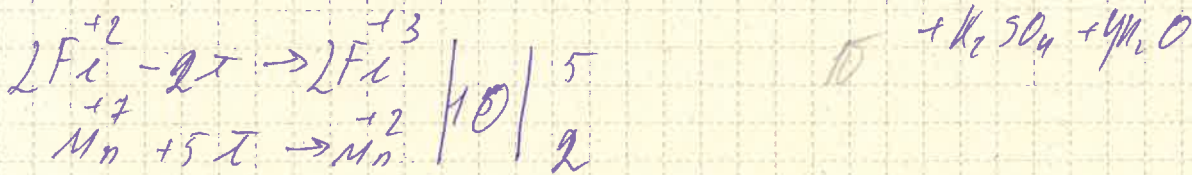
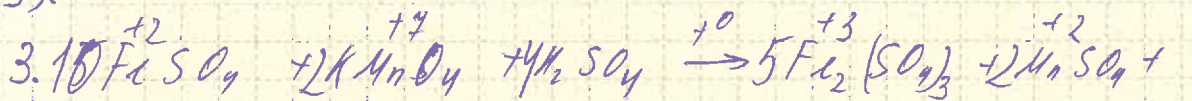


3)



FeSO_4 - восстанавливается (Fe^{+2})

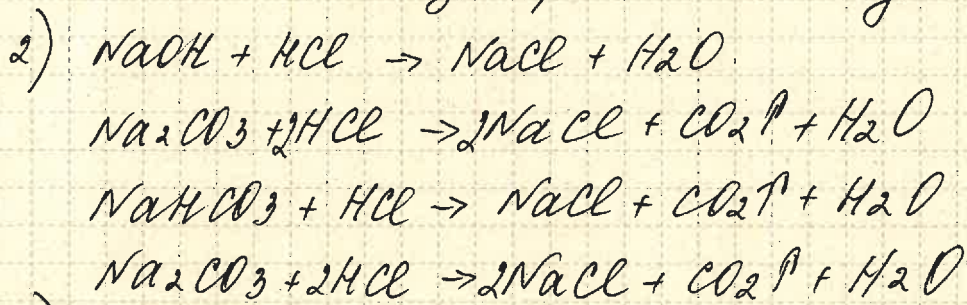
KMnO_4 - окисляется (Mn^{+7})

При добавлении К₂С₂О₈ (порода калия)

можно увидеть выпадение кристаллов порода

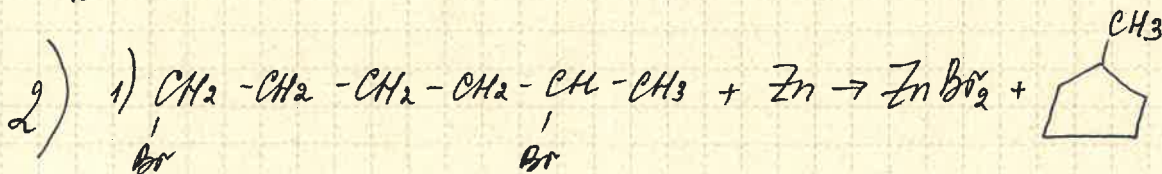
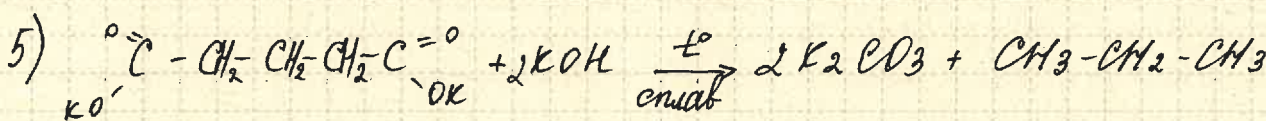
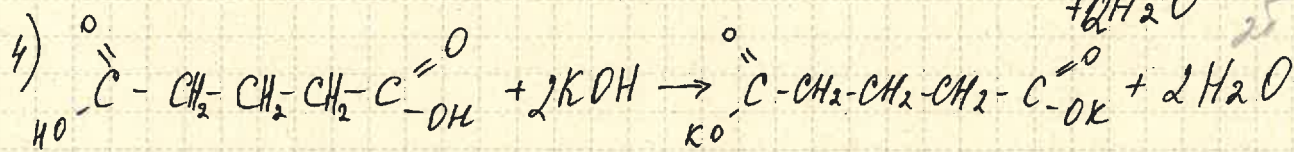
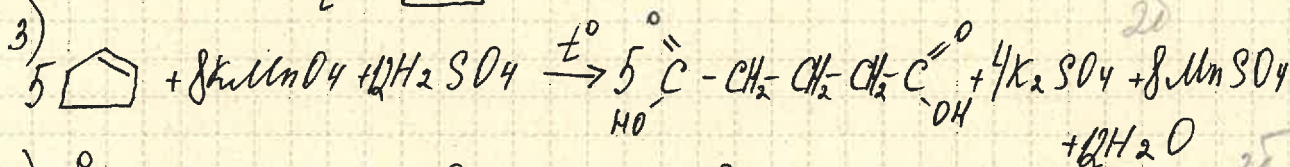
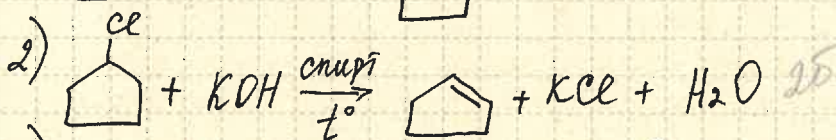
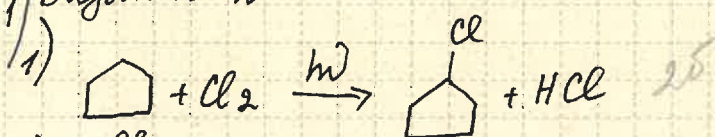
Задание 1

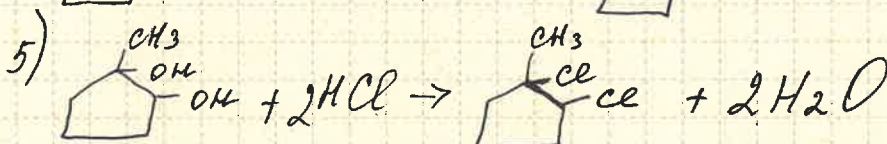
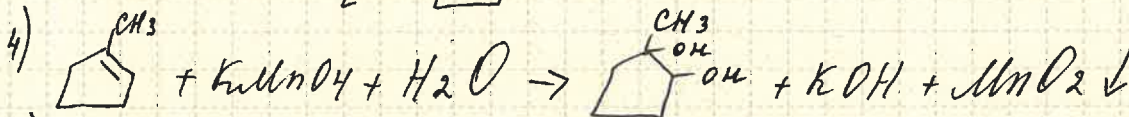
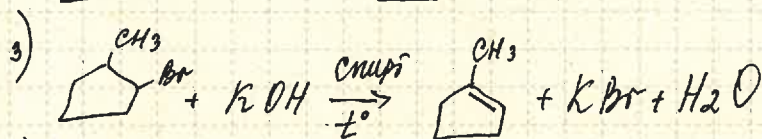
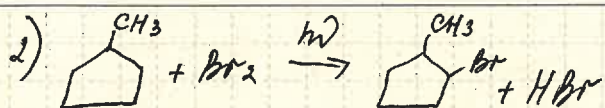
- 1) NaOH - каустическая сода (гидроксид натрия) 15
 Na₂CO₃ · 10H₂O - кристаллическая сода (карбонат натрия) 15
 NaHCO₃ - питьевая (или пищевая) сода (гидрокарбонат натрия) 15
 Na₂CO₃ - кальцинированная сода (карбонат натрия) 15



