

**Формулировка задания:** «Составьте уравнение реакции, используя для расстановки коэффициентов метод электронного баланса. Определите окислитель и восстановитель.»

2017

1.  $\text{KI} + \text{KIO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
2.  $\text{Cr}(\text{OH})_3 + \text{Cl}_2 + \text{KOH} \rightarrow \text{K}_2\text{CrO}_4 + \text{KCl} + \text{H}_2\text{O}$
3.  $\text{H}_2\text{S} + \text{Cl}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4 + \text{HCl}$
4.  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{HCl} \rightarrow \text{Cl}_2 + \text{CrCl}_3 + \text{KCl} + \text{H}_2\text{O}$
5.  $\text{SO}_2 + \text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4 \rightarrow \text{K}_2\text{SO}_4 + \text{Cr}_2(\text{SO}_4)_3 + \text{H}_2\text{O}$
6.  $\text{NaClO}_3 + \text{MnO}_2 + \text{NaOH} \rightarrow \text{Na}_2\text{MnO}_4 + \text{NaCl} + \text{H}_2\text{O}$
7.  $\text{Na}_2\text{SO}_3 + \text{CrO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{Cr}_2(\text{SO}_4)_3 + \text{H}_2\text{O}$
8.  $\text{NaNO}_2 + \text{Na}_2\text{Cr}_2\text{O}_7 + \text{HNO}_3 \rightarrow \text{NaNO}_3 + \text{Cr}(\text{NO}_3)_3 + \text{H}_2\text{O}$
9.  $\text{NO} + \text{KClO} + \text{KOH} \rightarrow \text{KNO}_3 + \text{KCl} + \text{H}_2\text{O}$
10.  $\text{FeSO}_4 + \text{NaClO} + \text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + \text{NaCl} + \text{H}_2\text{O}$
11.  $\text{Al} + \text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4 \rightarrow \text{Al}_2(\text{SO}_4)_3 + \text{Cr}_2(\text{SO}_4)_3 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
12.  $\text{KClO}_2 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{KClO}_3 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
13.  $\text{FeSO}_4 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
14.  $\text{CrCl}_2 + \text{H}_2\text{SO}_4(\text{конц.}) \rightarrow \text{Cr}_2(\text{SO}_4)_3 + \text{SO}_2 + \text{HCl} + \text{H}_2\text{O}$
15.  $\text{CrCl}_3 + \text{Cl}_2 + \text{KOH} \rightarrow \text{K}_2\text{CrO}_4 + \text{KCl} + \text{H}_2\text{O}$
16.  $\text{Na}_2\text{SO}_3 + \text{KIO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{K}_2\text{SO}_4 + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
17.  $\text{Cr}_2\text{O}_3 + \text{KBrO}_3 + \text{Na}_2\text{CO}_3 \rightarrow \text{Na}_2\text{CrO}_4 + \text{KBr} + \text{CO}_2$
18.  $\text{H}_3\text{PO}_3 + \text{KIO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{H}_3\text{PO}_4 + \text{I}_2 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
19.  $\text{KClO}_3 + \text{Na}_2\text{SO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{Cl}_2 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
20.  $\text{H}_2\text{O}_2 + \text{Cr}(\text{NO}_3)_3 + \text{NaOH} \rightarrow \text{Na}_2\text{CrO}_4 + \text{NaNO}_3 + \text{H}_2\text{O}$
21.  $\text{Na}_2\text{SO}_3 + \text{CrO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Cr}_2(\text{SO}_4)_3 + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
22.  $\text{Cr}_2(\text{SO}_4)_3 + \text{Br}_2 + \text{NaOH} \rightarrow \text{Na}_2\text{CrO}_4 + \text{NaBr} + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
23.  $\text{Cr}_2(\text{SO}_4)_3 + \text{H}_2\text{O}_2 + \text{NaOH} \rightarrow \text{Na}_2\text{CrO}_4 + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
24.  $\text{Na}_2\text{S} + \text{HNO}_3(\text{конц.}) \rightarrow \text{Na}_2\text{SO}_4 + \text{NO}_2 + \text{H}_2\text{O}$
25.  $\text{Cr}_2(\text{SO}_4)_3 + \text{KMnO}_4 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4 + \text{MnSO}_4 + \text{K}_2\text{SO}_4$
26.  $\text{Cr}(\text{OH})_3 + \text{Br}_2 + \text{KOH} \rightarrow \text{K}_2\text{CrO}_4 + \text{KBr} + \text{H}_2\text{O}$
27.  $\text{NH}_3 + \text{K}_2\text{FeO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{N}_2 + \text{Fe}_2(\text{SO}_4)_3 + \text{H}_2\text{O} + \text{K}_2\text{SO}_4$
28.  $\text{H}_2\text{O}_2 + \text{Br}_2 + \text{NaOH} \rightarrow \text{O}_2 + \text{NaBr} + \text{H}_2\text{O}$
29.  $\text{MnO} + \text{KClO}_3 + \text{KOH} \rightarrow \text{K}_2\text{MnO}_4 + \text{KCl} + \text{H}_2\text{O}$
30.  $\text{KNO}_2 + \text{K}_2\text{Cr}_2\text{O}_7 + \text{HNO}_3 \rightarrow \text{KNO}_3 + \text{Cr}(\text{NO}_3)_3 + \text{H}_2\text{O}$
31.  $\text{NaCrO}_2 + \text{Br}_2 + \text{NaOH} \rightarrow \text{Na}_2\text{CrO}_4 + \text{NaBr} + \text{H}_2\text{O}$

