





Заг-уе ~ 4 80

1.  $\text{CO}_2 + \text{CaCO}_3 + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{HCO}_3)_2$  10
2.  $\text{Ca}(\text{HCO}_3)_2 \xrightarrow{t} \text{CaCO}_3 + \text{H}_2\text{O} + \text{CO}_2$  10
3.  $\text{CaCO}_3 + \text{Na}_2\text{SO}_4 \rightarrow \text{CaSO}_4 \downarrow + \text{Na}_2\text{CO}_3$  00
4.  $\text{CaSO}_4 + \text{Na}_2\text{S} \rightarrow \text{CaS} \downarrow + \text{Na}_2\text{SO}_4$  10
5.  $\text{CaS} + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{S} \uparrow$  10
6.  $\text{CaCl}_2 + \text{Na}_2\text{CO}_3 \rightarrow \text{CaCO}_3 \downarrow + 2\text{NaCl}$  10
7.  $\text{CaCO}_3 \xrightarrow{b} \text{CaO} + \text{CO}_2$  10
8.  $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$  10
9.  $\text{C}_6\text{H}_{12}\text{O}_6 \xrightarrow{\text{брожение}} 2\text{C}_2\text{H}_5\text{OH} + 2\text{CO}_2$  10
10.  $2\text{C}_2\text{H}_5\text{OH} + 6\text{O}_2 \rightarrow 4\text{CO}_2 + 6\text{H}_2\text{O}$  00

Заг-уе ~ 5 100

1.  $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{OH} + \text{HBr} \xrightarrow{t} \text{CH}_3\text{-CH}_2\text{-CH}_2\text{Br} (\text{X}_1) + \text{H}_2\text{O}$  40
2.  $2\text{CH}_3\text{-CH}_2\text{-CH}_2\text{Br} + 2\text{Na} \rightarrow \text{C}_6\text{H}_{14} (\text{X}_2) + 2\text{NaBr}$  40
3.  $\text{C}_6\text{H}_{14} \xrightarrow{t, \text{Ni}} \text{C}_6\text{H}_6 (\text{X}_3) + 4\text{H}_2$  40
4.  $\text{C}_6\text{H}_6 + \text{HONO}_2 \xrightarrow{\text{H}_2\text{SO}_4} \text{C}_6\text{H}_5\text{NO}_2 (\text{X}_4) + \text{H}_2\text{O}$  40
5.  $\text{C}_6\text{H}_5\text{NO}_2 + 3\text{H}_2 \xrightarrow{t, \text{Ni}} \text{C}_6\text{H}_5\text{CH}_3 (\text{X}_5)$  00

Заг-уе ~ 6.

Дано:

$$V = 150 \text{ мл}$$

$$\rho = 0,8 \text{ г/см}^3$$

$$w(\text{C}_2\text{H}_5\text{OH}) = 0,96$$

Решение:

$$m(\text{C}_2\text{H}_5\text{OH}) = 150 \cdot 0,8 = 120 \text{ г}$$

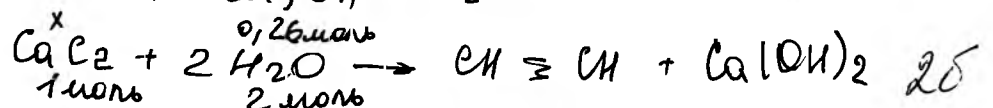
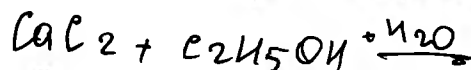
$$m(\text{зачем в-ва}) = w \cdot m(\text{р-ра})$$

$$m(\text{в-ва}) = 0,96 \cdot 120 = 115,2 \text{ г}$$

$$D = \frac{m}{M} \quad D(\text{C}_2\text{H}_5\text{OH}) = \frac{115,2}{46} = 2,5 \text{ моль}$$

