

<p>№1</p> <p><math>m(\text{Zn}) = 40 \text{ г}</math> <math>m(\text{S}) = 30 \text{ г}</math></p> <p>1) <math>w(\text{Zn}); w(\text{S}) = ?</math> 2) <math>m(\text{HBr}) = ?</math> 3) <math>D = ?</math></p> <p>Омбет: 1) <math>w(\text{Zn}) = 40\%</math> <math>w(\text{S}) = 30\%</math> 2) <math>m(\text{HBr}) = 46,14 \text{ г}</math></p>	<p>Решение</p> <p>1) <math>w_{\text{вещ}} = \frac{m_{\text{вещ}}}{m_{\text{смеси}}} \cdot 100\%</math></p> <p><math>m_{\text{смеси}} = 40 + 30 = 70</math></p> <p><math>w(\text{Zn}) = \frac{40}{70} \cdot 100\% = 40\%</math> <math>w(\text{S}) = \frac{30}{70} \cdot 100\% = 30\%</math></p> <p>3) <math>D = D \cdot M</math>    <math>M = 29</math>    <math>D</math></p>	<p>2) <math>n(\text{Zn}) = \frac{40}{65,39} = 1,04 \text{ моль}</math> <math>n(\text{S}) = \frac{30}{32} = 0,94 \text{ моль}</math> <math>n(\text{HBr}) = n(\text{HBr}) = 0,94 \text{ моль}</math> <math>m(\text{HBr}) = 0,94 \cdot (1+80) = 46,14 \text{ г}</math></p>
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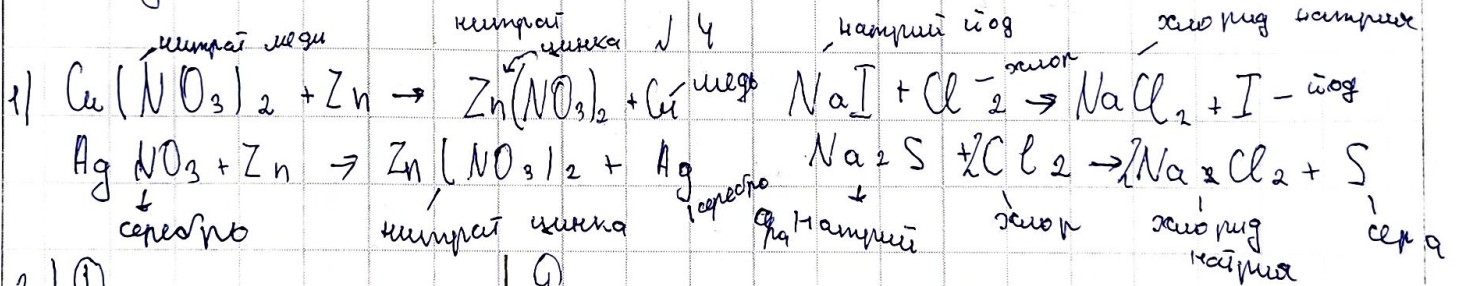
<p>Дано</p> <p><math>m(\text{HNO}_3) = 5 \text{ г}</math></p> <p>1) <math>m(\text{HCl}) = ?</math> 2) <math>V = ?</math></p>	<p>Решение</p> <p>1) <math>n(\text{HNO}_3) = \frac{5}{(1+14+46-3)} = 0,08 \text{ моль}</math>    <math>n = \frac{m}{M}</math></p> <p><math>m(\text{HCl}) = n \cdot M = 0,08 \cdot (1+35,5) = 2,92 \text{ г}</math></p> <p>2) <math>m = 0,584</math>    <math>V = n \cdot V</math>    <math>V = 22,4 \text{ л}</math></p> <p><math>m = V \cdot \rho</math>    <math>V = \frac{m}{\rho}</math>    <math>V = \frac{0,584}{1,19279} = 0,049 \text{ л}</math>    <math>V = 0,00479 \text{ л}</math></p>	<p>№2</p> <p>Омбет: <math>m = 2,922</math> <math>V = 0,00479 \text{ л}</math></p>
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<p>1) Дано</p> <p><math>m = 4,4 \text{ кг}</math> <math>T_1 = 25^\circ \text{C}</math> <math>T_2 = 100^\circ \text{C}</math> <math>c_s = 4186 \text{ Дж} \cdot \text{кг}^{-1} \cdot \text{K}^{-1}</math></p> <p><math>Q = ?</math></p>	<p>Решение</p> <p>№3</p> <p><math>Q = m c_s \Delta T</math>    <math>\Delta T = 100 - 25 = 75^\circ \text{C}</math> <math>Q = 4,4 \cdot 4186 \cdot 75 = 533715 \text{ Дж}</math></p> <p>Омбет: <math>533715 \text{ Дж}</math></p>
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<p>2) Дано</p> <p><math>c_s = 4186 \text{ Дж} \cdot \text{кг}^{-1} \cdot \text{K}^{-1}</math> <math>\rho_{\text{вода}} = 1 \text{ г} \cdot \text{см}^{-3}</math> <math>V_{\text{вода}} = 3,36 \cdot 10^5 \text{ Дж} \cdot \text{кг}^{-1}</math></p> <p><math>Q = ?</math></p>	<p>Решение</p> <p>1) <math>Q = c m \Delta T</math>    <math>Q = 4186</math>    <math>m = V \cdot \rho</math></p> <p>2) <math>Q = \lambda m</math>    <math>Q = c \cdot T \cdot L F</math>    <math>Q = 4186</math></p>
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Дано  
 $t = 120 \text{ с}$   
 $k = 0,084 \text{ Вт м}^{-1} \text{ К}^{-1}$   
 $A = 0,15 \text{ м}^2$   
 $d = 0,25 \text{ мм}$   
 $T_1 = 15^\circ \text{C}$   
 $\rho = 3,36 \cdot 10^5 \text{ Дж м}^{-3} \text{ К}^{-1}$   
 $T_2 = 0 \text{ C (Температура воды)}$   
 $m \text{ шуда?}$