3) $V(\text{CO}_2) \text{ по III гр} = \frac{52 \cdot 22,4 \text{ л/моль}}{92 \text{ г/моль}} = 1,25 \text{ л}$
 $V(\text{CO}_2) \text{ по IV гр} = \frac{52 \cdot 22,4 \text{ л/моль}}{106 \text{ г/моль}} = 1,056 \text{ л}$

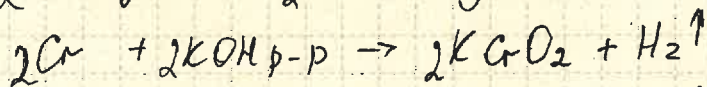
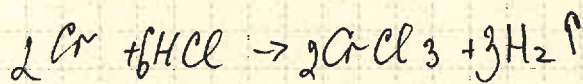
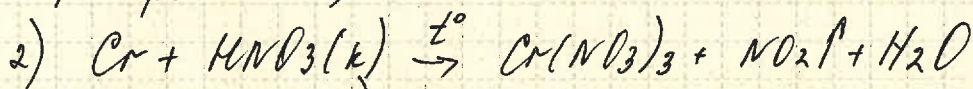
1) Задание 2





Задача 4

1) Хром (Cr)



X₁ - Cr(NO₃)₃ - нитрат хрома (III)

X₂ - Cr₂(SO₄)₃ - сульфат хрома (III)

X₃ - CrCl₃ - хлорид хрома (III)

X₄ - KCrO₂.

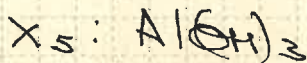
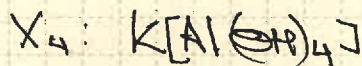
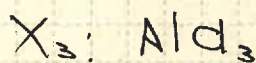
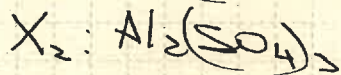
X₅ =

Задание 1.

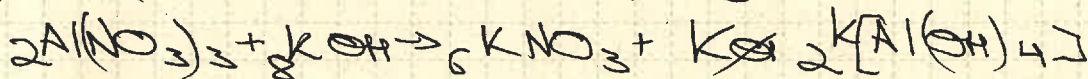
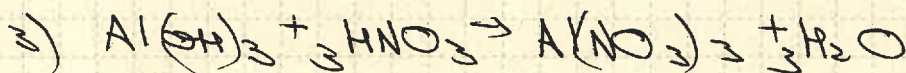
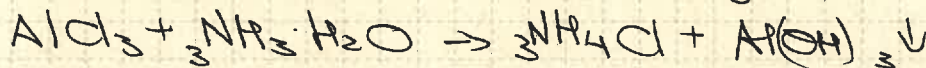
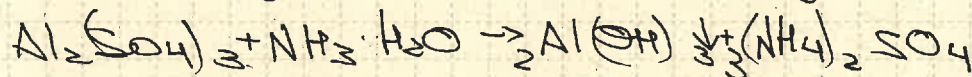
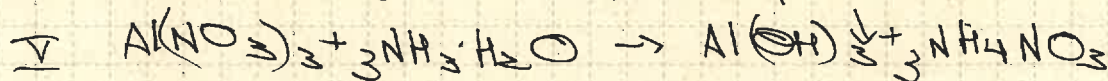
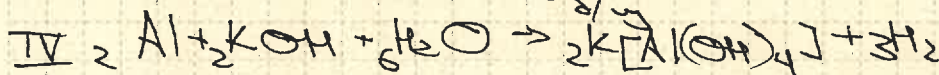
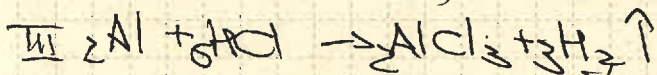
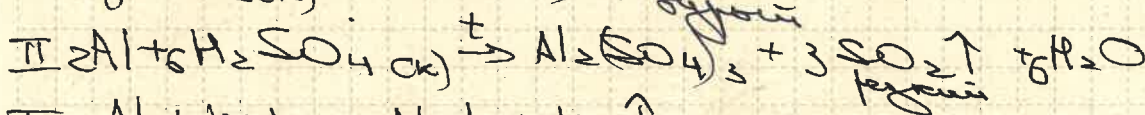
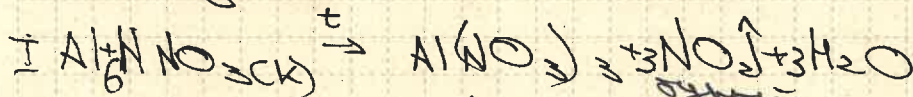
1) Данный металл реагирует с азотом (Al).

Он имеет единственную оксид Al_2O_3 , в котором $w(O_{оксидов}) = \frac{48 \cdot 3 / \text{моль} (O)}{102 \cdot 2 / \text{моль} (Al_2O_3)} \cdot 100\% = 47,06\%$.

2) Соединениями $X_1 - X_5$ являются:

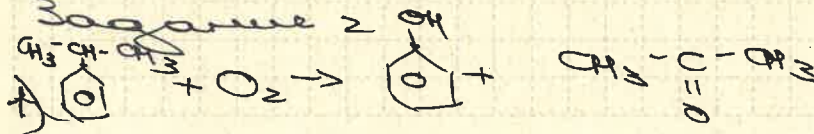


Реакции:

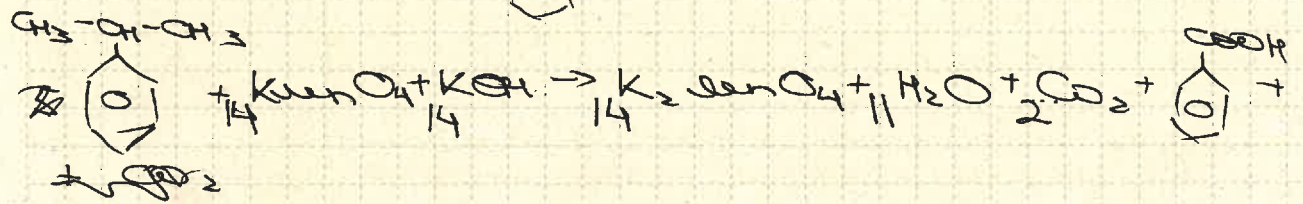
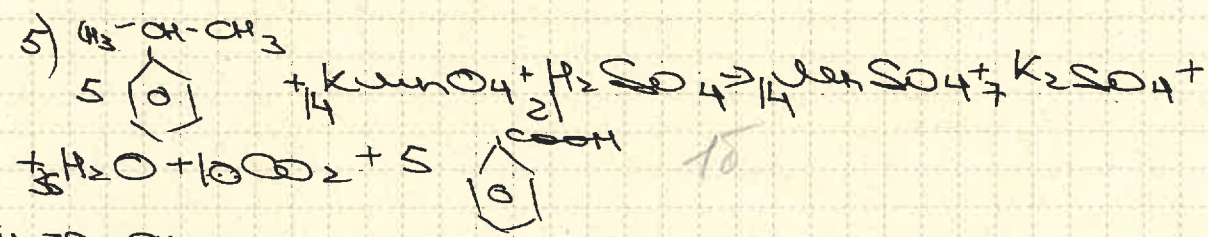
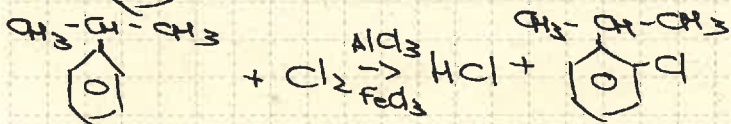
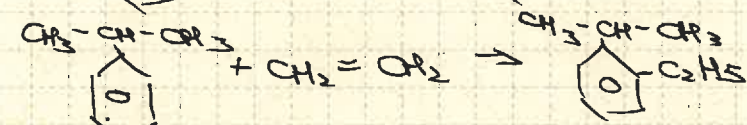
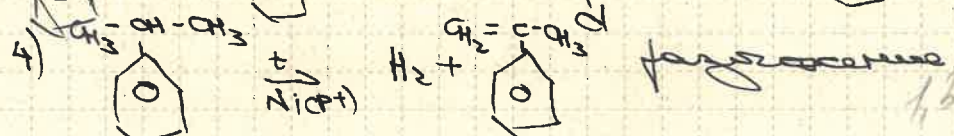
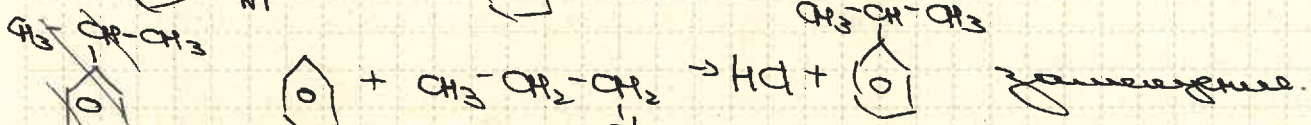
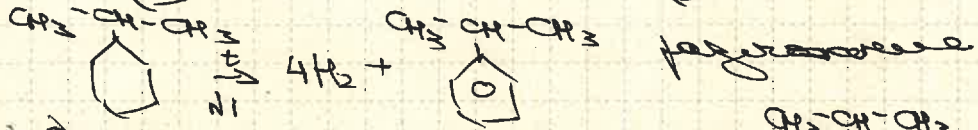
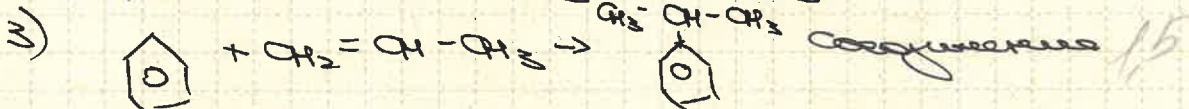


4)

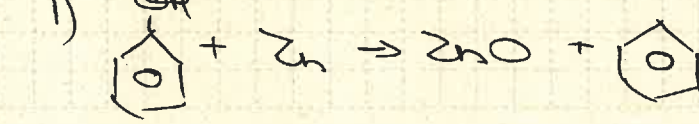
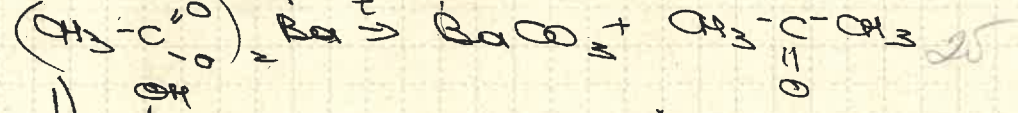
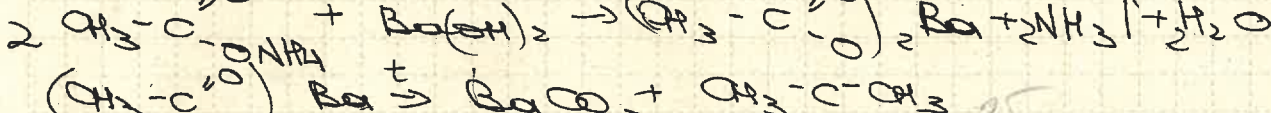
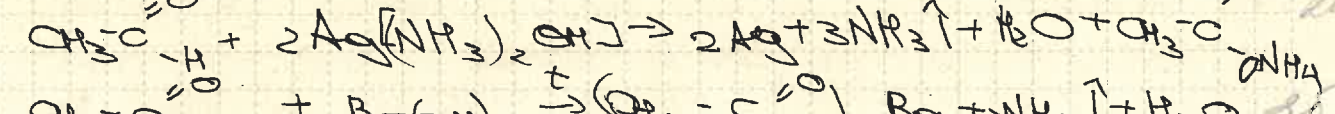
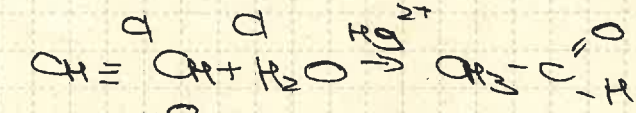
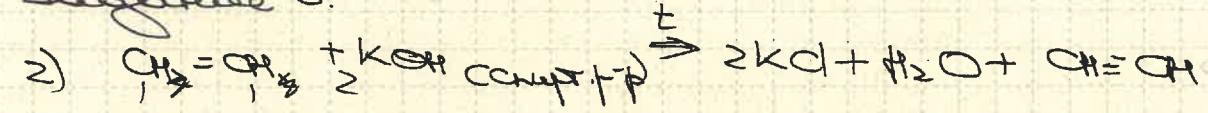
Задание 2

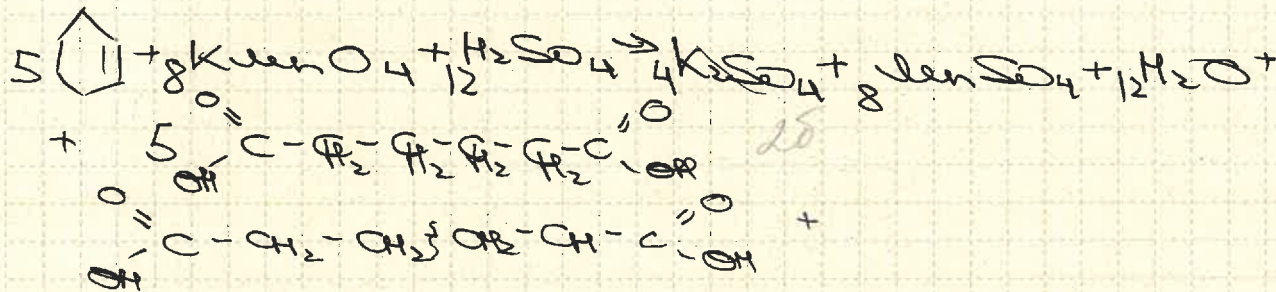
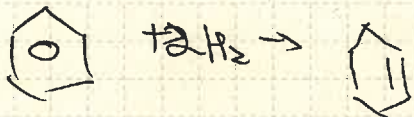


2) трибромбензол марганец: кумол. 10



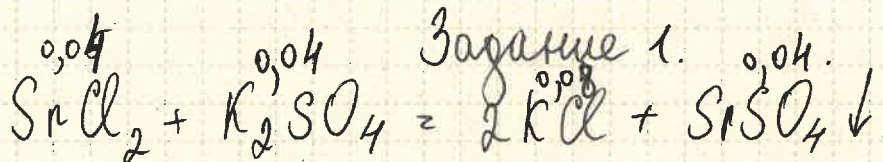
Задача 3:





Задача 4

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SnCl_2	K_2SO_4	$n(\text{SnCl}_2) : n(\text{K}_2\text{SO}_4) = 1 : 1$
$\omega = 0,08$	$\omega = 0,08$	а по факту $0,05 : 0,5 \Rightarrow$
$V = 90 \text{ мл.}$	$V = 80,5 \text{ мл.}$	$n(\text{SnCl}_2)$ - в недостатке,
$\rho = 1,10 \frac{\text{г}}{\text{мл}}$	$\rho = 1,08 \frac{\text{г}}{\text{мл}}$	$n(\text{K}_2\text{SO}_4)$ - в избытке.