32.  $\text{HNO}_3(\text{конц.}) + \text{FeCl}_2 \rightarrow \text{Fe}(\text{NO}_3)_3 + \text{HCl} + \text{NO}_2 + \text{H}_2\text{O}$
33.  $\text{CuS} + \text{HNO}_3 \rightarrow \text{CuSO}_4 + \text{NO}_2 + \text{H}_2\text{O}$
34.  $\text{HCHO} + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{CO}_2 + \text{K}_2\text{SO}_4 + \text{MnSO}_4 + \text{H}_2\text{O}$
35.  $\text{P}_2\text{O}_3 + \text{HClO}_4 + \text{H}_2\text{O} \rightarrow \text{HCl} + \text{H}_3\text{PO}_4$
36.  $\text{FeSO}_4 + \text{KClO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + \text{KCl} + \text{H}_2\text{O}$
37.  $\text{NaNO}_2 + \text{KIO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{K}_2\text{SO}_4 + \text{NaNO}_3 + \text{H}_2\text{O}$
38.  $\text{Cr}_2\text{O}_3 + \text{NaBrO} + \text{Na}_2\text{CO}_3 \rightarrow \text{Na}_2\text{CrO}_4 + \text{NaBr} + \text{CO}_2$
39.  $\text{S} + \text{HClO}_4 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4 + \text{HCl}$
40.  $\text{B} + \text{HClO}_3 + \text{H}_2\text{O} \rightarrow \text{H}_3\text{BO}_3 + \text{HCl}$
41.  $\text{B} + \text{HNO}_3 + \text{H}_2\text{O} \rightarrow \text{H}_3\text{BO}_3 + \text{NO}$
42.  $\text{NO}_2 + \text{KClO} + \text{KOH} \rightarrow \text{KNO}_3 + \text{KCl} + \text{H}_2\text{O}$