№ 3.3  
 Решение  
 $\frac{Q}{t} = \frac{k \cdot A \cdot \Delta T}{d} = \frac{0,084 \cdot 0,15 \cdot 15}{0,25} = 0,756$   
 $\frac{Q}{t} = 0,756 \quad Q = t \cdot k \quad Q = 0,756 \cdot 120 = 90,72 \text{ Дж}$   
 $Q = \rho \cdot m$   
 $m = \frac{Q}{\rho} = \frac{90,72}{3,36 \cdot 10^5} = 0,0027 \text{ кг}$



2) Дано  
 $V = 100 \text{ мл}$   
 $w_1 = w_2$   
 $\rho = 1,18 \text{ г/мл}$   
 $V(\text{NaCl}) = 10 \text{ мл}$   
 $m(\text{Zn}) = ?$

Решение  
 $m = n \cdot M \quad V = n \cdot V_m \quad V_{\text{взв}} = 100 : 2 = 50 \text{ мл}$   
 $w = \frac{V_{\text{взв}}}{V_{\text{раств}}}$   
 $n(\text{NaCl}) = \frac{10}{22,4} = 0,45 \text{ моль}$   
 $m(\text{Zn}) = 0,45 \cdot 65,4 = 29,4$   
 $m = V \cdot \rho$   
 $m(\text{AgNO}_3) = m(\text{Zn(NO}_3)_2) = 50 \cdot 1,18 = 59 \text{ г}$   
 $n(\text{NaCl}) = \frac{10}{22,4} = 0,45 \text{ моль} \quad m(\text{NaCl}) = 0,45 \cdot 58,5 = 26,32 \text{ г}$   
 $m(\text{Zn}) = 59 - 26,32 = 32,68 \text{ г}$



№1.

1.  $Zn + S = ZnS$

$w(Zn) = \frac{65}{97} \cdot 100\% = 67\%$

$w(S) = \frac{32}{97} \cdot 100\% = 32,9\% \approx 33\%$

2.  $ZnS + 2HBr = H_2S + ZnBr_2$   
 $n = 1 \text{ моль} \quad n = 2 \text{ моль}$

$M = 97 \text{ г/моль} \quad M = 216 \text{ г/моль}$   
 $m = 97 \text{ г} \quad m = 162 \text{ г}$   
 $\frac{100 \text{ г}}{97 \text{ г}} = \frac{x \text{ г}}{162 \text{ г}} \quad x = \frac{100 \cdot 162}{97} = 167 \text{ г.}$

3.  $ZnBr_2$  және  $H_2S$   
225 г                      4 г

$\frac{225 \text{ г}}{22,4} \text{ және } \frac{4 \text{ г}}{22,4} \Rightarrow 10,045 \cdot 10^3 \text{ м}^3 \text{ және } 0,177 \cdot 10^3 \text{ м}^3$

