$$

$$\frac{6}{4,92} = 1,2 \quad 6:5$$



№2.



№3.

$$1) V_1 = 400 \text{ мм}$$

$$\omega(NaOH) = 10\% = 0,1$$

$$\rho_{\text{рр}} = 1,12 \text{ г/мл}$$

$$V_2 = 200 \text{ мм}$$

$$\omega(HCl) = 20\% = 0,2$$

$$\rho_{\text{рр}} = 1,12 \text{ г/мл}$$

$$pH - ? \quad \rho = 1,12 \text{ г/мл}$$

$$2) pH \rightarrow 0 \quad V = \omega n s t$$



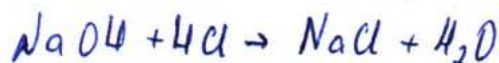
$$m = 42,6 \text{ г}$$

$$\omega(H_2) = 52,09\%$$

$$V = 31,36 \text{ л}$$

$$1) \omega_0 - ?$$

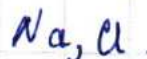
$$2) V(O_2) - ?$$



$$n_1 = \frac{V_1}{V_A} = \frac{400}{22,4} = 17,8 \text{ ммоль}$$

$$n_2 = \frac{V_2}{V_A} = \frac{200}{22,4} = 8,9 \text{ ммоль}$$

$$\frac{17,8}{8,9} = 1,8 \approx \frac{2}{1} \quad (2:1)$$



$$V = n V_A = 8 \cdot 22,4 = 179,2 \text{ мм}$$



$$\rho = \frac{m}{V} = \frac{42,6}{15,56} \approx 2,74 \text{ г/л}$$

$$\omega_0 = \frac{52,09}{2,34} = 22,5\%$$

$$M_r(O_2) = 32$$

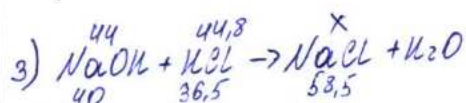
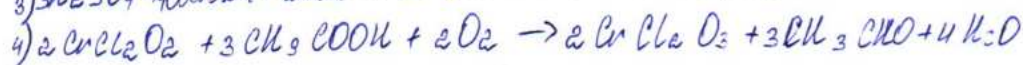
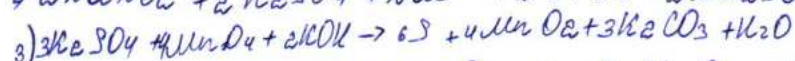
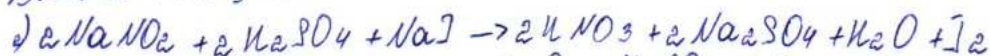
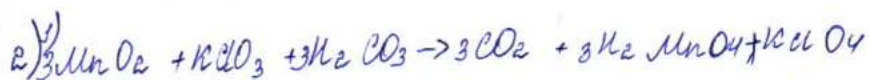
$$n = \frac{V}{V_0}$$

$$n = \frac{m}{M}$$

$$V = \frac{V_0 \cdot m}{M} = \frac{22,4}{32} = 0,7 \text{ л } (O_2)$$

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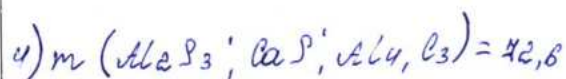
$$m = 8V\omega$$