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43.  $\text{P}_2\text{O}_3 + \text{HClO}_3 + \text{H}_2\text{O} \rightarrow \text{HCl} + \text{H}_3\text{PO}_4$
44.  $\text{KI} + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
45.  $\text{Cl}_2 + \text{NH}_3 \cdot \text{H}_2\text{O} \rightarrow \text{N}_2 + \text{NH}_4\text{Cl} + \text{H}_2\text{O}$
46.  $\text{NaCrO}_2 + \text{Br}_2 + \text{NaOH} \rightarrow \text{Na}_2\text{CrO}_4 + \text{NaBr} + \text{H}_2\text{O}$
47.  $\text{NH}_3 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{N}_2 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
48.  $\text{Cr}_2\text{O}_3 + \text{KNO}_3 + \text{KOH} \rightarrow \text{K}_2\text{CrO}_4 + \text{KNO}_2 + \text{H}_2\text{O}$
49.  $\text{SO}_2 + \text{HMnO}_4 + \text{H}_2\text{O} \rightarrow \text{MnSO}_4 + \text{H}_2\text{SO}_4$
50.  $\text{AlP} + \text{HNO}_3(\text{конц.}) \rightarrow \text{H}_3\text{PO}_4 + \text{NO}_2 + \text{Al}(\text{NO}_3)_3 + \text{H}_2\text{O}$
51.  $\text{Zn} + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
52.  $\text{PCl}_3 + \text{HNO}_3 + \text{H}_2\text{O} \rightarrow \text{NO} + \text{HCl} + \text{H}_3\text{PO}_4$
53.  $\text{Al} + \text{KOH} + \text{H}_2\text{O} \rightarrow \text{K}_3[\text{Al}(\text{OH})_6] + \text{H}_2$
54.  $\text{Ca}(\text{HS})_2 + \text{HNO}_3(\text{конц.}) \rightarrow \text{CaSO}_4 + \text{H}_2\text{SO}_4 + \text{NO}_2 + \text{H}_2\text{O}$
55.  $\text{SO}_2 + \text{KMnO}_4 + \text{H}_2\text{O} \rightarrow \text{MnSO}_4 + \text{H}_2\text{SO}_4 + \text{K}_2\text{SO}_4$
56.  $\text{KMnO}_4 + \text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
57.  $\text{KI} + \text{KNO}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{K}_2\text{SO}_4 + \text{NO} + \text{H}_2\text{O}$
58.  $\text{KNO}_2 + \text{FeCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{N}_2 + \text{FeCl}_3 + \text{Fe}_2(\text{SO}_4)_3 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
59.  $\text{KNO}_2 + \text{K}_2\text{Cr}_2\text{O}_7 + \text{HNO}_3 \rightarrow \text{Cr}(\text{NO}_3)_3 + \text{KNO}_3 + \text{H}_2\text{O}$
60.  $\text{KNO}_2 + \text{CrSO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{N}_2 + \text{Cr}_2(\text{SO}_4)_3 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
61.  $\text{Fe}(\text{CrO}_2)_2 + \text{HNO}_3(\text{конц.}) \rightarrow \text{Fe}(\text{NO}_3)_3 + \text{Cr}(\text{NO}_3)_3 + \text{NO}_2 + \text{H}_2\text{O}$
62.  $\text{H}_3\text{PO}_3 + \text{KMnO}_4 + \text{HCl} \rightarrow \text{H}_3\text{PO}_4 + \text{KCl} + \text{MnCl}_2 + \text{H}_2\text{O}$
63.  $\text{Na}_2\text{SO}_3 + \text{Zn} + \text{HCl} \rightarrow \text{H}_2\text{S} + \text{ZnCl}_2 + \text{NaCl} + \text{H}_2\text{O}$
64.  $\text{KClO}_3 + \text{KI} + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{K}_2\text{SO}_4 + \text{KCl} + \text{H}_2\text{O}$