№3

1) Берілгені:

$m = 1,7 \text{ кг}$   
 $T_1 = 25^\circ\text{C}$   
 $T_2 = 100^\circ\text{C}$   
 $C_s = 4186 \text{ Дж/кг} \cdot \text{K}$   
 $Q = ?$

CU  
298,15 K  
373,15 K

Менші:  
 $Q = mc_s \Delta T$   
 $\Delta T = T_2 - T_1$   
 $\Delta T = 373,15 - 298,15 = 75 \text{ K}$   
 $Q = 1,7 \text{ кг} \cdot 4186 \text{ Дж/кг} \cdot \text{K} \cdot 75 \text{ K} = 533715 \text{ Дж} = 5,34 \text{ МДж.}$

2) Берілгені:

$L_f = 3,36 \cdot 10^5 \text{ Дж/кг}$   
 $C_s = 4186 \text{ Дж/кг} \cdot \text{K}$   
 $\rho = 1 \text{ г/см}^3$   
 $V = ?$

Менші:  
 $Q = mc_s \Delta T$   
 $Q = m \cdot 114 \cdot 10^4$   
 $m = \frac{114 \cdot 10^4}{53600} = 39 \text{ кг.}$   
 $V = \frac{39}{1} = 39 \text{ л.}$

3) Берілгені:

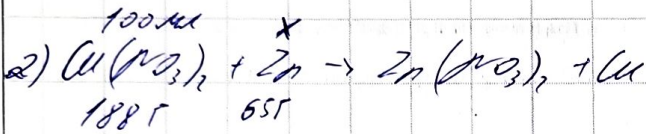
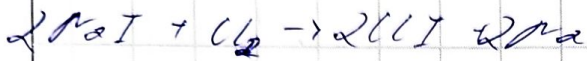
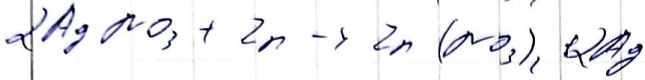
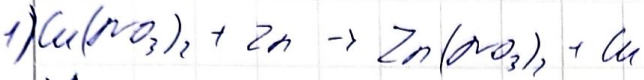
$t = 2 \text{ мм}$   
 $K = 0,084 \text{ Вт/м} \cdot \text{K}$   
 $A = 0,15 \text{ м}^2$   
 $d = 0,25 \text{ мм}$   
 $T = 15^\circ\text{C}$   
 $m = ?$

CU  
120 C  
25 · 10<sup>5</sup> м.  
288,15 K

Менші:  
 $\frac{Q}{t} = \frac{KA(T_1 - T_2)}{d}$   
 $m L_f = \frac{KA(T_1 - T_2)}{d}$   
 $m \cdot 3,36 \cdot 10^5 = \frac{0,084 \cdot 0,15 \cdot 288,15}{0,00025 \text{ м.}}$   
 $m = \frac{3,53069}{3,36 \cdot 10^5} = 1,05 \cdot 10^{-6} \text{ кг.}$   
Мағына:  $m \approx 5,2 \text{ кг.}$   
 $m = \frac{435,6828}{84} = 5,186 \text{ кг.}$

$L = 3,36 \cdot 10^5$

№1.



$\frac{100}{188} = \frac{x}{65} \Rightarrow x = \frac{100 \cdot 65}{188} = 34,57 \text{ г}$



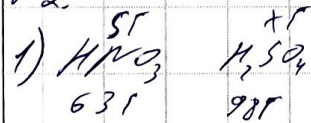
$\frac{100}{340} = \frac{x}{65} \Rightarrow x = \frac{65 \cdot 100}{340} = 19,12 \text{ г}$

~~1)  $100 \text{ мм} \cdot 100 \text{ мм}$~~

~~$m = 100 + 100 = 200 \text{ г}$~~



№2.



