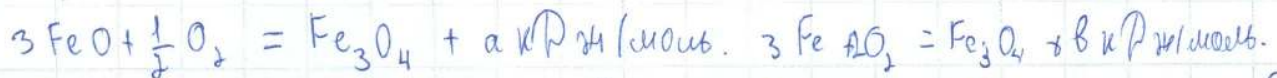
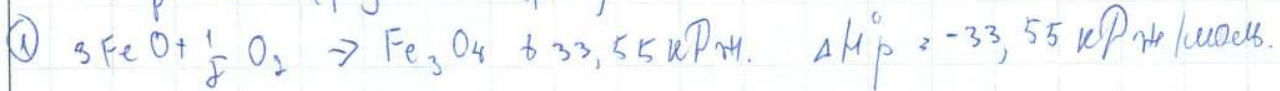


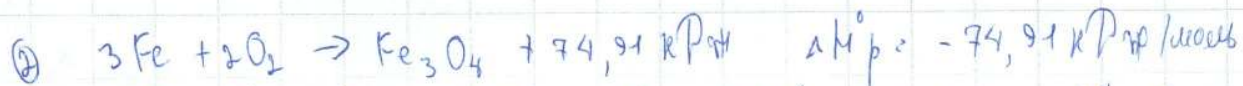
№2.



$$\Delta H_p^\circ = \sum M^\circ(\text{prod}) - \sum M^\circ(\text{reac})$$



$$\Delta H_p^\circ = \Delta H^\circ(\text{Fe}_3\text{O}_4) - \Delta H^\circ 3(\text{FeO})$$



$$\Delta H_p^\circ \Delta H^\circ(\text{Fe}_3\text{O}_4) - \Delta H^\circ(3\text{Fe} + 2\text{O}_2) = \Delta H^\circ(\text{Fe}_3\text{O}_4) - 0 \Rightarrow \Delta H^\circ \text{Fe}_3\text{O}_4 = 74,91 \text{ кРЖ / моль}$$

$$\Delta H_p^\circ = \Delta H^\circ(\text{Fe}_3\text{O}_4) - \Delta H^\circ 3(\text{FeO})$$

$$-33,55 = 74,91 - \Delta H^\circ 3(\text{FeO})$$

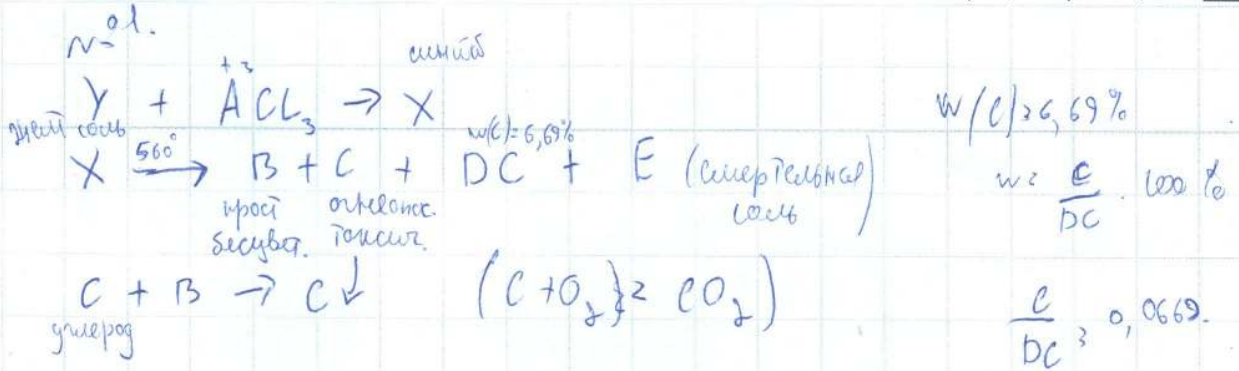
$$\text{шұғыл FeO} = x \quad \Delta H^\circ 3(\text{FeO}) = 3x.$$