$M_{\text{р-ра}} = 9,92$ $M_{\text{р-ра}} = 86,94$

$M = 159 \frac{\text{г}}{\text{моль}}$ $M = 174 \frac{\text{г}}{\text{моль}}$

$m_{\text{в-ва}} = 7,92 \text{ г}$ $n \approx \frac{0,04}{0,5} \text{ моль}$

$n \approx 0,05 \text{ моль}$ $m_{\text{в-ва}} = 6,9552 \text{ г}$

$n(\text{SnCl}_2) : n(\text{K}_2\text{SO}_4) = 1 : 1$, а по факту $0,05 : 0,04 \Rightarrow$
 $n(\text{SnCl}_2)$ - в избытке, а $n(\text{K}_2\text{SO}_4)$ - в недостатке.

$n_{\text{изб.}}(\text{SnCl}_2) = 0,01 \text{ моль}$

$m_{\text{р-ра}} = m_{\text{р-ра}}(\text{SnCl}_2) + m_{\text{р-ра}}(\text{K}_2\text{SO}_4) - m(\text{SnSO}_4) \downarrow$

SnSO_4 $M_{\text{р-ра}} = 99 + 86,94 - 7,36 = 178,58$

$n = n(\text{K}_2\text{SO}_4) = 0,04 \text{ моль}$ $178,58 \text{ г}$

$M = 184 \frac{\text{г}}{\text{моль}}$ KCl

$m(\downarrow) = 7,36 \text{ г}$ $n = 2n(\text{K}_2\text{SO}_4) = 0,08 \text{ моль}$

$M = 74,5 \frac{\text{г}}{\text{моль}}$ $m = 5,96 \text{ г}$

$\text{SnCl}_2 \text{ изд.}$

$n = 0,01 \text{ моль}$

$M = 159 \frac{\text{г}}{\text{моль}}$

$m = 1,59 \text{ г}$

Задание 1 (продолжение).

$$\omega(\text{KCl}) = \frac{5,962}{178,582} \approx 0,03.$$

$$\omega(\text{SnCl}_2) = \frac{1,592}{178,582} \approx 0,01$$

Задание 4.

Соединения:

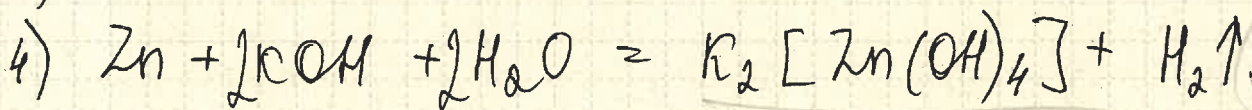
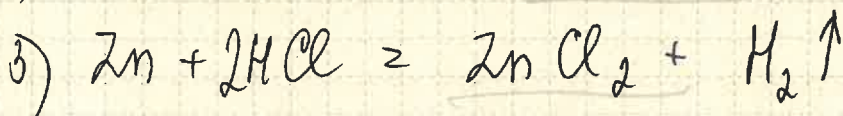
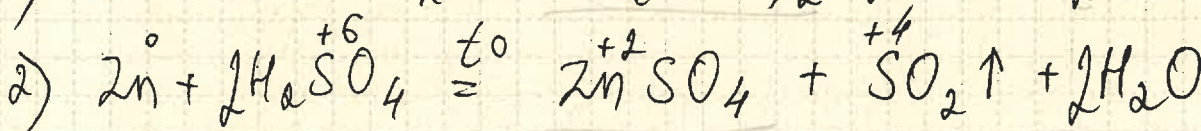
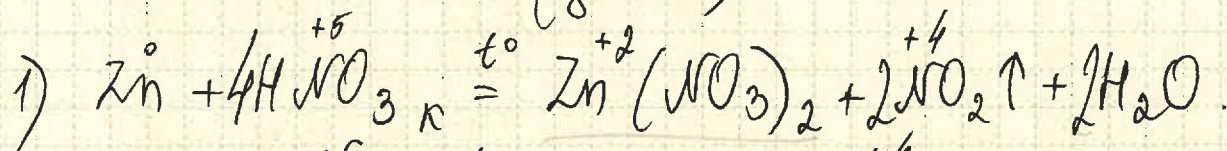
NaCl, KCl, PbCl

Задание 4.

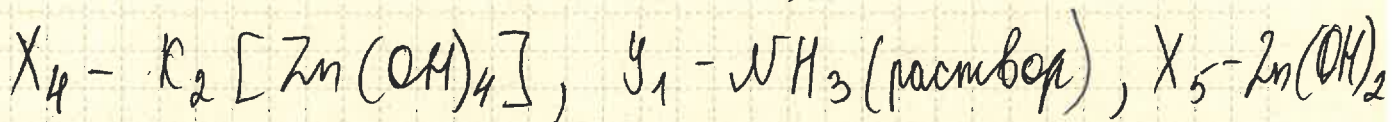
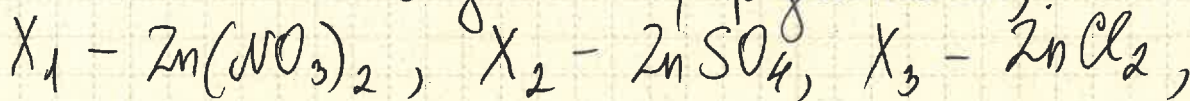
Это ZnO, т.к. $\omega(\text{O}) \approx 19,7\%$ $M(\text{ZnO}) = 81 \frac{\text{г}}{\text{моль}}$

$$\omega = \frac{16}{65+16} = \frac{16}{81} \cdot 100\% \approx 19,7\%.$$

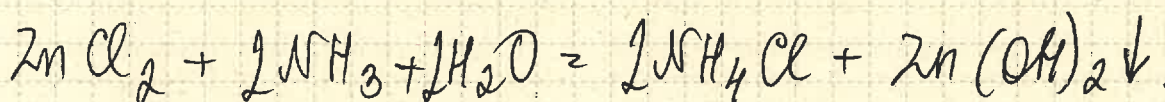
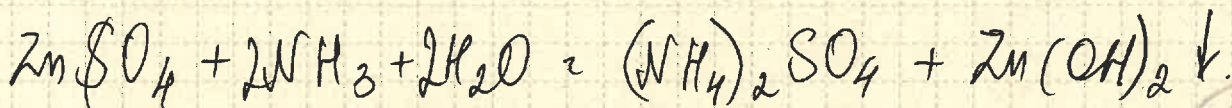
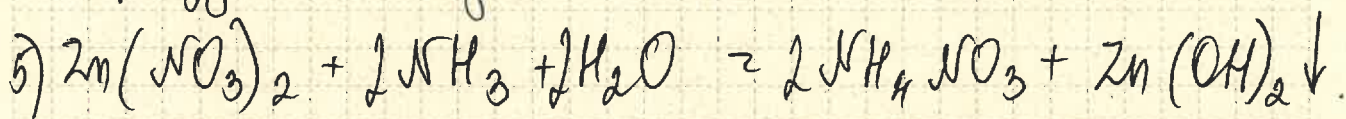
Металл — Zn (цинк).