$\frac{5}{63} = \frac{x}{98} \Rightarrow x = \frac{5 \cdot 98}{63} = 7,78 \text{ г}$

~~2)  $20\% (HNO_3) = \frac{m}{61} \cdot 100 \text{ мм}$~~

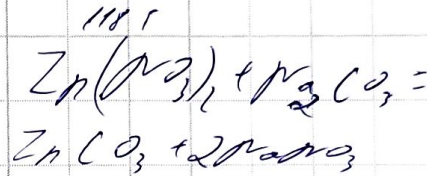
2)  $20\% (HNO_3) = \frac{m}{61} \cdot 100 \text{ мм}$

$m = \frac{20 \cdot 61}{100} = 12,2 \text{ г}$

$V = \frac{12,2}{1,219} \approx 10 \text{ мл}$

Мәңгілік:  $V = 10 \text{ мл}$

$V = 10 \text{ мл}$



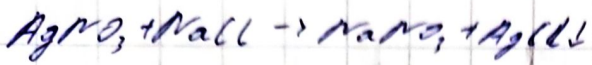
$\frac{118}{187} = \frac{x}{108} \Rightarrow x = \frac{108 \cdot 118}{187} = 67,43 \text{ г}$

$\omega = \frac{67,43}{500} \cdot 100\% = 13,49\%$



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нч.



$$n(AgNO_3) = n(NaCl) = (C_{NaCl}) \cdot V(NaCl)$$

$$w(AgNO_3) = w(Cu(NO_3)_2) = \frac{m(Cu(NO_3)_2) \cdot n(Cu(NO_3)_2)}{m_{\text{сум.}}} = \frac{M_{AgNO_3} \cdot n(AgNO_3)}{m_{\text{сум.}}}$$

$$n(Cu(NO_3)_2) = \frac{m(AgNO_3) \cdot n(AgNO_3)}{M_{Cu(NO_3)_2}}$$

$$n(AgNO_3) = n(NaCl) = (C_{NaCl}) \cdot V(NaCl)$$

$$n(Zn) = \frac{n(AgNO_3)}{2} + n(Cu(NO_3)_2)$$

$$m(Zn) = M(Zn) \cdot \left( \frac{1}{2} + \frac{m(AgNO_3)}{M_{Cu(NO_3)_2}} \right) \cdot (C_{NaCl}) \cdot V(NaCl) = 4,596 \text{ г}$$

№1  
 $Zn + S \rightarrow ZnS$   
 $n(Zn) = \frac{70}{65,38} = 1,07 \text{ моль}$   
 $n(S) = \frac{30}{32,06} = 0,93 \text{ моль}$   
 $x = \frac{94,14 \cdot 30}{32,06} = 91,14\%$   
 $\omega(Zn) = \frac{70}{91,14} \cdot 100\% = 76,74\%$   
 $\omega(S) = \frac{30}{91,14} \cdot 100\% = 32,9\%$

2.  $ZnS + 2HBr \rightarrow ZnBr_2 + H_2S$   
 1 : 1  
 81 : 162  
 1 : 0,5  
 $n(HBr) = 0,5 \text{ моль}$

3.  $D(H_2) = \frac{m}{M}$   
 $D(H_2) = \frac{4,003}{8,006} = 0,5$   
 $D(H_2S) = \frac{37,076}{...}$

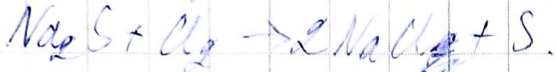
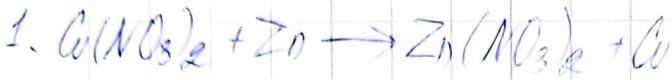
№2.  
 1.  $H_2SO_4$   
 $M = 98,076 \text{ г/моль}$   
 $n(HNO_3) = 163,018$   
 $x = 7,782$   
 2.  $p = 1,219 \text{ г/мл}$   
 $HNO_3 + NaOH \rightarrow NaNO_3 + H_2O$   
 $\omega = 20\%$   
 $\omega = \frac{m}{m} \cdot 100\%$   
 $20\% = \frac{x}{39,998} \cdot 100\%$   
 $x = 7,9996$

№3.  
 1.  $Q = mc\Delta T$   
 $c = 4186 \text{ Дж/кг} \cdot \text{K}$   
 $m = 1,4 \text{ кг}$   
 $T_1 = 25^\circ C = 298,15 \text{ K}$   
 $T_2 = 75^\circ C = 373,15 \text{ K}$   
 $\Delta T = 373,15 \text{ K} - 298,15 \text{ K} = 75 \text{ K}$   
 $Q = 1,4 \cdot 4186 \cdot 75 = 538715 \text{ Дж}$   
 2.  $T_1 = 0^\circ C = 273,15 \text{ K}$   
 $T_2 = 373,15 \text{ K}$   
 $L = 3,36 \cdot 10^5 \text{ Дж/кг}$   
 $c = 4186 \text{ Дж/кг} \cdot \text{K}$   
 $\rho = 1000 \text{ кг/м}^3$   
 $V = 1 \text{ м}^3 = 1000 \text{ л}$   
 $Q = mc\Delta T + V\rho L$   
 $\frac{Q}{m} = \frac{m}{M(H_2O)} = 0,09$   
 $Q_1 = 1000 \cdot 4186 \cdot 100 = (84389760 \text{ Дж}) \cdot 10^8 \text{ Дж}$   
 $Q_2 = mL = 350 \cdot 3,36 \cdot 10^5 = 1176 \cdot 10^5 \text{ Дж}$   
 $Q = Q_1 + Q_2 = 1176 \cdot 10^5 + 10000 \cdot 10^5 = 11176 \cdot 10^5 \text{ Дж}$