$$3x - 74,91 = -33,55.$$

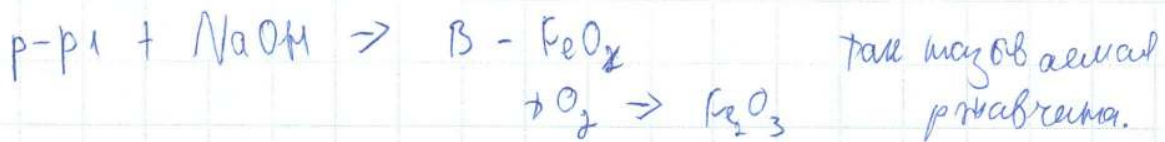
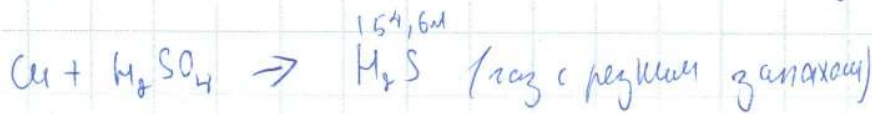
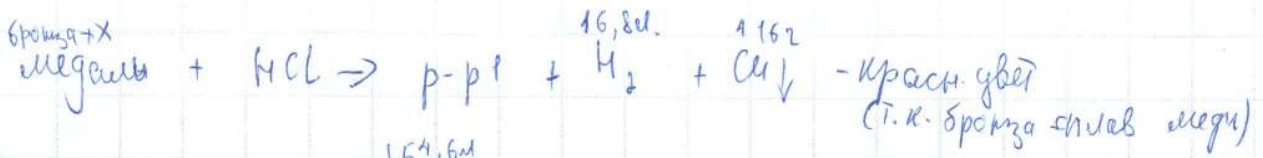
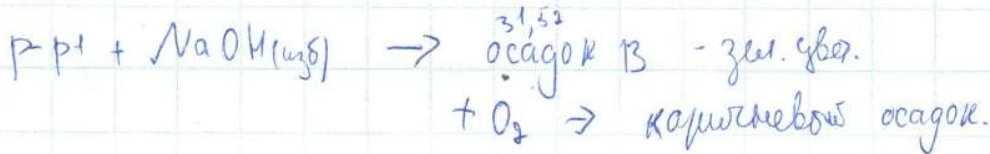
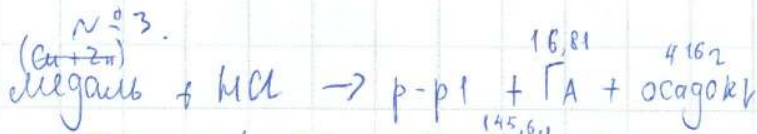
$$3x = 41,36.$$

$$(x = 13,78) \quad x = 13,78.$$

$$\text{Анвем: } \Delta H^\circ(\text{FeO}) = (41,36) 13,78 \text{ кРЖ / моль.}$$

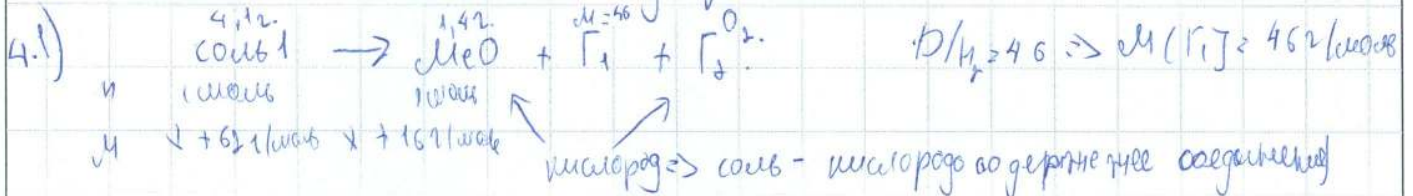


Әуеет: C -  $CO_2$ ; B -  $O_2$



Әуеет: A -  $H_2$ ; B -  $H_2S$ ; B -  $FeO_x$ ; Г -  $Fe_2O_3$

~04.