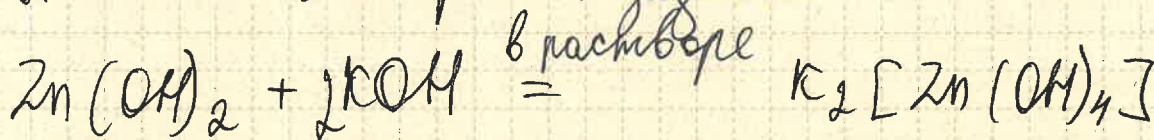
Задание 4 (продолжение)



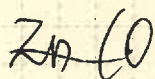
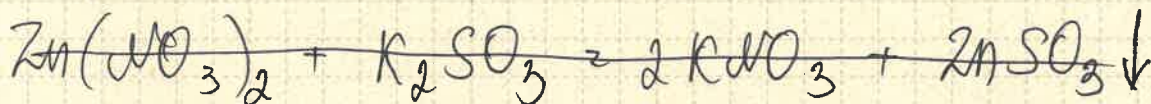
Y_1 - скорее всего р-р NH_3 , при котором образуется осадок $\text{Zn}(\text{OH})_2 - X_5$.



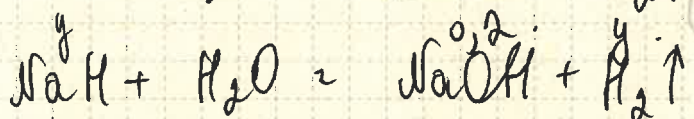
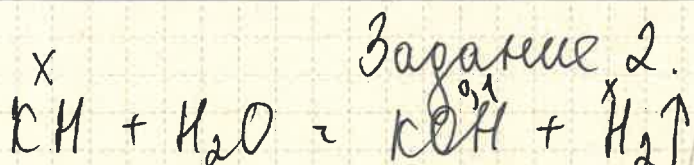
Ответ на 3 вопрос 4 задание:



к $\text{Zn}(\text{OH})_2$ нужно добавить раствор КОМ.
вопрос.



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KN

NaH

моль x моль
 $M = 40 \frac{\text{г}}{\text{моль}}$
 $m = 40x$

моль y моль.
 $M = 24 \frac{\text{г}}{\text{моль}}$
 $m = 24y$

$$\begin{cases} 40x + 24y = 8,82 \\ x + y = 0,3 \text{ моль} \end{cases}$$

$$x = 0,3 - y$$

$$12 - 40y + 24y = 8,82$$

$$16y = 3,2$$

$$y = 0,2 \text{ моль}$$

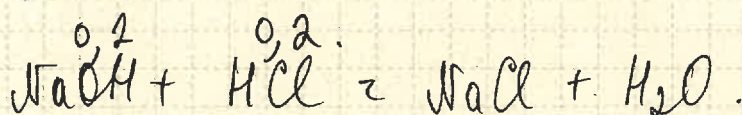
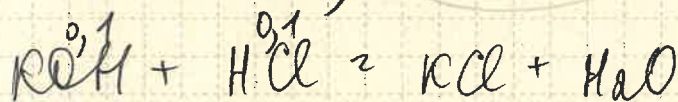
$$x = 0,1 \text{ моль}$$

$$n(\text{газа}) = \frac{6,72}{22,4} = 0,3 \text{ моль}$$

$$m(\text{KN}) = 0,1 \cdot 40 = 4 \text{ г} \quad m(\text{NaH}) = 0,2 \cdot 24 = 4,8 \text{ г}$$

$$\omega(\text{KN}) = \frac{4}{8,8} \cdot 100\% \approx 45\%$$

$$\Rightarrow \omega(\text{NaH}) \approx 55\%$$



HCl

моль $0,3$ моль

$M = 36,5 \frac{\text{г}}{\text{моль}}$

$m = 109,5 \text{ г}$

$\rho = 1,025 \frac{\text{г}}{\text{мл}}$

$$V = \frac{m}{\rho} = \frac{109,5}{1,025} \approx 107 \text{ мл}$$

$$m_{\text{р-ра}} = 109,5 : 0,073 \approx 1499 \text{ г}$$

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Шифр
X И М А 9 0 8

N1

Дано:

$$\omega(K_2SO_4) = 0,08$$

$$\omega(SrCl_2) = 0,08$$

$$\rho(SrCl_2) = 1,1 \text{ г/мл}$$

$$\rho(K_2SO_4) = 1,08 \text{ г/мл}$$

$$V(K_2SO_4) = 80,5 \text{ мл}$$

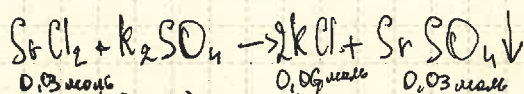
$$V(SrCl_2) = 90 \text{ мл}$$

Найти:

$$\omega(SrSO_4) ?$$

$$\omega(KCl) ?$$

Решение:



$$n(SrCl_2) = 1,1 \text{ г/мл} \cdot 90 \text{ мл} = 99 \text{ г}$$

$$m_{\text{р-ра}}(K_2SO_4) = 1,08 \text{ г/мл} \cdot 80,5 \text{ г} \approx 86,9 \text{ г}$$

$$m_{\text{в-ва}}(SrCl_2) = 99 \text{ г} \cdot 0,08 = 6,16 \text{ г}$$

$$m_{\text{в-ва}}(K_2SO_4) = 86,9 \text{ г} \cdot 0,08 \approx 6,96 \text{ г}$$

$$M(SrCl_2) = 155 \text{ г/моль} \quad M(K_2SO_4) = 174 \text{ г/моль}$$

$$n(SrCl_2) = \frac{6,16 \text{ г}}{155 \text{ г/моль}} = 0,03 \text{ моль}$$

$$n(K_2SO_4) = \frac{6,96 \text{ г}}{174 \text{ г/моль}} = 0,04 \text{ моль}$$

$SrCl_2$ - в недостатке

$$n(KCl) = 2n(SrCl_2) = 0,06 \text{ моль}$$

$$n(SrSO_4) = n(SrCl_2) = 0,03 \text{ моль}$$

$$M(KCl) = 74,5 \text{ г/моль} \quad M(SrSO_4) = 183 \text{ г/моль}$$

$$m_{\text{в-ва}}(KCl) = 74,5 \text{ г/моль} \cdot 0,06 \text{ моль} = 4,47 \text{ г}$$

$$m_{\text{в-ва}}(SrSO_4) = 183 \text{ г/моль} \cdot 0,03 \text{ моль} = 5,49 \text{ г}$$

$$m_{\text{в-ва}} \text{ р-ра} = 99 \text{ г} + 86,9 \text{ г} = 185,9 \text{ г}$$