$$m(\text{H}_2\text{O}) = 120 - 115,2 = 4,8 \text{ г}$$

$$D(\text{H}_2\text{O}) = \frac{4,8}{18} = 0,26 \text{ моль}$$



$$\frac{x}{1} = \frac{0,26}{2} \quad x = 0,13 \text{ моль}$$

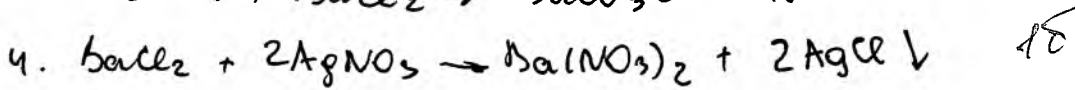
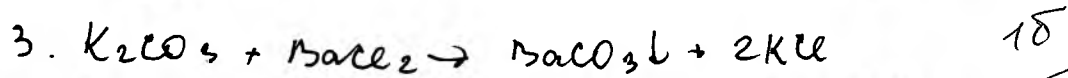
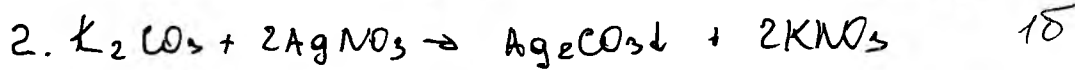
$$D(\text{CaCl}_2) = 0,13 \text{ моль}$$

$$m(\text{CaCl}_2) = 0,13 \cdot 68 = 8,842$$

Объем: 8,842 200

Трапезнический эман = 125

В-во	$\text{HNO}_3$	$\text{K}_2\text{CO}_3$	$\text{AgNO}_3$	$\text{BaCl}_2$
$\text{HNO}_3$	$\neq$	$\text{CO}_2 \uparrow$	$\neq$ δнегво- септмюи ↓	δептмюи ↓
$\text{K}_2\text{CO}_3$	$\text{CO}_2 \uparrow$	$\neq$	$\neq$	δептмюи, не раетмво- мюи в кистомас ↓
$\text{AgNO}_3$	$\neq$	δнегво- септмюи ↓	$\neq$	$\neq$
$\text{BaCl}_2$	$\neq$	δептмюи ↓	δептмюи ↓	$\neq$



- 1. 3)
- 2. 1)
- 3. 3)
- 4. 2)
- 5. 1)
- 6. 1)
- 7. 3)
- 8. 2)
- 9. 2)
- 10. 3) 205

Задание 1

В 2.

XIIГ-23 85

Задание 2 = 115

Дано

$m(\text{H}_3\text{PO}_4) - 200 \text{ г}$   
раств

$w(\text{H}_3\text{PO}_4) - 9,8\%$

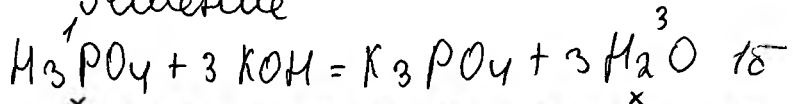
$V(\text{KOH}) - 430,8 \text{ мл}$

$w(\text{KOH}) - 5\%$

$\rho(\text{KOH}) - 1,042 \text{ г/мл}^3$

$w(\text{K}_3\text{PO}_4) - ?$

Решение



$m(\text{H}_3\text{PO}_4) = 200 \cdot 0,098 = 19,6 \text{ г}$

$\nu(\text{H}_3\text{PO}_4) = \frac{19,6}{98} = 0,2 \text{ моль}$

$m(\text{KOH}) = 1,04 \cdot 430,8 = 448,032 \text{ г}$   
 $m = \rho \cdot V$

$m(\text{KOH}) = m(\text{раств}) \cdot w(\text{в-ва})$

$m(\text{KOH}) = 448,032 \cdot 0,05 = 22,4016 \text{ г}$

$\nu(\text{KOH}) = \frac{22,4016}{56} = 0,4 \text{ моль}$

Т.к.  $\text{H}_3\text{PO}_4$  в недостатке, то расчет введем по его количеству.