$(x + 16) \cdot 4,1 = 1,4(x + 62)$

$4,1x + 65,6 = 1,4x + 86,8$

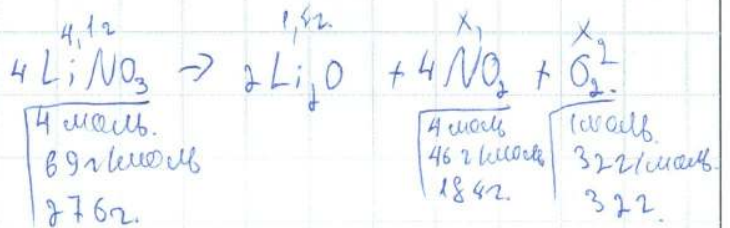
$4,1x - 1,4x = 86,8 - 65,6$

$2,7x = 21,2$

$x \approx 7,85 \approx 8$

кислород → соль - кислородо водородные соединения

пусть соль - нитрат  $MeX$



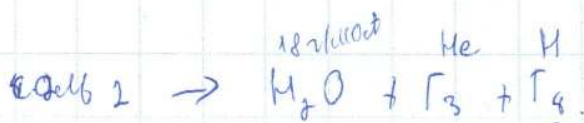
$\frac{4,1 \text{ г}}{276 \text{ г}} = \frac{x_1}{184 \text{ г}} = \frac{x_2}{32 \text{ г}} \Rightarrow x_1 = \frac{4,1 \cdot 184}{276} \approx 2,73 \text{ г}$

$x_2 = 0,47 \text{ г} \quad V = \frac{m}{M} =$

$V(NO_2) = \frac{2,73 \text{ г}}{46 \text{ г/моль}} = 0,06 \text{ моль}$

$V(O_2) = \frac{0,47 \text{ г}}{32 \text{ г/моль}} = 0,015 \text{ моль}$

$V_{\text{общ}} = 0,05 + 0,015 = 0,065$



$M = 24 \text{ г/моль}$

$H_2O : \Gamma_3 : \Gamma_4 = 2 : 1 : 1$

$\Rightarrow \Gamma_3 + \Gamma_4 = 6 \text{ г моль}$

$M(\Gamma_3) > M(\Gamma_4) \text{ на } 2,59$

$x + x + 2,59 = 6$

$2x = 3,41$

$x = 1,705$

$\Gamma_3 = 4,295 = He$

$\Gamma_4 = 1,705 = H$

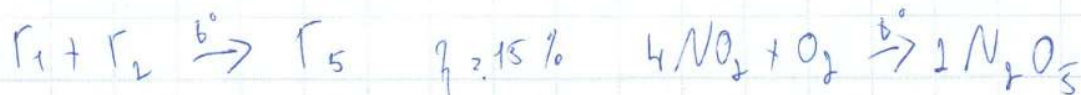
4.4.

$$K_{sp} = 4,65 \cdot 10^{-9}$$

$$K_{sp} = 10 \text{ м.г.} \cdot 4,65 \cdot 10^{-9} = 4650 \cdot 10^{-9} \text{ г.}$$

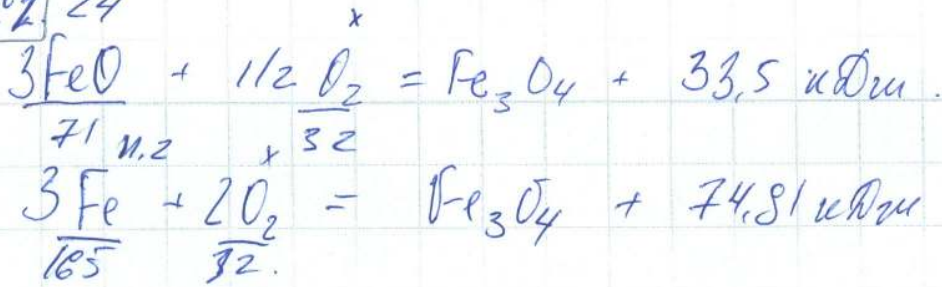
ОТВЕТ: на 10 л воды можно растворить  $4650 \cdot 10^{-9} \text{ г.}$