3.  $\frac{Q}{V} = \frac{KA(T_2 - T_1)}{d}$   
 $\frac{m \cdot 3,36 \cdot 10^5}{120} = \frac{0,087 \cdot 0,15(0-15)}{0,25 \cdot 10^{-3}}$   
 $\frac{m \cdot 3,36 \cdot 10^5}{120} = 0,689$   
 $\frac{m \cdot 3,36 \cdot 10^5}{120} = 0,456 \cdot 10^3$   
 $V = \frac{m}{\rho}$   
 $m = 27 \cdot 10^{-5} \text{ кг}$   
 $V = \frac{7,9996}{1,219} = 6,56 \text{ мл}$



№24.



2.

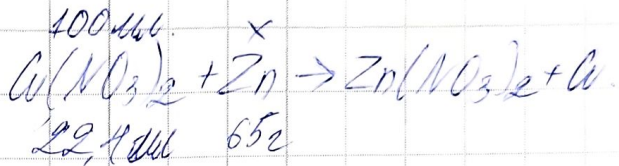
$\omega(Cu(NO_3)_2) = \omega(AgNO_3)$

$\rho = 1,18 \text{ г/мл}$

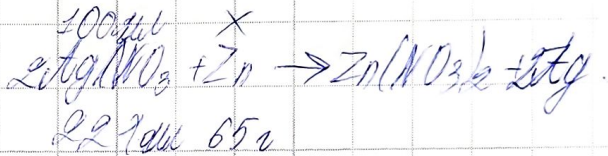
$V(Ag) = 100 \text{ мл}$

$V(NaCl) = 10 \text{ мл}$

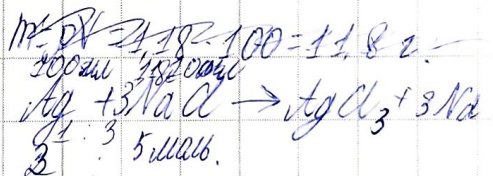
$\frac{\text{---}}{\text{---}} = \frac{100\%}{\text{---}} \cdot 100\%$



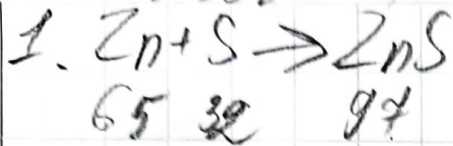
$x = 290 \text{ г}$



$x = 145 \text{ г}$



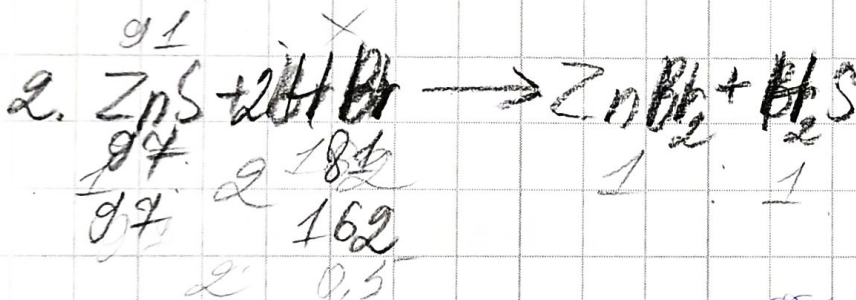
$m = 324 \text{ г} \quad m = 11,8 \text{ г}$

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$$x = \frac{30 \cdot 97}{32} = 90,9 \approx 91$$

$$\omega = \frac{70}{91} \cdot 100\% \Rightarrow 76,92 \approx 77\%$$

$$\omega = \frac{30}{91} \cdot 100\% = 32,96 \approx 33\%$$



$$1:0,5$$

$$1:0,5$$

$$3. D(\text{H}_2) = \frac{1}{2} =$$

D(