$\nu(\text{H}_3\text{PO}_4) = \nu(\text{K}_3\text{PO}_4) = 0,2 \text{ моль}$

$m(\text{K}_3\text{PO}_4) = \nu \cdot M$

$m(\text{K}_3\text{PO}_4) = 0,2 \cdot 212 = 42,4 \text{ г}$

$M(\text{K}_3\text{PO}_4) = 117 + 3 \cdot 1 + 64 = 212 \text{ г/моль}$

$\frac{\rho(\text{H}_2\text{O})}{\rho(\text{H}_3\text{PO}_4)} \cdot \frac{1}{3}$

$\rho(\text{H}_2\text{O}) = \rho(\text{H}_3\text{PO}_4) \cdot 3 \quad \rho(\text{H}_2\text{O}) = 3 \cdot 0,2 = 0,6 \text{ моль}$

$m(\text{H}_2\text{O}) = m \cdot \rho$

$m(\text{H}_2\text{O}) = 0,6 \cdot 18 = 10,8 \text{ г}$

$$m(\text{смеси}) = m(\text{H}_3\text{PO}_4) + m(\text{KOH}) - m(\text{H}_2\text{O})$$

$$m(\text{смеси}) = 200 + 448,032 - 10,8 = \cancel{867,232} = 648,032 \text{ г}$$

$$w(\text{K}_3\text{PO}_4) = \frac{42,4}{637,232} = 6,65\%$$

Ответ: 6,65%

Задача 3 = 5 б

Дано

$$m(\text{смеси}) = 11,22$$

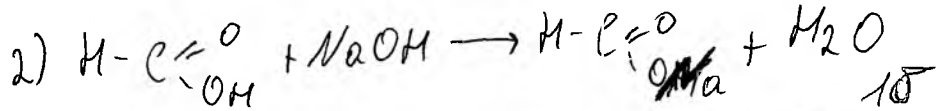
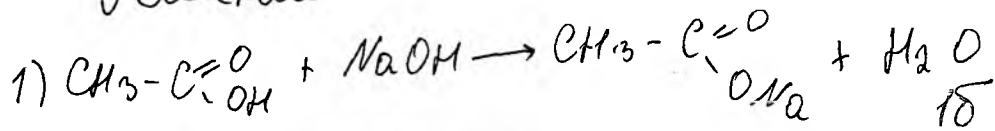
$$V(\text{NaOH}) = 51,92 \text{ мл}$$

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

$$\rho(\text{NaOH}) = 1,682$$

$w(\text{глицерол})$

Решение



$$m(\text{NaOH}) = 1,08 \cdot 51,92 = 56,072 \text{ г}$$

$$m(\text{г. в.}) = m(\text{раств.}) \cdot w(\text{г. в.})$$

$$m(\text{NaOH})_{\text{г. в.}} = 56,07 \cdot 0,1 = 5,6072 \text{ г}$$

$$\nu(\text{NaOH}) = \frac{5,607}{40} = 0,140175 \text{ моль}$$

В обеих реакциях расходуется одинаковое кол-во NaOH  $\Rightarrow$  в первой реакции