4.5.  $p = 1 \text{ атм}$   $n(\Gamma_1) = n(\Gamma_2)$



$$K_p = \frac{[\Gamma_5]}{[\Gamma_1][\Gamma_2]} = \frac{[\text{N}_2\text{O}_5]^2}{[\text{NO}_2]^4 [\text{O}_2]}$$

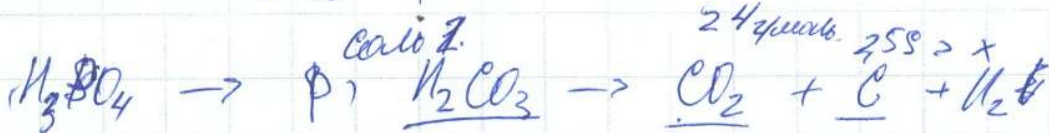
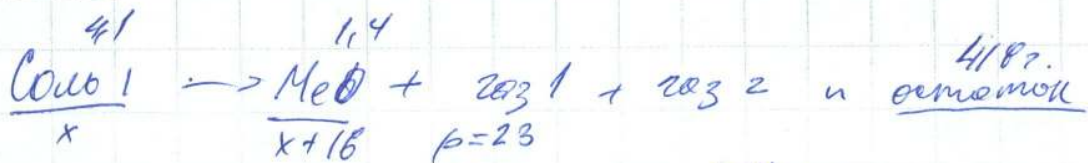
№2 24



$$\Delta H_p = \sum n_{\text{prod}} \Delta H_{\text{prod}}^{\circ} - \sum n_{\text{rea}} \Delta H_{\text{rea}}^{\circ}$$

$$\Delta H_p^{\circ} = 268 - 33,55 - 24,81 = 5$$

№3. 4

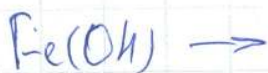
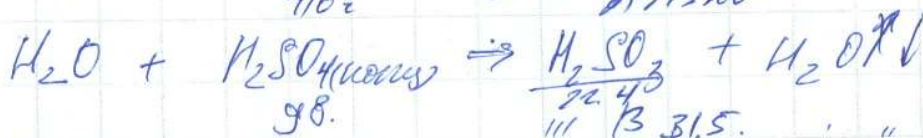
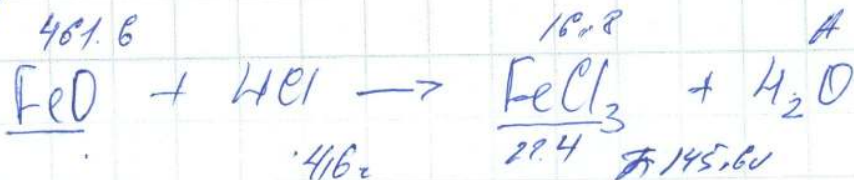


$$4,65 = 10$$

$$x = x$$

$$x = 5,215$$

№4



A)

$$\begin{array}{r} \text{Масса} \rightarrow \text{FeCl}_3 \\ x \rightarrow 1 \end{array} \quad \begin{array}{r} 461,6 \\ 461 \end{array} \quad \begin{array}{r} 16,8 \\ x \end{array} \quad \begin{array}{r} 461 - 16,8 \\ - 22,4 \end{array} = \textcircled{615}$$

$$\text{Б) А)} \quad \begin{array}{r} 461,6 \\ x \end{array} \quad \begin{array}{r} 145,6 \\ - 22,4 \end{array} = \textcircled{71}$$

$$\text{Б)} \quad \begin{array}{r} 461,6 \\ x \end{array} \quad \begin{array}{r} 145,6 \\ - 74 \end{array} \quad 31,5 = \textcircled{1084}$$

№1



1-тапсырма

X-Cl<sub>2</sub>, себебі хлор XVIII ғасырдың басында Германияда алынған.