$$m(\text{NaOH}) = 1,1 \cdot 400 \cdot 0,1 = 44,2$$

$$m(\text{HCl}) = 200 \cdot 0,2 \cdot 1,19 = 47,8$$

$$x = 84,35$$

$$S = 1,12 \text{ г/мл}$$

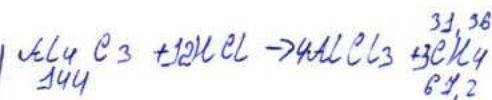


$$\omega(\text{Al}) = 52,04\%$$

$$\omega(\text{O}_2) - ? \quad \omega(\text{Al}_4\text{C}_3) - ?$$

$$\omega(\text{Al}_2\text{S}_3) - ?$$

$$\omega(\text{CaS}) - ?$$



$$x = 64,2$$

№ 1

$$m = 6,542$$

$$cy = 93,462$$

массалық үлесі: 4,92%

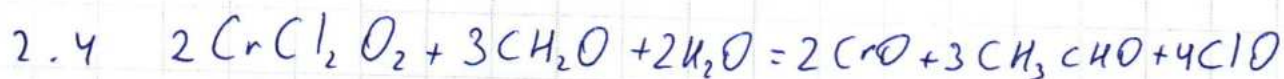
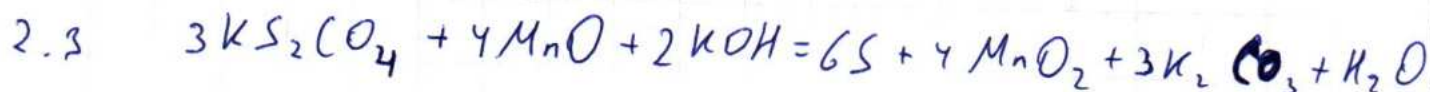
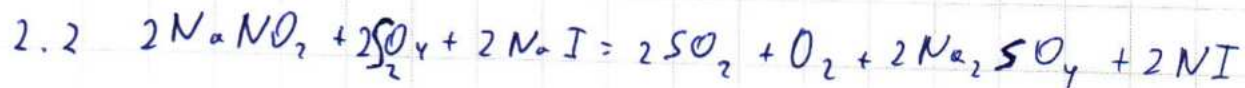
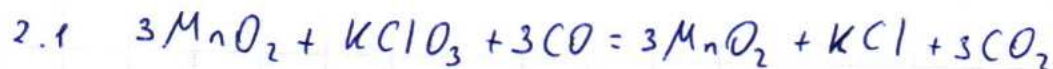
~~Масса~~
~~саны~~

$$\frac{6,54 + 93,46}{100} = 1$$

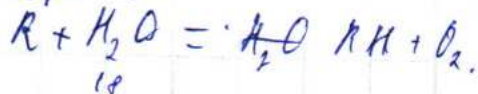
$$4,92 \cdot 1 = 4,92\%$$

$$\frac{6,54 \cdot 4,92}{93,46} = 3$$

№ 2



$$M = 93,46$$



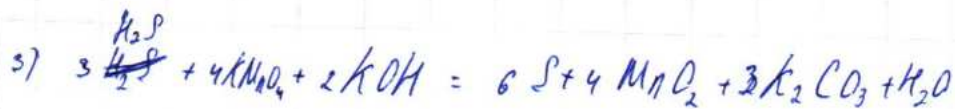
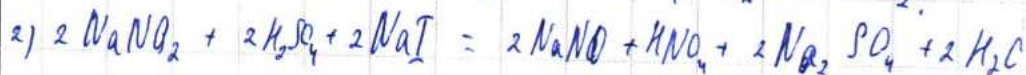
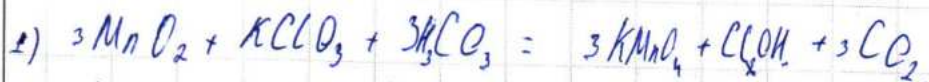
$$m(R) = 6,542$$

$$M_r(R) = \frac{2 \cdot 93,46 \cdot 1}{93,46} = 2$$

$$n(R) = \frac{(6,54 + 93,46)}{93,46} \cdot 0,492 = 0,492$$



№2.



№3

$$V_2(NaOH) = 40 \text{ мл}$$



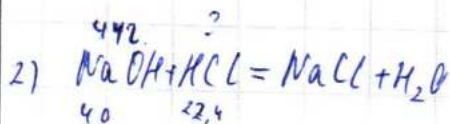
$$m_1(NaOH) = 442$$

$$V_2(HCl) = 40 \text{ мл}$$

$$m_1(HCl) = 442$$

$$\rho = 1,12 \text{ г/мл}$$

$$1) \rho_H = 1,12 + \frac{m_2 \cdot \rho_1}{V_2 \cdot \rho_2} = 1,12 + \frac{1,12 \cdot 1,12}{1,12} = 1,31$$



$$V(HCl) = \frac{44 \cdot 22,4}{40} = 24,64 \text{ мл} \cdot 0,2 = 4,928 \text{ л}$$

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№ 4.

