



ШИФР

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9-12

Номер варианта	3		
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Класс 9 Вариант 3 Дата Олимпиады 24.02.2018

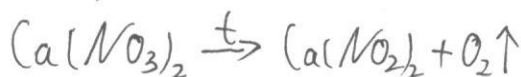
Площадка написания УГНТУ

Задача	1	2	3	4	5	6	Σ		Подпись
							Цифрой	Прописью	
Оценка	5	5	5	5	3	5	28,0	двадцать восемь	

№1



$m(Ca) : m(N) : m(O) = 24,39 : 14,04 : 58,54$. Разделим эти числа на молярные массы элементов.
 $n(Ca) : n(N) : n(O) = 0,61 : 1,22 : 3,66 = 1 : 2 : 6 \Rightarrow$ вещество А - $Ca(NO_3)_2$



№2

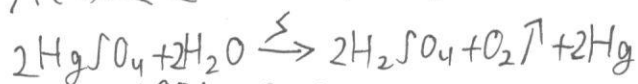
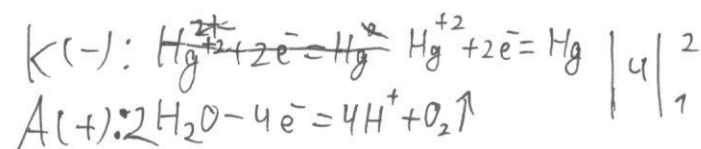
Дано:

$m_{r-га1} = 1452$
 $m_{r-га2} = 3452$
 $w_1 = 10\%$
 $w_2 = 16\%$
 $w_3 = ?$

$m(NH_4NO_3)_1 = m_{r-га1} \cdot w_1 = 1452 \cdot 0,1 = 145,2$
 $m(NH_4NO_3)_2 = m_{r-га2} \cdot w_2 = 3452 \cdot 0,16 = 602$
 $w_3 = \frac{m_1 + m_2}{m_{r-га1} + m_{r-га2}} = \frac{145,2 + 602}{1452 + 3452} = 0,1409 \cdot 100\% = 14,09\%$

Ответ: 14,09%.

№3



$n(O_2) = \frac{V(O_2)}{V_{н.з.}} = \frac{3,36 \text{ л}}{22,4 \frac{\text{л}}{\text{моль}}} = 0,15 \text{ моль}$

$\frac{n(O_2)}{n(Hg)} = \frac{1}{2} \Rightarrow n(Hg) = 2n(O_2) = 0,3 \text{ моль}$

$m(Hg) = M \cdot n = 201 \frac{\text{г}}{\text{моль}} \cdot 0,3 \text{ моль} = 60,3 \text{ г}$

Ответ: 60,3 г.

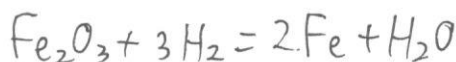
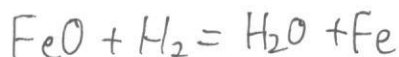


$$(ab)c = a(bc)$$

$$E = mc^2$$



№4



$$m(FeO + Fe_2O_3) = 148 \text{ г}, m(Fe) = 112 \text{ г}. n_1(Fe) = n(FeO), n_2(Fe) = 2n(Fe_2O_3)$$

$$\text{Пусть } n(FeO) = x, n(Fe_2O_3) = y, \text{ тогда:}$$

$$\begin{cases} 72x + 160y = 148 \\ 56x + 112y = 112 \end{cases} \Leftrightarrow \begin{cases} 18x + 40y = 37 \\ x + 2y = 2 \end{cases} \Leftrightarrow \begin{cases} 36 - 36y + 40y = 37 \\ x = 2 - 2y \end{cases} \Leftrightarrow \begin{cases} 4y = 1 \\ x = 2 - 2y \end{cases} \Leftrightarrow \begin{cases} y = 0,25 \\ x = 1,5 \end{cases}$$

$$n(FeO) = 1,5 \text{ моль}, n(Fe_2O_3) = 0,25 \text{ моль}$$

$$m(FeO) = n \cdot M = 108 \text{ г}$$

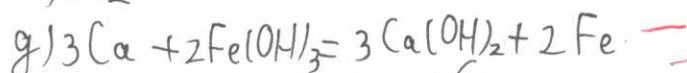
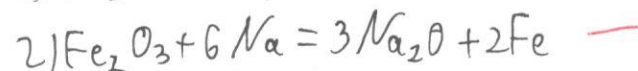
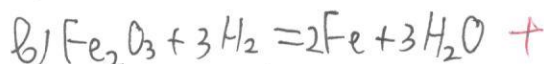
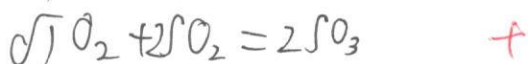
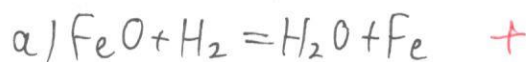
$$m(Fe_2O_3) = n \cdot M = 40 \text{ г}$$

$$w(FeO) = \frac{m}{m_{\text{смеси}}} = 72,97\%$$

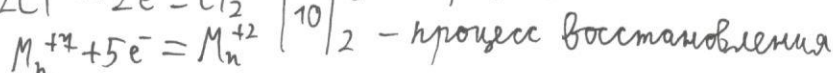
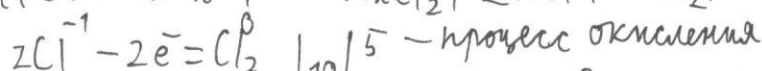
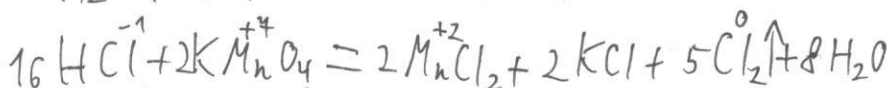
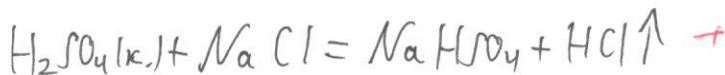
$$w(Fe_2O_3) = \frac{m}{m_{\text{смеси}}} = 27,03\%$$

Ответ: 72,97% FeO, 27,03% Fe₂O₃

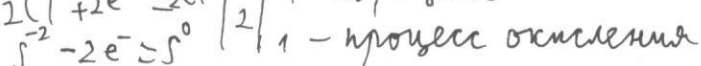
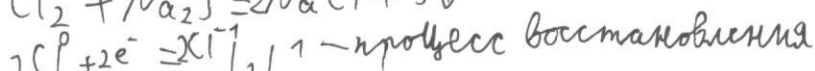
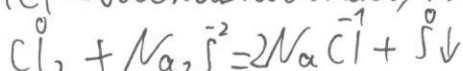
№5



№6



HCl - восстановитель, KMnO₄ - окислитель.



Cl₂ - окислитель, S - Na₂S - восстановитель.