65.  $\text{HNO}_3 + \text{I}_2 \rightarrow \text{HIO}_3 + \text{NO}_2 + \text{H}_2\text{O}$
66.  $\text{Na}_2\text{SO}_3 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
67.  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{Na}_2\text{SO}_3 + \text{H}_2\text{O} \rightarrow \text{Cr}(\text{OH})_3 + \text{Na}_2\text{SO}_4 + \text{KOH}$
68.  $\text{KNO}_2 + \text{KMnO}_4 + \text{HCl} \rightarrow \text{MnCl}_2 + \text{KNO}_3 + \text{KCl} + \text{H}_2\text{O}$
69.  $\text{Cr}_2(\text{SO}_4)_3 + \text{Br}_2 + \text{NaOH} \rightarrow \text{Na}_2\text{CrO}_4 + \text{NaBr} + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
70.  $\text{NH}_3 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{N}_2 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
71.  $\text{Ca}_3\text{P}_2 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{Ca}_3(\text{PO}_4)_2 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
72.  $\text{NaClO}_3 + \text{MnO}_2 + \text{NaOH} \rightarrow \text{Na}_2\text{MnO}_4 + \text{NaCl} + \text{H}_2\text{O}$
73.  $\text{FeO} + \text{HNO}_3 \rightarrow \text{Fe}(\text{NO}_3)_3 + \text{NO} + \text{H}_2\text{O}$
74.  $\text{P}_2\text{O}_3 + \text{K}_2\text{CrO}_4 + \text{HCl} \rightarrow \text{H}_3\text{PO}_4 + \text{CrCl}_3 + \text{KCl} + \text{H}_2\text{O}$
75.  $\text{KMnO}_4 + \text{HBr} \rightarrow \text{MnBr}_2 + \text{Br}_2 + \text{KBr} + \text{H}_2\text{O}$
76.  $\text{KMnO}_4 + \text{HBr} \rightarrow \text{MnBr}_2 + \text{Br}_2 + \text{KBr} + \text{H}_2\text{O}$
77.  $\text{I}_2 + \text{KOH} \rightarrow \text{KI} + \text{KIO}_3 + \text{H}_2\text{O}$
78.  $\text{KNO}_2 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{KNO}_3 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
79.  $\text{PH}_3 + \text{CrO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{H}_3\text{PO}_4 + \text{Cr}_2(\text{SO}_4)_3 + \text{H}_2\text{O}$
80.  $\text{HI} + \text{HNO}_3(\text{конц.}) \rightarrow \text{HIO}_3 + \text{NO}_2 + \text{H}_2\text{O}$
81.  $\text{Mg}_3\text{P}_2 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{Mg}_3(\text{PO}_4)_2 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
82.  $\text{KI} + \text{H}_2\text{SO}_4(\text{конц.}) \rightarrow \text{I}_2 + \text{S} + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
83.  $\text{FeCl}_2 + \text{H}_2\text{SO}_4(\text{конц.}) \rightarrow \text{Fe}_2(\text{SO}_4)_3 + \text{SO}_2 + \text{HCl} + \text{H}_2\text{O}$

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84.  $\text{Fe}(\text{OH})_3 + \text{Br}_2 + \text{KOH} \rightarrow \text{K}_2\text{FeO}_4 + \text{KBr} + \text{H}_2\text{O}$
85.  $\text{Cr}(\text{OH})_3 + \text{Br}_2 + \text{KOH} \rightarrow \text{K}_2\text{CrO}_4 + \text{KBr} + \text{H}_2\text{O}$
86.  $\text{KClO}_4 + \text{Na}_2\text{SO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{Cl}_2 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
87.  $\text{KClO}_4 + \text{KI} + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{K}_2\text{SO}_4 + \text{KCl} + \text{H}_2\text{O}$
88.  $\text{Ca}(\text{ClO})_2 + \text{HCl} \rightarrow \text{CaCl}_2 + \text{Cl}_2 + \text{H}_2\text{O}$
89.  $\text{KIO}_3 + \text{KI} + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
90.  $\text{Cr}_2\text{O}_3 + \text{NaNO}_3 + \text{Na}_2\text{CO}_3 \rightarrow \text{Na}_2\text{CrO}_4 + \text{NaNO}_2 + \text{CO}_2$
91.  $\text{SO}_2 + \text{KMnO}_4 + \text{H}_2\text{O} \rightarrow \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{SO}_4$
92.  $\text{Cr}_2(\text{SO}_4)_3 + \text{Cl}_2 + \text{KOH} \rightarrow \text{K}_2\text{CrO}_4 + \text{KCl} + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
93.  $\text{K}_2\text{SO}_3 + \text{KMnO}_4 + \text{H}_2\text{O} \rightarrow \text{K}_2\text{SO}_4 + \text{MnO}_2 + \text{KOH}$
94.  $\text{HNO}_3 + \text{CrCl}_2 \rightarrow \text{Cr}(\text{NO}_3)_3 + \text{HCl} + \text{NO}_2 + \text{H}_2\text{O}$
95.  $\text{P} + \text{HNO}_3(\text{конц.}) \rightarrow \text{H}_3\text{PO}_4 + \text{NO}_2 + \text{H}_2\text{O}$
96.  $\text{KCrO}_2 + \text{Cl}_2 + \text{KOH} \rightarrow \text{K}_2\text{CrO}_4 + \text{KCl} + \text{H}_2\text{O}$
97.  $\text{NaHS} + \text{MnO}_2 + \text{HNO}_3 \rightarrow \text{Mn}(\text{NO}_3)_2 + \text{S} + \text{NaNO}_3 + \text{H}_2\text{O}$

