



**ОТРАСЛЕВАЯ
ОЛИМПИАДА
ШКОЛЬНИКОВ**

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

$$E=mc^2$$



Использовать только эту сторону листа,
обратная сторона не проверяется!

16:05

ШИФР 20139

Класс 9

Вариант 2

Дата Олимпиады 24.02.18

Площадка написания РГУ НЕФТИ И ГАЗА (НИУ) имени И.М.Губкина

Задача	1	2	3	4	5	6	Σ		Подпись
	Цифрой	Прописью							
Оценка	5 5 5 5 5 5	тридцать	30	тридцать					<i>Юрий</i>

§2.

Дано:

$$\begin{aligned} m(\text{б-ба})_1 &= 200 \text{ г} \\ \omega(\text{CuSO}_4)_1 &= 10\% \\ m(\text{б-ба})_2 &= 340 \text{ г} \\ \omega(\text{CuSO}_4)_2 &= 16\% \\ \frac{\omega(\text{CuSO}_4)_3}{\omega(\text{CuSO}_4)_3} &=? \end{aligned}$$

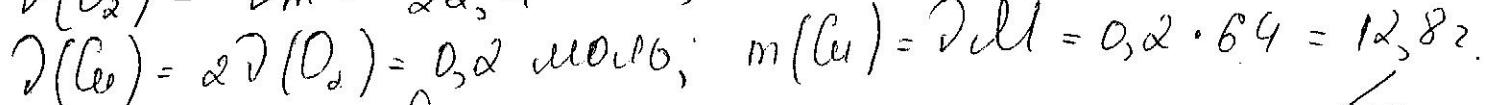
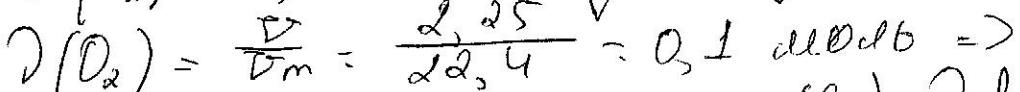
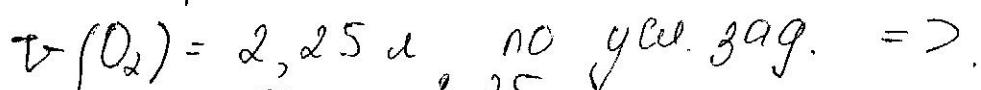
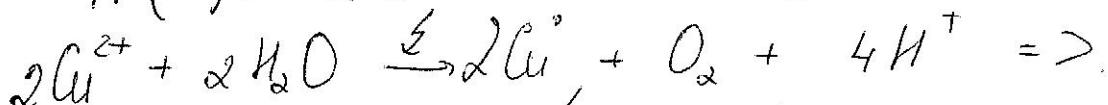
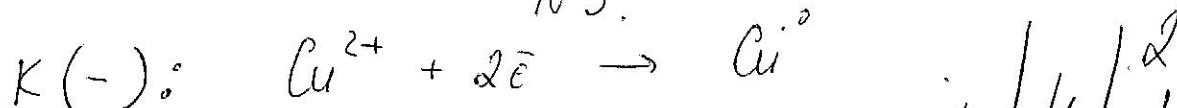
Решение:

$$\begin{aligned} m(\text{CuSO}_4)_1 &= m \cdot \omega \cdot 100 = 200 \cdot 0,1 = 20 \text{ г} ; \\ m(\text{CuSO}_4)_2 &= 340 \cdot 0,16 = 54,4 \text{ г} ; \\ m(\text{б-ба})_3 &= 200 + 340 = 540 \text{ г} ; \Rightarrow \\ \omega(\text{CuSO}_4)_3 &= \frac{m(\text{CuSO}_4)_1 + m(\text{CuSO}_4)_2}{m(\text{б-ба})_3} \cdot 100\% = \\ &= \frac{20 + 54,4}{540} \cdot 100\% = 13,78\% \end{aligned}$$

Ответ: 13,78%.

/5

§3.



Ответ: 12,8 г.

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§4.

Дано:

$$m(Cu + Ag) = 2,8 \text{ г.}$$

$$m(\text{нитратов}) = 5,28 \text{ г.}$$

$$\begin{aligned} \omega(Cu) &= ? \\ \omega(Ag) &= ? \end{aligned}$$

Пусть $x - \omega(Cu)$,

$$m(Cu) = 64x \text{ (д.м.)},$$

$$\omega(Cu(NO_3)_2) = x \text{ моль},$$

$$m(Cu(NO_3)_2) = 188x,$$

$$\begin{cases} 64x + 108y = 2,8 \\ 188x + 170y = 5,28 \end{cases}$$

$$64x = 2,8 - 108y$$

$$x = 0,04375 - 1,6875y$$

$$188(0,04375 - 1,6875y) + 170y = 5,28.$$

~~$$8,225 - 0,0738y + 170y = 5,28.$$~~

$$8,225 - 317,25y + 170y = 5,28.$$

$$147,25y = 2,945 \Rightarrow \omega(Ag) = m(Ag) = 2,945 \text{ г.}$$

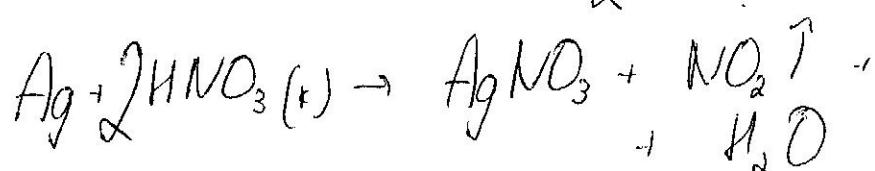
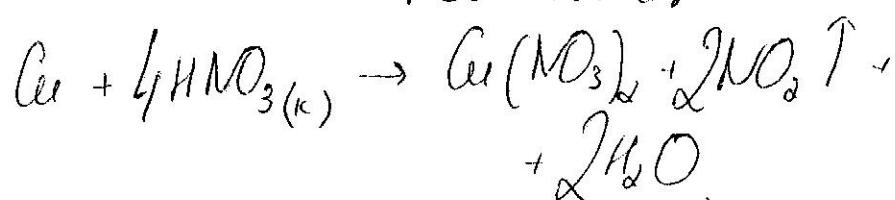
$$y = 0,02 \text{ (моль)} = 0,02 \cdot 108 = 2,16 \Rightarrow m(Cu) = 2,8 - 2,16 = 0,64 \text{ г.}$$

$$\omega(Cu) = \frac{0,64}{2,8} \cdot 100\% = 22,86\%.$$

$$\omega(Ag) = \frac{2,16}{2,8} \cdot 100\% = 77,14\%$$

Ответ: $\omega(Cu) = 22,86\%$;

решение:



$y - \omega(Ag), \text{ моль}$

$$m(Ag) = 108y,$$

$$\omega(AgNO_3) = y \text{ моль},$$

$$m(AgNO_3) = 170y, \Rightarrow$$

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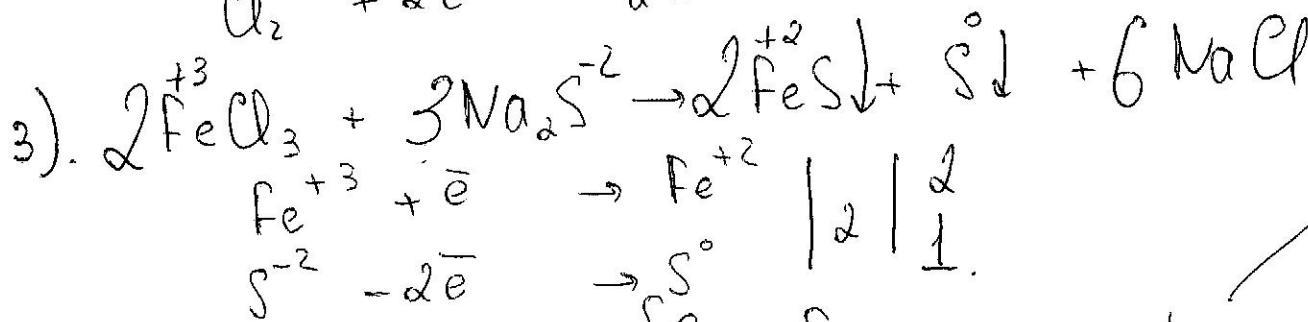
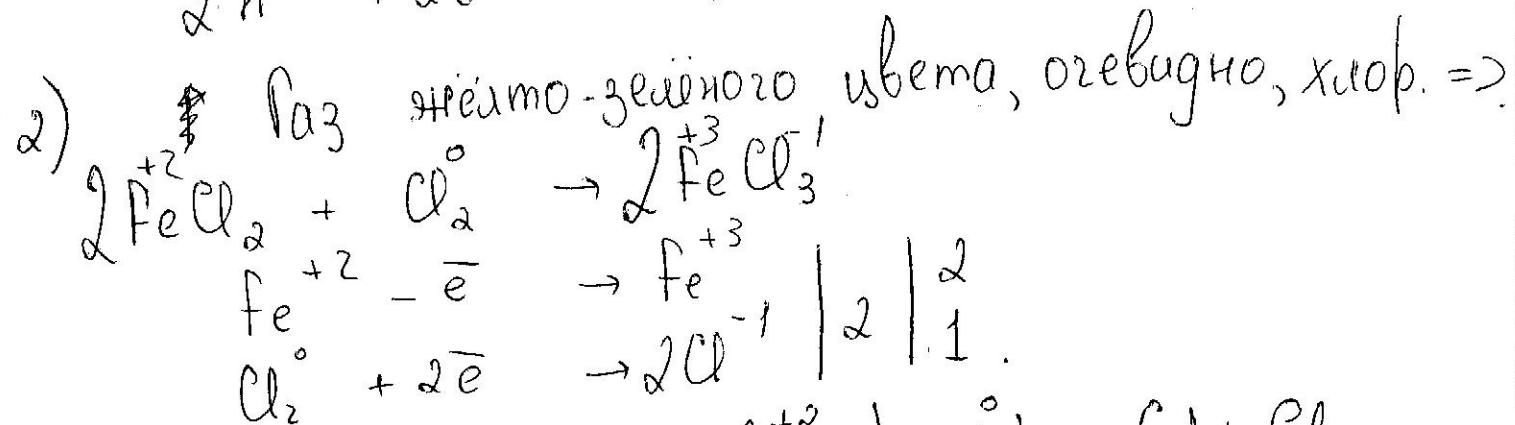
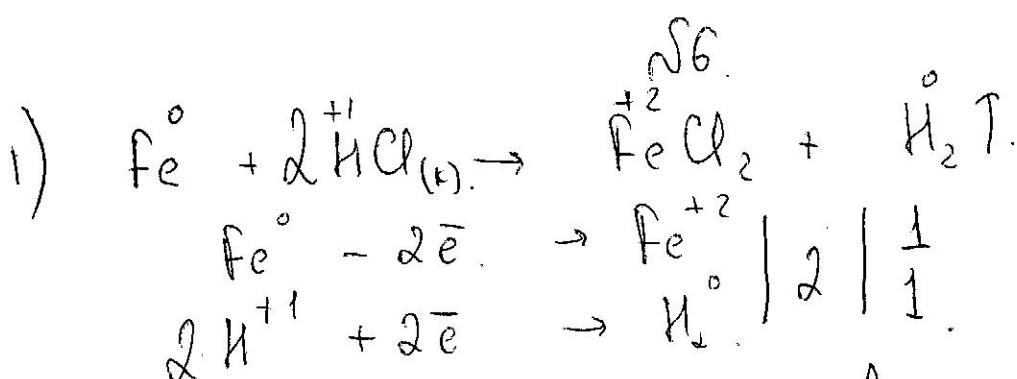
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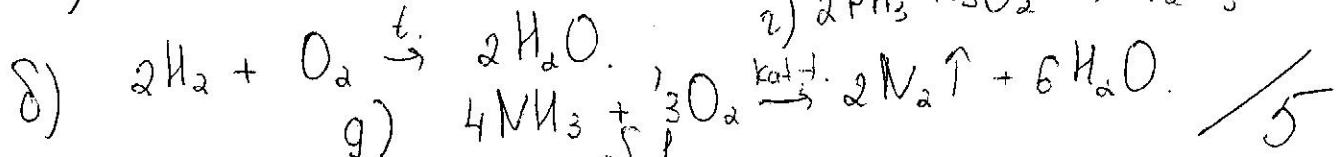
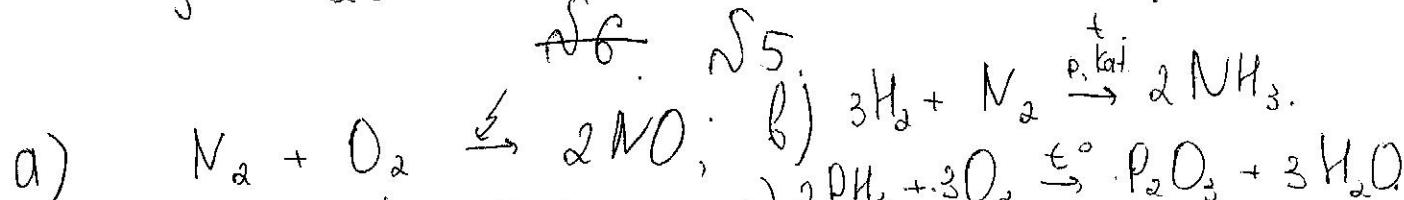
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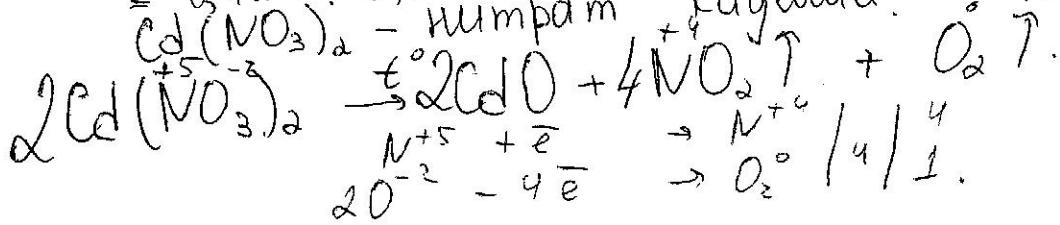


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Нужно найти $\text{Cd}\text{N}_2\text{O}_6$ и $m(D)$
 тогда $m(Cd) = 47,46$; $m(N) = 11,86$; $m(D) = 40,68$;
 $\sigma(Cd) = \frac{m}{M} = \frac{47,46}{112} = 0,424$ моль; $\sigma(N) = \frac{11,86}{14} = 0,847$ моль;

$\sigma(D) = \frac{40,68}{16} = 2,5425$ моль $\Rightarrow \sigma(Cd) : \sigma(N) : \sigma(D) =$

$0,424 : 0,847 : 2,5425 = 1 : 2 : 6 \Rightarrow \text{CdN}_2\text{O}_6$ или
 $\text{Cd}(\text{NO}_3)_2$ - нитрат кадмия.



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