$$m(\text{Al}_2\text{S}_3 \cdot \text{CaS} \cdot \text{Al}_4\text{C}_3) = 72,62$$

$$\omega(\text{Al}) = 52,07\%$$

$$2) m(\text{Al}) = 37,82$$

$$\omega(\text{C}) = \frac{M_r(\text{C}_3)}{M_r(\text{S}_4; \text{Ca}; \text{C}_3)} \cdot 47,93 = 0,177 \cdot 47,93 \approx 8,5\%$$

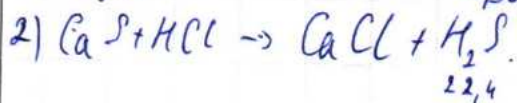
$$\omega(\text{S}; \text{C}; \text{Ca}) = 47,93\%$$

$$\omega(\text{S}) = \frac{M_r(\text{S}_4)}{M_r(\text{S}_4; \text{Ca}; \text{C}_3)} \cdot 47,93 = 0,624 \cdot 47,93 \approx 29,79\%$$

$$\omega(\text{Ca}) = \frac{M_r(\text{Ca})}{M_r(\text{S}_4; \text{Ca}; \text{C}_3)} \cdot 47,93 = 0,196 \cdot 47,93 \approx 9,4\%$$

14,52.

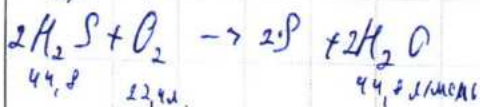
31,36 л.



22,4

$$m(\text{CaS}) = \frac{M_r(\text{CaS})}{M_r(\text{CaS}; \text{Al}_2\text{S}_3 \cdot \text{Al}_4\text{C}_3)} \cdot 72,62 \approx 14,52$$

31,6 л



44,8

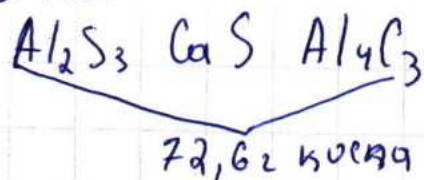
22,4 л.

44,8 л/моль

$$V(\text{O}_2) = \frac{31,6 \cdot 22,4}{44,8} = 15,68 \text{ л.}$$

$$\text{HCl}; V(\text{O}_2) = 15,68 \text{ л.}$$

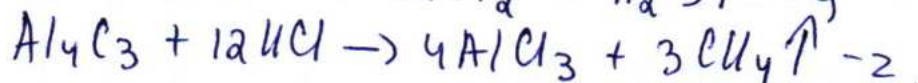
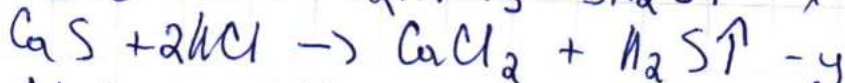
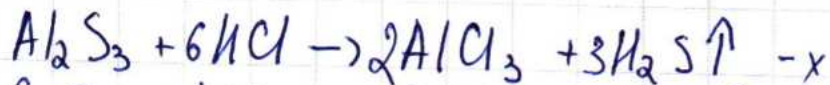
④ есеп.



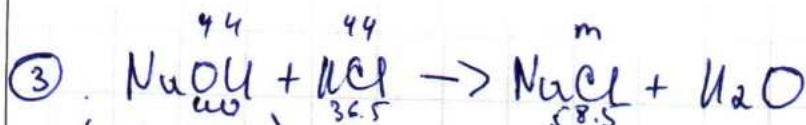
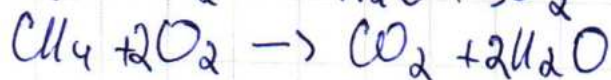
$$72,6 - 100\%$$

$$x - 52,07\%$$

$$x = 37.82 \text{ масса Al}$$



$$x + y + z = 31.364 \text{ газ}$$



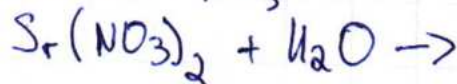
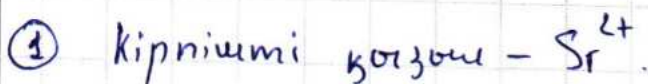
$$m(\text{epimung}) \rightarrow 400 + 200 = 600 \text{ мм}$$

$$m(\text{NaOH}) = m = \rho V W \quad m = 1,1 \cdot 0,1 \cdot 400 = 44 \text{ г}$$