98.  $\text{K}_2\text{MnO}_4 + \text{HBr} \rightarrow \text{MnBr}_2 + \text{Br}_2 + \text{KBr} + \text{H}_2\text{O}$
99.  $\text{Mg} + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{MnSO}_4 + \text{MgSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
100.  $\text{H}_2\text{S} + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{S} + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
101.  $\text{MnO}_2 + \text{KCl} + \text{H}_2\text{SO}_4 \rightarrow \text{Cl}_2 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
102.  $\text{ZnS} + \text{HNO}_3 \rightarrow \text{ZnSO}_4 + \text{NO}_2 + \text{H}_2\text{O}$
103.  $\text{NaNO}_2 + \text{CrO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{NaNO}_3 + \text{Cr}_2(\text{SO}_4)_3 + \text{H}_2\text{O}$
104.  $\text{CrO}_3 + \text{KBr} + \text{H}_2\text{SO}_4 \rightarrow \text{Br}_2 + \text{Cr}_2(\text{SO}_4)_3 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
105.  $\text{Mg} + \text{Na}_2\text{SO}_3 + \text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2\text{S} + \text{NaCl} + \text{H}_2\text{O}$
106.  $\text{MnO}_2 + \text{KClO}_3 + \text{K}_2\text{CO}_3 \rightarrow \text{K}_2\text{MnO}_4 + \text{KCl} + \text{CO}_2$
107.  $\text{CaI}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{CaSO}_4 + \text{H}_2\text{S} + \text{I}_2 + \text{H}_2\text{O}$
108.  $\text{NaI} + \text{NaNO}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{NO} + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
109.  $\text{Br}_2 + \text{KOH} \rightarrow \text{KBr} + \text{KBrO}_3 + \text{H}_2\text{O}$
110.  $\text{N}_2\text{O} + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{NO}_2 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$