$$- 5,49 \text{ г} =$$

$$\omega(SrSO_4) = \frac{5,49 \text{ г}}{180,41 \text{ г}}$$

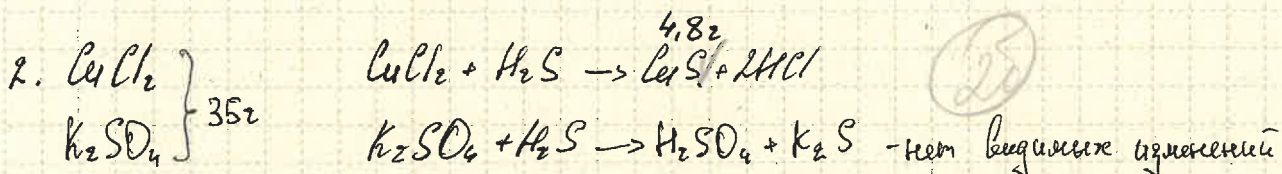
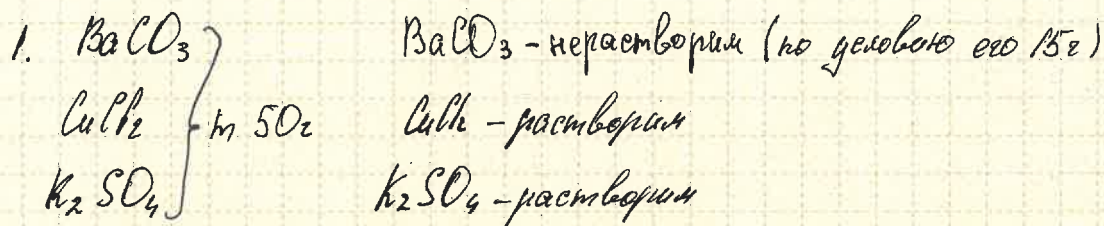
$$= 180,41$$

$$\omega(KCl) = \frac{4,47 \text{ г}}{180,41} \approx 2,4\% \quad \text{Ответ: } \omega(KCl) = 2,4\%$$

Примеры соединений: $MgCl_2, BaSO_4, CaCO_3$

18

№3.



$M(\text{CuS}) = 64 + 32 = 96 \text{ г/моль}$ $n(\text{CuS}) = \frac{4,8\text{г}}{96 \text{ г/моль}} = 0,2 \text{ моль}$

$n(\text{CuCl}_2) = n(\text{CuS}) = 0,2 \text{ моль}$ $M(\text{CuCl}_2) = 64 + 71 = 135 \text{ г/моль}$

$m(\text{CuCl}_2) = 135 \text{ г/моль} \cdot 0,2 \text{ моль} = 27,0 = 27\text{г}$ 10

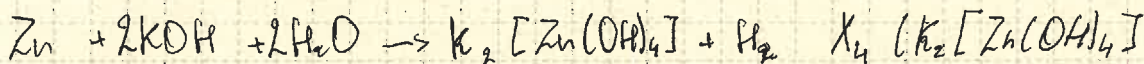
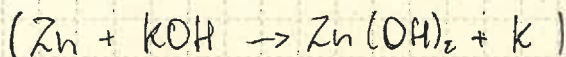
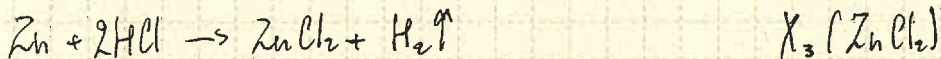
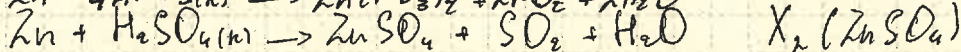
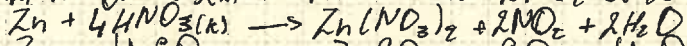
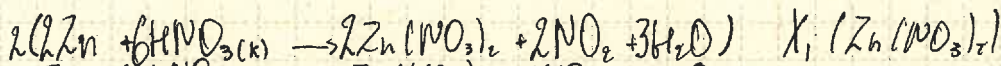
$m(\text{K}_2\text{SO}_4) = 35 - 27 = 8\text{г}$

$\omega(\text{K}_2\text{SO}_4) = \frac{8\text{г}}{50\text{г}} \cdot 100\% = 16\%$

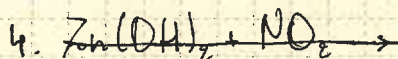
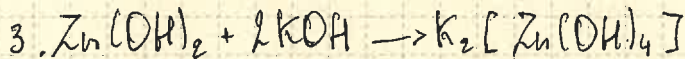
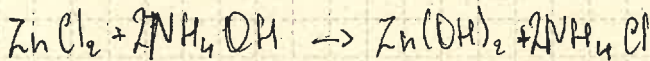
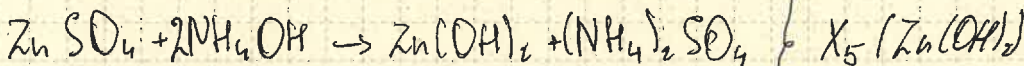
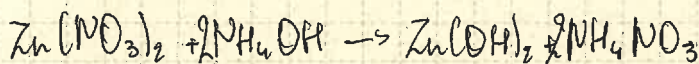
Ответ: $\omega(\text{K}_2\text{SO}_4) = 16\%$ 50

№4.

1. Металл - Zn. $M(ZnO) = 81 \text{ г/моль}$ $\omega(O) = \frac{16 \text{ г/моль}}{81 \text{ г/моль}} \cdot 100\% = 19,7\%$



$Y_1 - NH_3 \cdot H_2O$

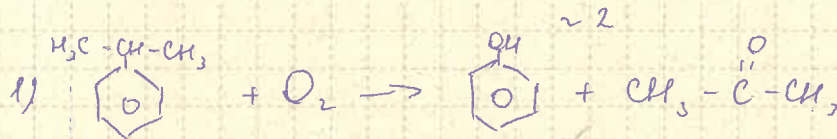
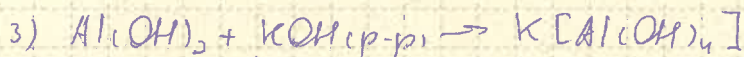
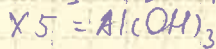
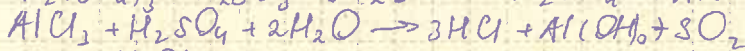
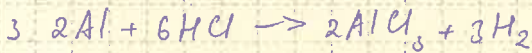
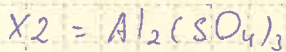
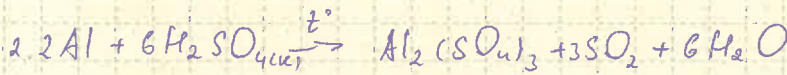
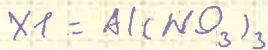
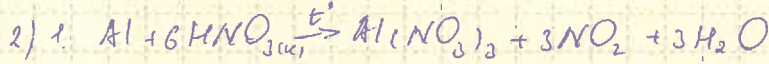


80

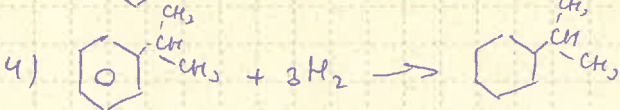
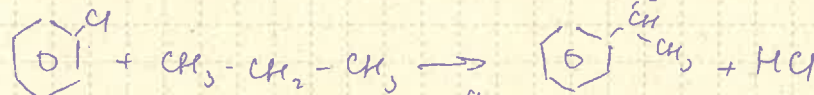
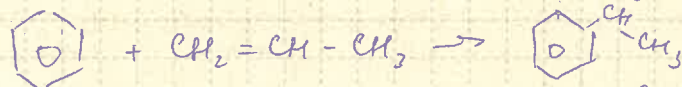
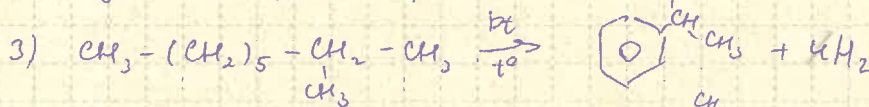
1) Al

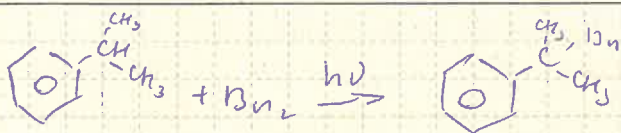
$M_{\text{m}}(\text{Al}_2\text{O}_3) = 2 \cdot 27 + 3 \cdot 16 = 102 \text{ г/моль}$