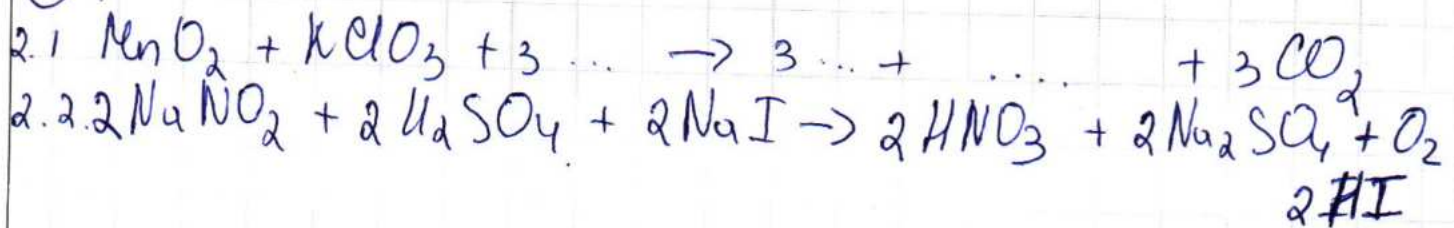
$$m(\text{HCl}) = 0,2 \cdot 1,1 \cdot 200 = 44 \text{ г}$$

$$\frac{44}{40} = 1,1 < \frac{44}{36,5} = 1,2$$

$$m(\text{NaCl}) = \frac{58,5 \cdot 44}{40} = 64,35 \text{ г}$$

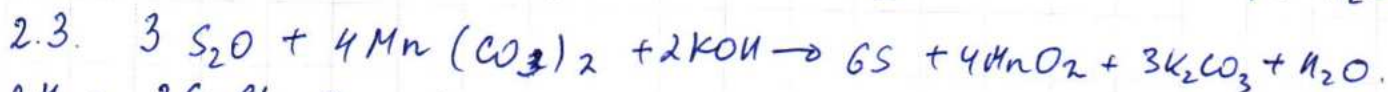
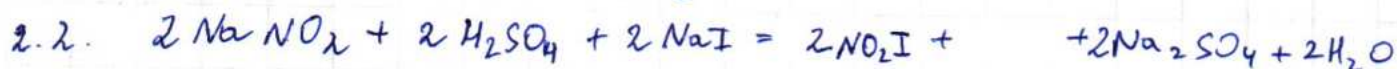
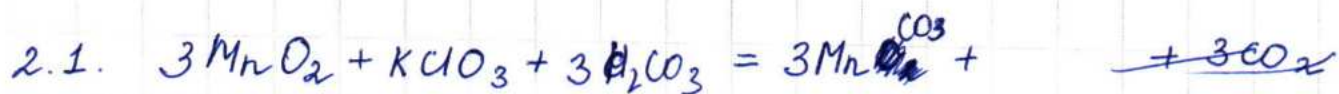


②



1 тапсырма

2 тапсырма



1.

$$m_{\text{ж}} = 6,54 \text{ г}$$

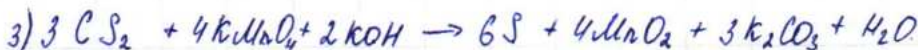
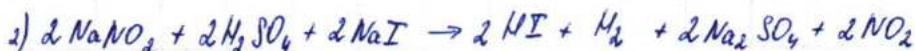
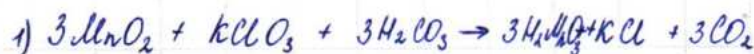
$$+ m(\text{H}_2\text{O}) = 93,46 \text{ г}$$

$$\omega_{\text{ж}} = 4,92\%$$

$$m_{\text{с.ж}} = \frac{(6,54 + 93,46) \cdot 4,92\%}{100\%} = 4,92 \text{ г}$$

кристаллогидрат?

2.