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111.  $\text{Na}_2\text{SO}_3 + \text{KMnO}_4 + \text{H}_2\text{O} \rightarrow \text{Na}_2\text{SO}_4 + \text{MnO}_2 + \text{KOH}$
112.  $\text{Cl}_2 + \text{I}_2 + \text{H}_2\text{O} \rightarrow \text{HIO}_3 + \text{HCl}$
113.  $\text{H}_2\text{O}_2 + \text{HIO}_3 \rightarrow \text{I}_2 + \text{O}_2 + \text{H}_2\text{O}$
114.  $\text{Ca}(\text{HS})_2 + \text{HNO}_3(\text{конц.}) \rightarrow \text{CaSO}_4 + \text{H}_2\text{SO}_4 + \text{NO}_2 + \text{H}_2\text{O}$
115.  $\text{Zn} + \text{KNO}_3 + \text{KOH} \rightarrow \text{NH}_3 + \text{K}_2\text{ZnO}_2 + \text{H}_2\text{O}$
116.  $\text{KMnO}_4 + \text{H}_2\text{C}_2\text{O}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{CO}_2 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
117.  $\text{NH}_3 + \text{KMnO}_4 \rightarrow \text{N}_2 + \text{MnO}_2 + \text{KOH} + \text{H}_2\text{O}$
118.  $\text{Mn}(\text{OH})_2 + \text{Cl}_2 + \text{KOH} \rightarrow \text{MnO}_2 + \text{KCl} + \text{H}_2\text{O}$
119.  $\text{K}_2\text{MnO}_4 + \text{HCl} \rightarrow \text{MnCl}_2 + \text{Cl}_2 + \text{KCl} + \text{H}_2\text{O}$
120.  $\text{MnO}_2 + \text{KNO}_3 + \text{K}_2\text{CO}_3 \rightarrow \text{K}_2\text{MnO}_4 + \text{KNO}_2 + \text{CO}_2$
121.  $\text{H}_2\text{S} + \text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4 \rightarrow \text{K}_2\text{SO}_4 + \text{Cr}_2(\text{SO}_4)_3 + \text{S} + \text{H}_2\text{O}$
122.  $\text{KI} + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
123.  $\text{Ca}_3\text{P}_2 + \text{KMnO}_4 + \text{H}_2\text{O} \rightarrow \text{Ca}_3(\text{PO}_4)_2 + \text{MnO}_2 + \text{KOH}$
124.  $\text{SO}_2 + \text{HMnO}_4 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4 + \text{MnSO}_4$
125.  $\text{H}_3\text{PO}_3 + \text{HNO}_3(\text{конц.}) \rightarrow \text{H}_3\text{PO}_4 + \text{NO}_2 + \text{H}_2\text{O}$
126.  $\text{KNO}_2 + \text{KI} + \text{H}_2\text{SO}_4 \rightarrow \text{NO} + \text{I}_2 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
127.  $\text{KNO}_2 + \text{FeCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{N}_2 + \text{FeCl}_3 + \text{Fe}_2(\text{SO}_4)_3 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
128.  $\text{Na}_2\text{SO}_3 + \text{KIO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{K}_2\text{SO}_4 + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$

2013

129.  $\text{NH}_3 + \text{KMnO}_4 + \text{KOH} \rightarrow \text{N}_2 + \text{K}_2\text{MnO}_4 + \text{H}_2\text{O}$

130.  $\text{FeSO}_4 + \text{KClO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + \text{KCl} + \text{H}_2\text{O}$
131.  $\text{NaBrO}_3 + \text{F}_2 + \text{NaOH} \rightarrow \text{NaF} + \text{NaBrO}_4 + \text{H}_2\text{O}$
132.  $\text{Cr}_2\text{O}_3 + \text{KNO}_3 + \text{KOH} \rightarrow \text{K}_2\text{CrO}_4 + \text{KNO}_2 + \text{H}_2\text{O}$
133.  $\text{Cu} + \text{NaNO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{NO}_2 + \text{CuSO}_4 + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
134.  $\text{NaNO}_3 + \text{Cu} + \text{H}_2\text{SO}_4 \rightarrow \text{CuSO}_4 + \text{Na}_2\text{SO}_4 + \text{NO}_2 + \text{H}_2\text{O}$
135.  $\text{KNO}_2 + \text{KMnO}_4 + \text{HCl} \rightarrow \text{KNO}_3 + \text{MnCl}_2 + \text{KCl} + \text{H}_2\text{O}$
136.  $\text{Na}_2\text{CrO}_4 + \text{NaI} + \text{H}_2\text{SO}_4(\text{разб.}) \rightarrow \text{I}_2 + \text{Cr}_2(\text{SO}_4)_3 + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
137.  $\text{FeSO}_4 + \text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + \text{Cr}_2(\text{SO}_4)_3 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
138.  $\text{KClO}_3 + \text{CrCl}_3 + \text{KOH} \rightarrow \text{K}_2\text{CrO}_4 + \text{KCl} + \text{H}_2\text{O}$
139.  $\text{FeSO}_4 + \text{KMnO}_4 + \text{KOH} \rightarrow \text{Fe}(\text{OH})_3 + \text{K}_2\text{SO}_4 + \text{K}_2\text{MnO}_4$