$w(\text{O}) = \frac{n(\text{O}) \cdot M(\text{O})}{M(\text{Al}_2\text{O}_3)} \cdot 100\% = \frac{48 \text{ г/моль}}{102 \text{ г/моль}} \cdot 100\% = 47,06\%$

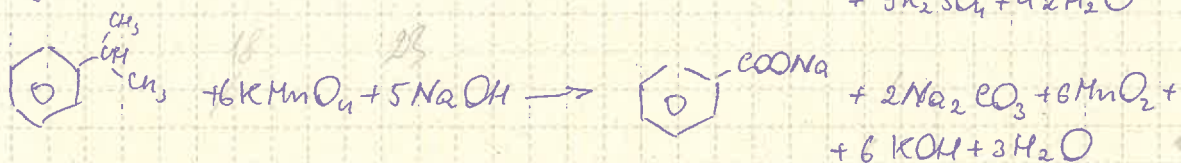
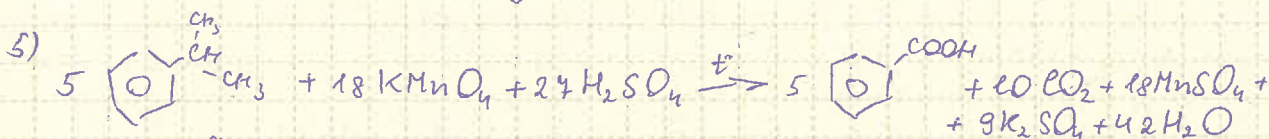


2) кумол, 2-фенилпропан

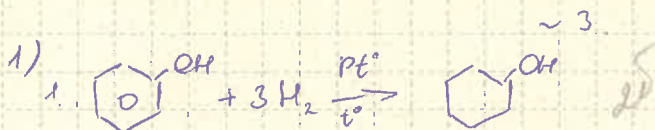




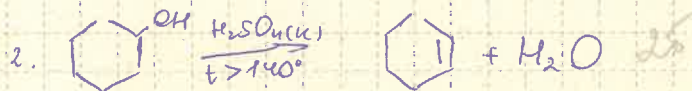
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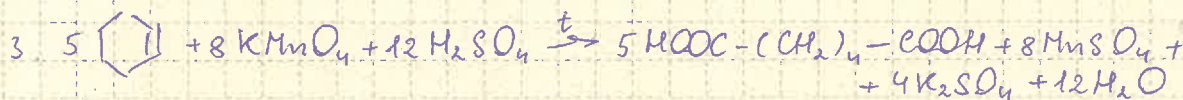
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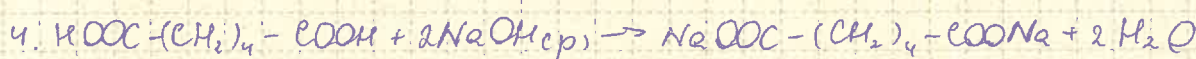
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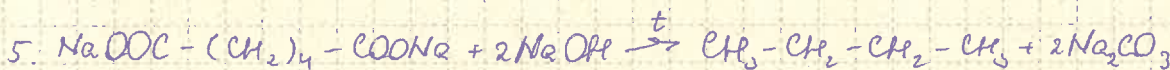
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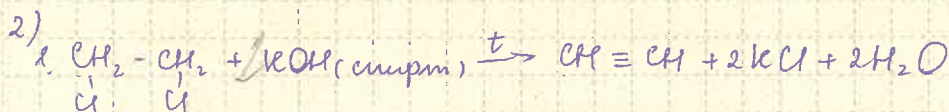
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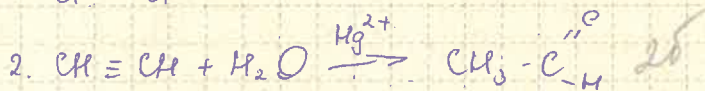
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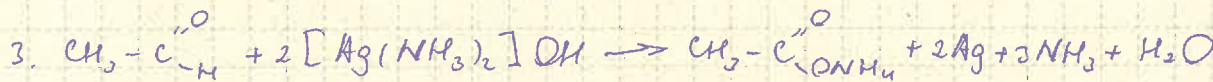
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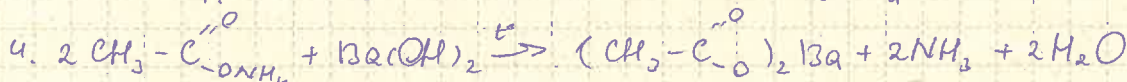
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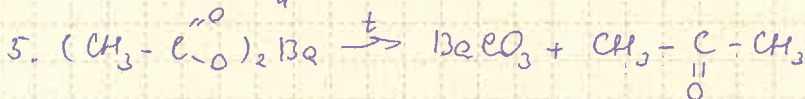
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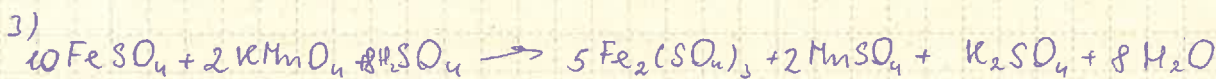


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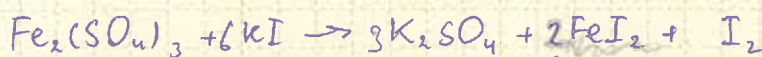


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~4



25



3

если добавить йодид калия, то будет протекать ОВР, в ходе которой выпадет осадок ферристого цвета в осадок

Бланк ответов

Шифр

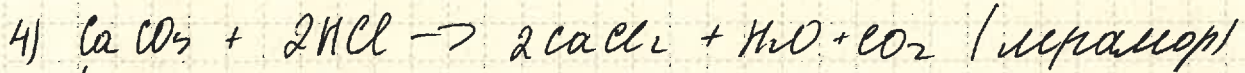
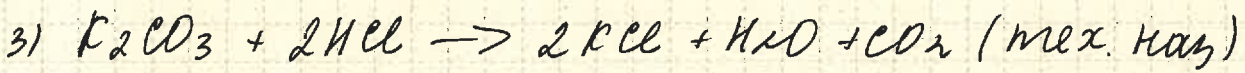
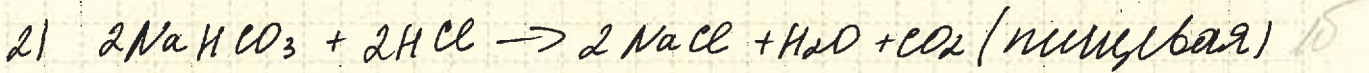
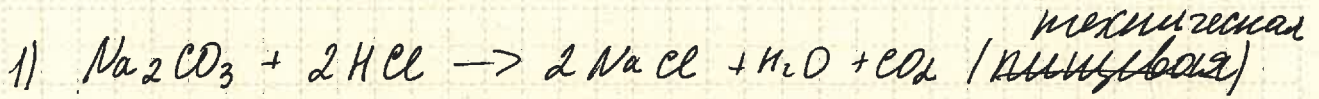
X | Ч | М | 10 | 02

$$1. m(\text{FeSO}_4)_{\text{в р-ве}} = \frac{m(\text{FeSO}_4)}{m_{\text{р-ра}}} = \frac{54,42}{154,42}$$

$$\frac{m(\text{FeSO}_4)}{3002} = \frac{54,42}{154,42} \quad m(\text{FeSO}_4) = \frac{54,42 \cdot 3002}{154,42} = \frac{16320,02}{154,42} = \frac{816002}{7722} =$$

$$= \frac{40800}{386} = \frac{20400}{193} = 105,72$$

$$m(\text{FeSO}_4)_{\text{в р-ве}} = \frac{26,62 \cdot 3002}{126,62} = \frac{798002}{12662}$$