3.

$$V(\text{NaOH}) = 400 \text{ мл}$$

$$\omega(\text{NaOH}) = 10\%$$

$$\rho = 1,1 \text{ г/мл}$$

$$+ V(\text{HCl}) = 200 \text{ мл}$$

$$\omega(\text{HCl}) = 20\%$$

$$\rho = 1,1 \text{ г/мл}$$

$$\text{pH} - ?$$

$$\frac{40 \text{ г}}{40 \text{ г/мл}} + \frac{40 \text{ г}}{36,5 \text{ г/мл}} \rightarrow \text{NaCl} + \text{H}_2\text{O}$$

$$m(\text{NaOH}) = 400 \text{ мл} \cdot 0,1 \cdot 1,1 \text{ г/мл} = 44 \text{ г}$$

$$m(\text{HCl}) = 200 \text{ мл} \cdot 0,2 \cdot 1,1 \text{ г/мл} = 44 \text{ г}$$

$$n_1 = \frac{44 \text{ г}}{40 \text{ г/моль}} = 1,1 \text{ моль}$$

$$n_2 = \frac{44 \text{ г}}{36,5 \text{ г/моль}} = 1,205 \text{ моль}$$

$$n_1 < n_2$$

$$\text{pH} < 7$$

$$V(\text{HCl}) = 22,4 \text{ г/моль} \cdot 1,1 \text{ моль} = 24,64 \text{ мл}$$

4.

$$m(\text{Al}_2\text{S}_3 + \text{CaS} + \text{Al}_4\text{C}_3) = 72,6 \text{ г}$$

$$\omega(\text{Al}) = 52,07\%$$

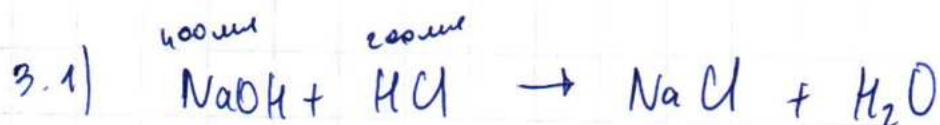
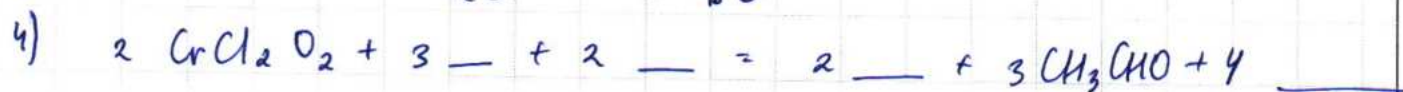
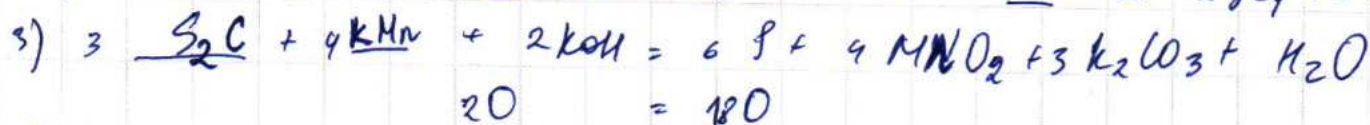
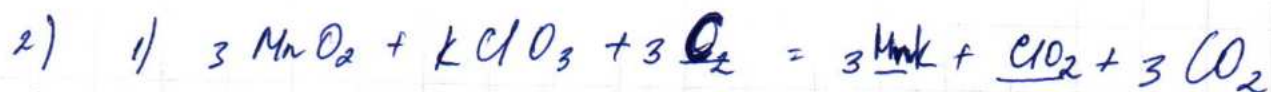
+ HCl

$$V(\text{газ}) = 31,36 \text{ л}$$

$$\omega_{1,2,3} - ?$$

$$V(\text{O}_2) - ?$$

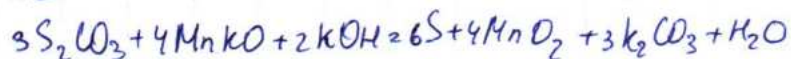
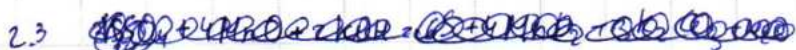
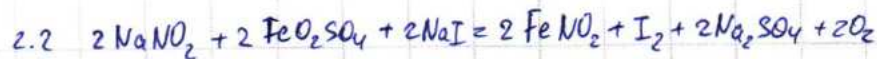
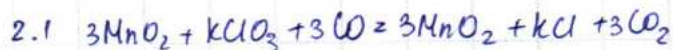