A-Al, себебі алюминий тотығу дәрежесі +3

B-AlCl<sub>3</sub>, себебі алюминий хлориді түссіз қарапайым газ

D-CH<sub>4</sub>, себебі құрамында көміртегі 6,69% болады

Y-NaCl, себебі сары тұз

Z-C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>, себебі глюкоза, 40-тан астам атом құрамында бар.

1.2) хлор ыдырау реакциясы:  $2NaCl + 2H_2O = Cl_2 + H_2 + 2NaOH$

1.3) C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>

тотығу дәрежелері: C: 0      H: +1      O: -2

2-тапсырма

2.1)  $3Fe + 2O_2 = Fe_3O_4$

$$\Delta H^\circ_{(p)} = \sum n_{\text{prod}} \Delta H^\circ_{(\text{prod})} - \sum n_{\text{исх}} \Delta H^\circ_{(\text{исх})}$$

$$\Delta H^\circ(\text{FeO}) = -272 \text{ кДж/моль}$$

$$\Delta H^\circ(\text{Fe}) = 0 \text{ кДж/моль}$$

$$\Delta H^\circ(\text{O}_2) = 0 \text{ кДж/моль}$$

$$\Delta H^\circ = (2 \cdot \Delta H^\circ(\text{FeO})) - (2 \cdot \Delta H^\circ(\text{Fe}) + \Delta H^\circ(\text{O}_2))$$

$$\Delta H^\circ = (2 \cdot (-272)) - (2 \cdot 0 + 0)$$

$$\Delta H^\circ = -544 \text{ кДж/моль}$$

(Темір (II) оксидінің стандартты түзілу жылуы: -544 кДж/моль)

(3-тапсырма)

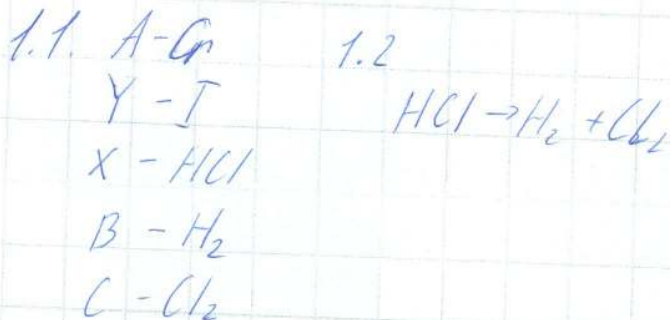
$$\Delta H^\circ(\text{Fe}_3\text{O}_4) = -1118 \text{ кДж/моль}$$