$n(\text{Na}_2\text{CO}_3) = \frac{5}{106} = 0,05$ (и.ч.) 25

$PV = nRT$

$n = \frac{RT}{PV}$

$n_{\text{кв}} = 0,03$

$V(\text{CO}_2) 0,03 \cdot 22,4 = 0,672 \text{ л}$

$n = \frac{1013 \cdot 207}{745 \cdot 22,4}$

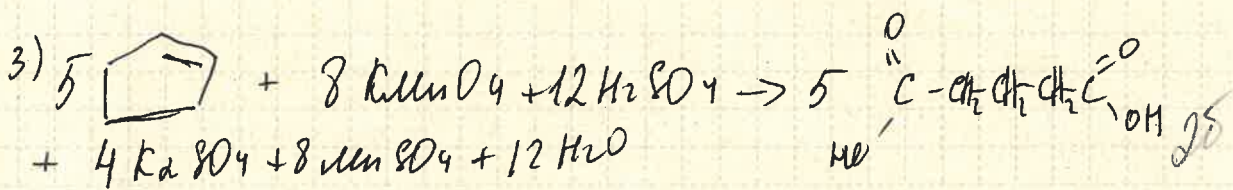
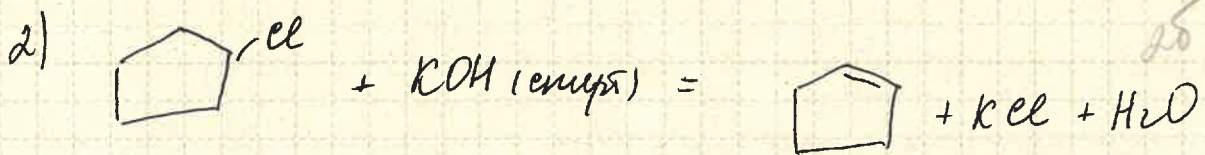
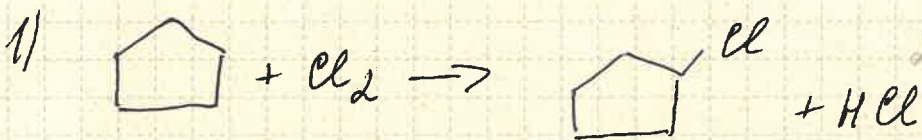
$n(\text{NaHCO}_3) = 0,04$

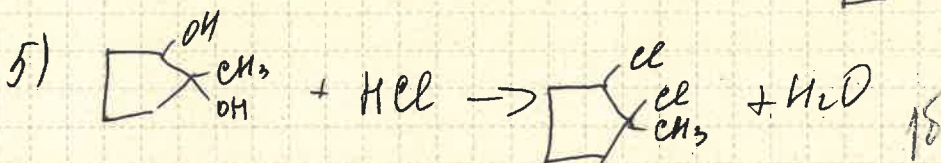
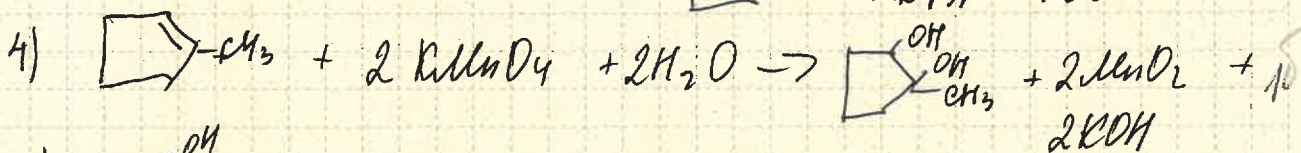
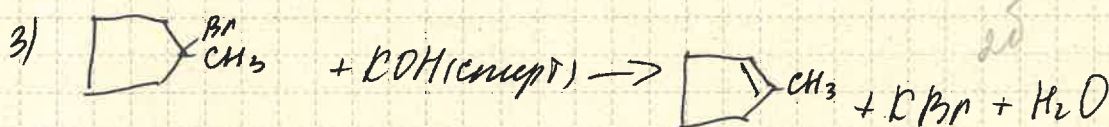
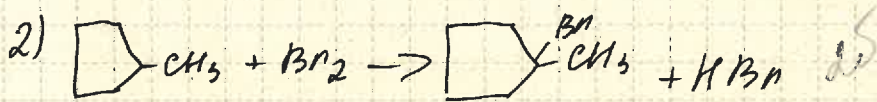
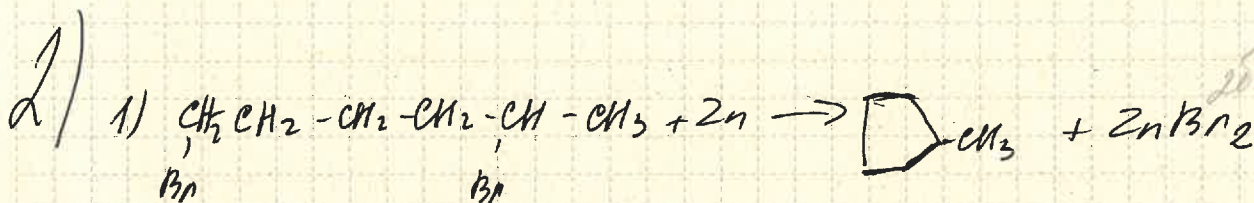
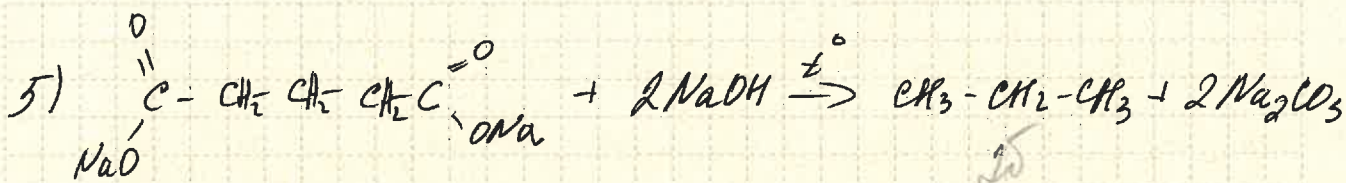
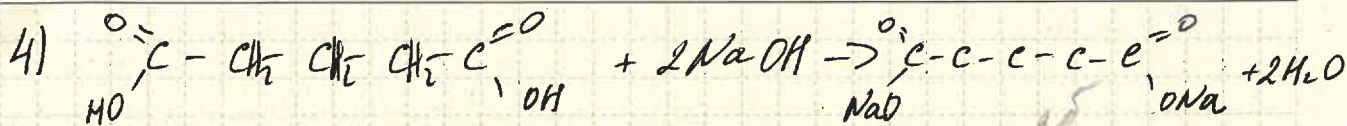
$V(\text{CO}_2) = 0,04 \cdot 22,4 = 0,896 \text{ л}$

$n(\text{K}_2\text{CO}_3) \Rightarrow 0,02 \cdot 22,4 = 0,448 \text{ л}$

$V_{\text{общ}}(\text{CO}_2) = 2,006 \text{ л}$

Задача 2





Задача 4.