$$m = \frac{V}{2,24 \text{ L}}$$

$$1.1 \quad 6,542 + 93,462 = 1002$$

$$100 \cdot 4,82\% = 4,822$$



$$4.1 \quad 6\text{Al} - 52,07\%$$

$$726 - 100\%$$

$$\times 26302$$

$$\text{Al} = \frac{630}{6} = 1052$$

№1

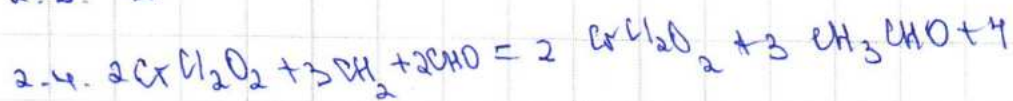
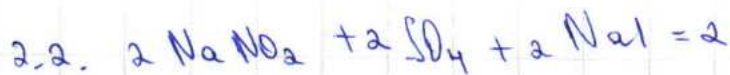
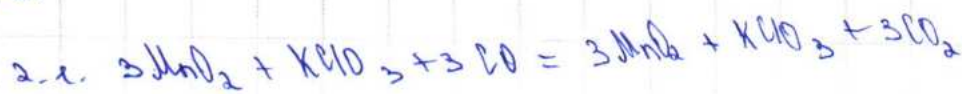
1.1. Берілгені:

$$m = 6,542$$

$$K_{2O} = 93,462$$

$$M = 1,92\%$$

№2.



3.1. Маңы:

$$\omega(NaOH) = 10\%$$

$$pH =$$

$$P_{ep-gi} = 1,12 \text{ мм.}$$

$$\omega(HCl) = 20\%$$

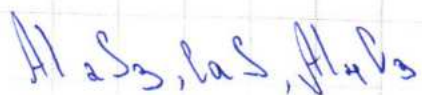
$$P_{ep-gi} = 1,12 \text{ мм.}$$

$$pH = ?$$

$$P = 1,12 \text{ мм.}$$

3.2.

Нәт.



$$m = 72,62.$$

$$M = 52,07\%$$

$$q_{\text{CaS}} = 31,36\%$$

$$V = ?$$

Шешуі:

$$M = \frac{m}{V}$$

$$V = \frac{m}{M}$$

$$V = \frac{72,62}{31,36\% \cdot 52,07\%} =$$

N1

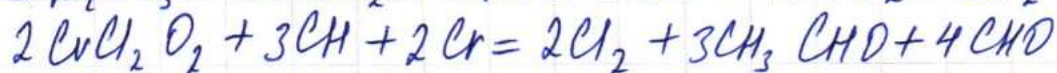
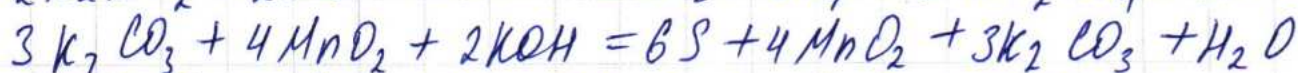
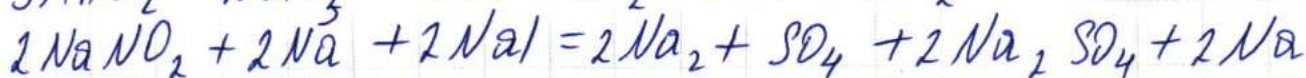
Берілгені:

$$m = 6,542$$

93,462 суда ерігді
 $m(\text{үлсеі}) - 4,92\%$

$$m = \frac{6,542 \cdot 93,462}{4,92} = 12,4$$

N2



N3

NaOH - 400 мл

 $\omega(\text{NaOH}) = 10\%$, $\rho_{\text{ер-гі}} = 1,12/\text{мл}$

HCl - 200 мл ерітілді

 $\omega(\text{HCl}) = 20\%$, $\rho_{\text{ер-гі}} = 1,12/\text{мл}$

$$\omega(\text{NaOH}) = \frac{400 \cdot 200}{10\%} = \frac{80,0}{10} = 8,0$$

$$\frac{6,0}{20}$$

N4

 $\text{Al}_2\text{S}_3, \text{CaS}, \text{Al}_4\text{C}_3$
 $\text{Al}(\text{м, үлсе}) - 52,07\%$