$$\Delta H^\circ = (-1118) - (3 \cdot 0 + 2 \cdot 0) = -1118 \text{ кДж/моль}$$

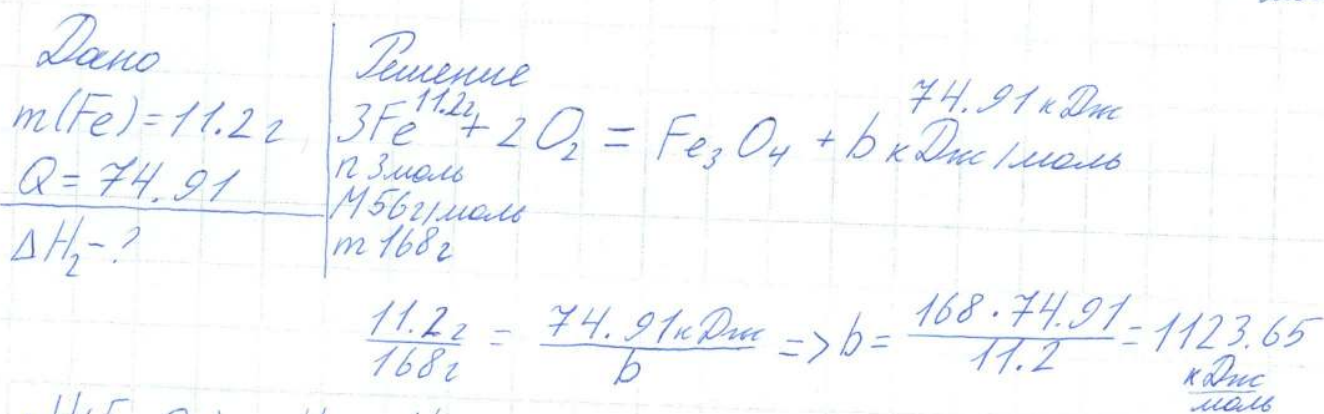
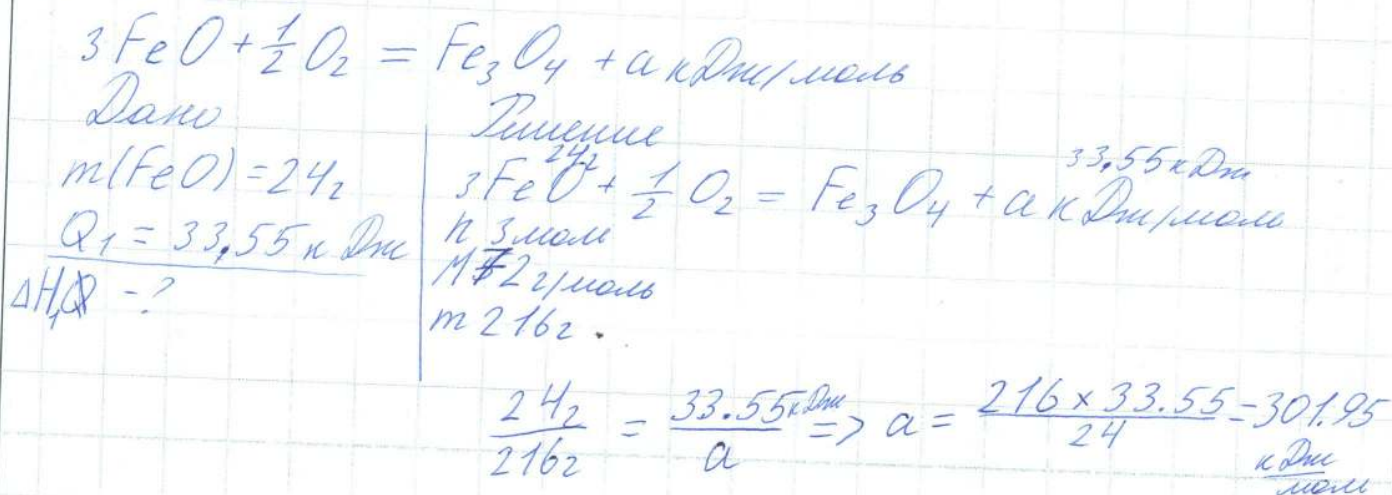
Темір(III) оксидінің стандартты түзілу жылуы: -1118 кДж/моль



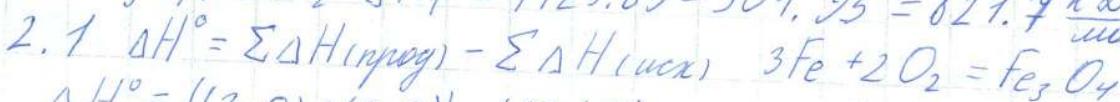
№ 1



№ 2



$\Delta H(Fe_3O_4) = \Delta H_2 - \Delta H_1 = 1123,65 - 301,95 = 821,7 \text{ кДж/моль}$



$\Delta H^\circ = (3 \cdot 0) + (2 \cdot 0) - (821,7) = -821,7 \text{ кДж/моль}$

Ответ :  $\Delta H = -821,7 \text{ кДж/моль}$

№4