$$\nu(\text{NaOH}) = \frac{0,14}{2} = 0,07 \text{ моль}$$

$$\nu_2(\text{NaOH}) = \frac{0,14}{2} = 0,07 \text{ моль}$$

$$\nu_1(\text{NaOH}) = \nu(\text{C}_2\text{H}_4\text{O}_2) = 0,07 \text{ моль}$$

$$\nu_2(\text{NaOH}) = \nu(\text{C}_2\text{H}_2\text{O}_2) = 0,07 \text{ моль}$$

$$m(\text{C}_2\text{H}_4\text{O}_2) = \nu \cdot M$$

$$m(\text{C}_2\text{H}_4\text{O}_2) = 0,07 \cdot 48 = 3,36 \text{ г}$$

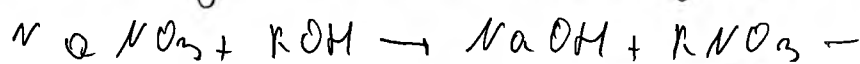
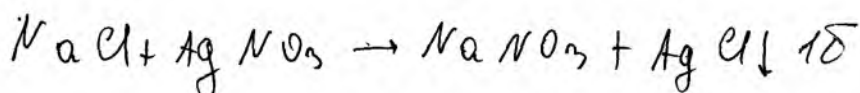
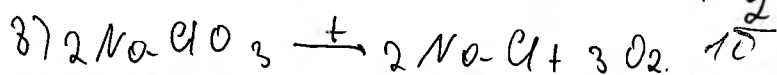
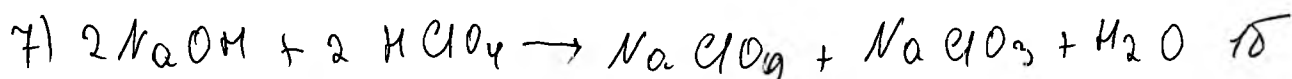
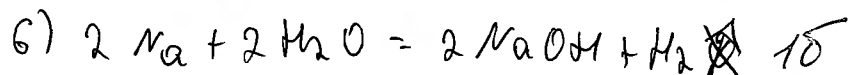
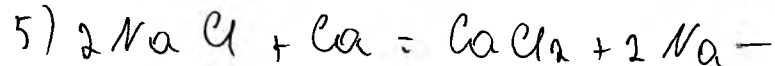
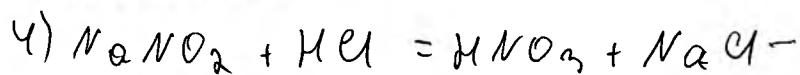
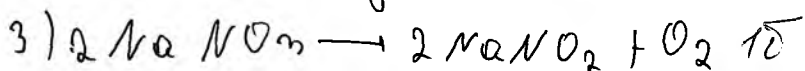
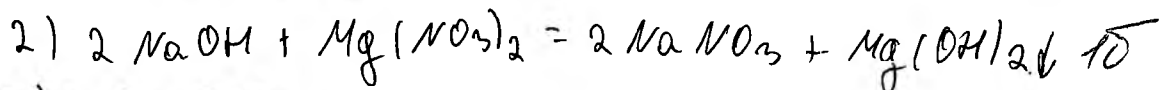
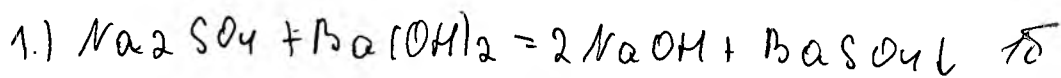
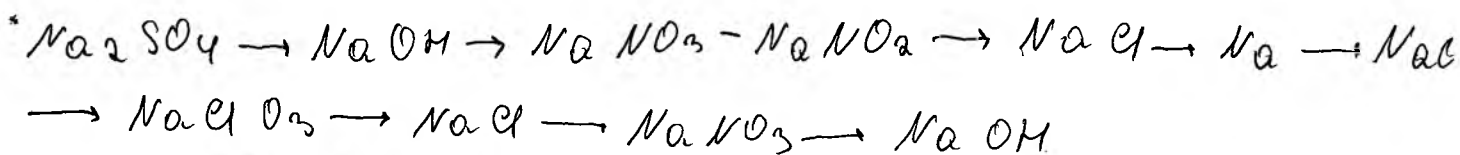
$$m(\text{C}_2\text{H}_2\text{O}_2) = 0,07 \cdot 46 = 3,22 \text{ г}$$

$$w(\text{C}_2\text{H}_2\text{O}_2) = \frac{3,22}{11,2} = 2,875\%$$

$$w(\text{C}_2\text{H}_4\text{O}_2) = \frac{3,36}{11,2} = 3\%$$

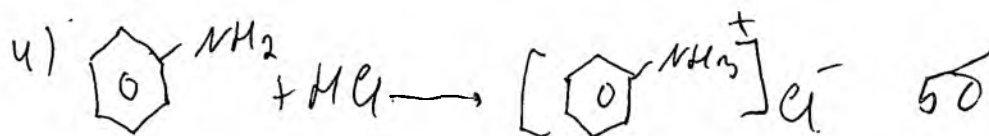
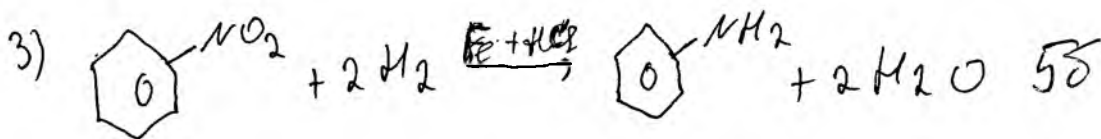
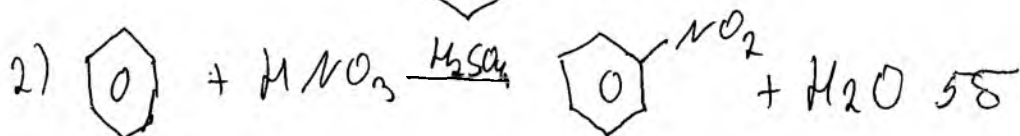
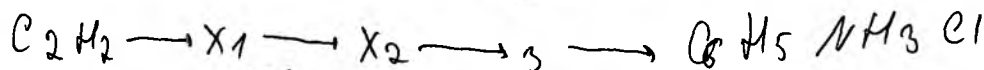
Задача 4