#массаның үлсе - 52,07%

N1

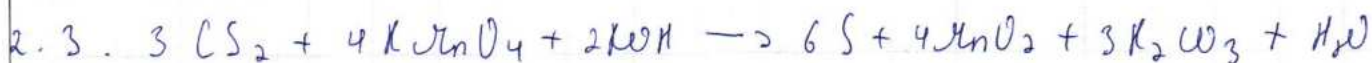
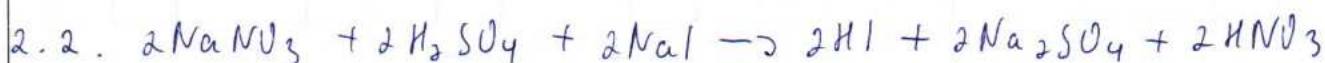
Ca - кальций элементінің мұай кірісінгі қарап түзе бөлігін.

S - күрт бейорганикалық анион болып табылады.

Сәйкесінше белгісіз кристаллы гидрат формуласы: $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

- заттың.

N2.



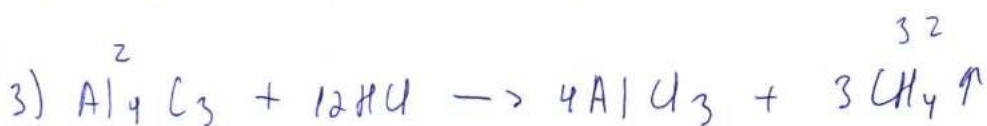
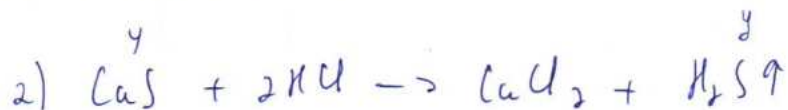
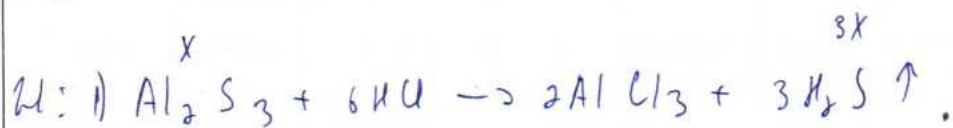
N 4

$$m(\text{қоспа}) (\text{Al}_2\text{S}_3, \text{CaS}, \text{Al}_4\text{C}_3) = 72,62$$

$$\omega(\text{Al}) = 52,07\%$$

$$V(\text{2-жүздік қоспа}) = 31,36\text{ л}$$

$$T.K - \omega(\text{қоспа}), V(\text{O}_2) - ?$$



$$x + y + z = 72,62 - 72,62 - \text{жол} \quad 1 \text{ моль жол алынғаны}$$

$$3x + y + 3z = 1,4 \text{ моль}$$

$$\begin{cases} x + y + z = 1 \text{ моль} \\ 3x + y + 3z = 1,4 \text{ моль} \end{cases} \Rightarrow z = 1 - x - y$$

$$3x + y + 3 - 3x - 3y = 1,4$$

$$2y = 1,6$$

$$y = 0,8$$

$$\text{CaS} = 51,62$$

N 4.2



$$\begin{cases} x + y = 1,4 \\ x + 2y = 1 \end{cases}$$

$$y = 0,4$$

$$V = 0,4 \cdot 22,4 = 8,96 \text{ л}$$

02-00001

Парақтың артқы жағын толтырмаңыз / Обратную сторону листа не заполнять

N1

Кер:

жалпы түсі - кірпіш қуысы

$$m_{\text{крисст.}} \approx 6,542$$

$$m_{\text{H}_2\text{O}} \approx 93,462$$

$$\omega_2(\text{ер.з.}) \approx 4,92\%$$

m/k: формула - ?