$\checkmark$

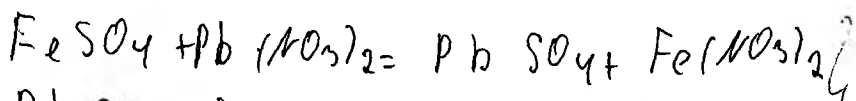
### Задача 5



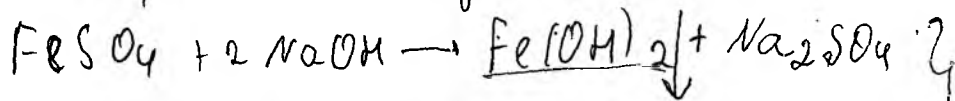
200

# Задача 6 (кислородный)

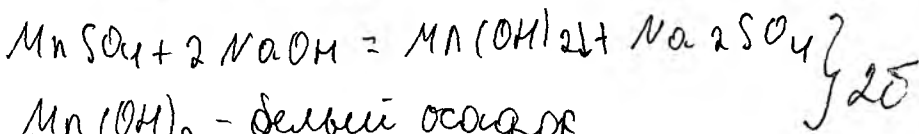
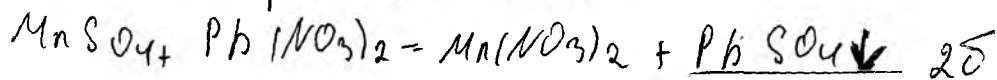
Вещество	FeSO <sub>4</sub>	MnSO <sub>4</sub>	H <sub>2</sub> SO <sub>4</sub>	Pb(NO <sub>3</sub> ) <sub>2</sub>	NaOH	H <sub>2</sub> O <sub>2</sub>
№1 FeSO <sub>4</sub>	-	-	-	↓	↓	
№2 MnSO <sub>4</sub>	-	-	-	↓	↓	↑
№3 H <sub>2</sub> SO <sub>4</sub>	-	-	-	↓	H <sub>2</sub> O	
№4 Pb(NO <sub>3</sub> ) <sub>2</sub>	↓	↓	↓	-	↓	
№5 NaOH	↓	↓	-	↓	≠	*
H <sub>2</sub> O <sub>2</sub>					↑	-



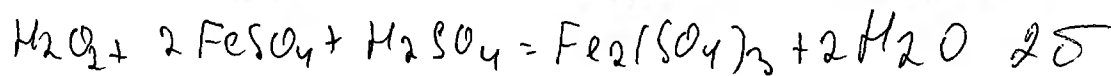
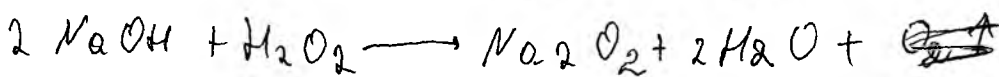
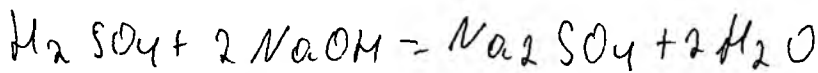
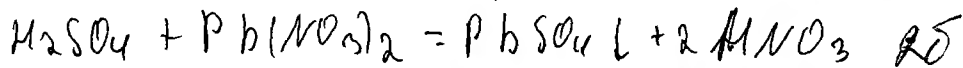
PbSO<sub>4</sub> - белый осадок 2б



Fe(OH)<sub>2</sub> - ~~красновато-бурый~~ белый осадок ↓ 2б



Mn(OH)<sub>2</sub> - белый осадок



18б