Шешуі:

1) Ca

$$2) \text{CaX} \cdot n\text{H}_2\text{O} \rightarrow$$

$$6,542$$

$$+ \text{H}_2\text{O} \rightarrow$$

$$93,46$$

$$\frac{\text{CaX}}{\text{H}_2\text{O}} \rightarrow 4,92\%$$

$$1002$$

$$m(\text{CaX}) \approx 4,922$$

$$3) m(\text{CaX} \cdot n\text{H}_2\text{O}) \approx 6,542$$

$$m(\text{CaX}) \approx 4,922$$

$$m(\text{nH}_2\text{O}) \approx 6,54 - 4,922 \approx 1,622$$

$$n \approx 2 \text{ болса} \rightarrow \nu(\text{H}_2\text{O}) = \frac{1,622}{2} : 18 \frac{\text{г}}{\text{моль}} \approx 0,045 \text{ моль}$$

$$\nu(\text{CaX}) \approx 0,045$$

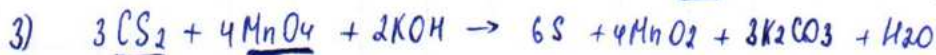
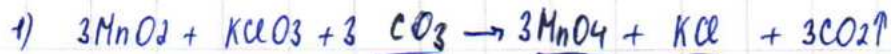
$$m(\text{CaX}) \approx 40 \cdot 0,045 + M(X) \cdot 0,045 \approx 4,92$$

$$M(X) \cdot 0,045 \approx 3,12$$

$$M(X) \approx 71 \frac{\text{г}}{\text{моль}} \rightarrow \text{Cl}_2$$

$$\text{ж/б/ы: } \text{CaCl}_2 \cdot 2\text{H}_2\text{O}$$

N2



N3

Кер:

$$\begin{aligned} V(\text{NaOH}) &= 400 \text{ мл} \\ \omega(\text{NaOH}) &= 10\% = 0,1 \\ \rho(\text{NaOH}) &= 1,12 \text{ г/мл} \end{aligned}$$

$$\begin{aligned} V(\text{HCl}) &= 200 \text{ мл} \\ \omega(\text{HCl}) &= 20\% \\ \rho(\text{HCl}) &= 1,12 \text{ г/мл} \end{aligned}$$

$$\rho_{\text{ер-гі}} = 1,12 \text{ г/мл}$$

м/к: pH = ?

$$m = \rho \cdot V$$

$$\text{Шешуі: } 1) m(\text{NaOH})_{\text{ер-гі}} = 400 \text{ мл} \cdot 1,12 \frac{\text{г}}{\text{мл}} = 448 \text{ г}$$

$$m(\text{HCl})_{\text{ер-гі}} = 200 \text{ мл} \cdot 1,12 \frac{\text{г}}{\text{мл}} = 224 \text{ г}$$

$$2) V_{\text{ер-гі}} = \frac{(448 + 224) \text{ г}}{1,12 \text{ г/мл}} = 589,29 \text{ мл} \approx \underline{0,589 \text{ л}}$$

$$3) \text{pH} = -\lg[\text{H}^+]$$

$$C(\text{H}^+) = \frac{V(\text{H}^+)}{V(\text{H}^+)}$$

N4

Кер:

$$m(\text{Al}_2\text{S}_3 + \text{CaS} + \text{Al}_4\text{C}_3) = 72,6 \text{ г}$$

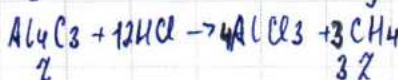
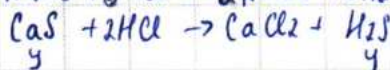
$$\omega(\text{Al}) = 52,07\% = 0,5207$$

$$V(\text{газдар}) = 31,36 \text{ л}$$

$$m/\kappa: 1) \omega_{1,2,3} = ?$$

$$2) V(\text{O}_2) = ?$$

Шешуі:



$$\begin{cases} 150x + 72y + 144z = 72,6 \\ 3x + y + 3z = \frac{31,36}{22,4} = 1,4 \cdot 50 \end{cases} \Rightarrow \begin{cases} 150x + 72y + 144z = 72,6 \\ 150x + 50y + 150z = 70 \end{cases}$$

$$\begin{aligned} 22y - 6z &= 2,6 \\ y &= \frac{6z + 2,6}{22} \end{aligned}$$