### 2012

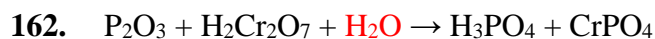
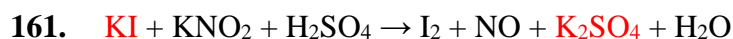
140.  $\text{KClO}_3 + \text{Na}_2\text{SO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{Cl}_2 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
141.  $\text{CrCl}_2 + \text{K}_2\text{Cr}_2\text{O}_7 + \text{HCl} \rightarrow \text{CrCl}_3 + \text{KCl} + \text{H}_2\text{O}$
142.  $\text{K}_2\text{CrO}_4 + \text{HCl} \rightarrow \text{CrCl}_3 + \text{KCl} + \text{Cl}_2 + \text{H}_2\text{O}$
143.  $\text{FeSO}_4 + \text{KClO}_3 + \text{KOH} \rightarrow \text{K}_2\text{FeO}_4 + \text{KCl} + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
144.  $\text{FeSO}_4 + \text{Ca}(\text{ClO})_2 + \text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + \text{CaCl}_2 + \text{H}_2\text{O}$
145.  $\text{Fe}(\text{OH})_2 + \text{KClO} + \text{H}_2\text{SO}_4 \rightarrow \text{KCl} + \text{Fe}_2(\text{SO}_4)_3 + \text{H}_2\text{O}$
146.  $\text{MnO}_2 + \text{KCl} + \text{HNO}_3 \rightarrow \text{Mn}(\text{NO}_3)_2 + \text{Cl}_2 + \text{KNO}_3 + \text{H}_2\text{O}$
147.  $\text{Na}_2\text{SO}_3 + \text{AgNO}_3 + \text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + \text{Ag} + \text{NaNO}_3 + \text{H}_2\text{O}$

### 2011

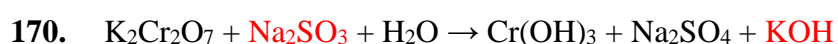
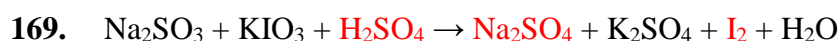
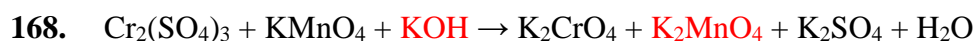
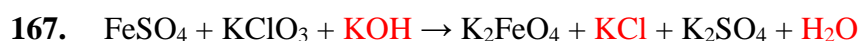
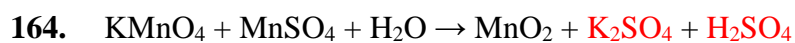
148.  $\text{Mn}(\text{OH})_2 + \text{Cl}_2 + \text{KOH} \rightarrow \text{MnO}_2 + \text{KCl} + \text{H}_2\text{O}$
149.  $\text{FeSO}_4 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
150.  $\text{Na}_2\text{SO}_3 + \text{KMnO}_4 + \text{KOH} \rightarrow \text{K}_2\text{MnO}_4 + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
151.  $\text{H}_2\text{O}_2 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{O}_2 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
152.  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{S} + \text{H}_2\text{SO}_4 \rightarrow \text{Cr}_2(\text{SO}_4)_3 + \text{K}_2\text{SO}_4 + \text{S} + \text{H}_2\text{O}$
153.  $\text{KMnO}_4 + \text{HCl} \rightarrow \text{MnCl}_2 + \text{Cl}_2 + \text{KCl} + \text{H}_2\text{O}$
154.  $\text{MnO} + \text{KClO}_3 + \text{KOH} \rightarrow \text{K}_2\text{MnO}_4 + \text{KCl} + \text{H}_2\text{O}$
155.  $\text{Cl}_2 + \text{I}_2 + \text{H}_2\text{O} \rightarrow \text{HIO}_3 + \text{HCl}$
156.  $\text{Na}_2\text{SO}_3 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$

### 2010

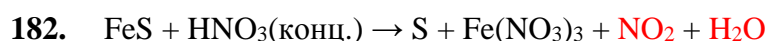
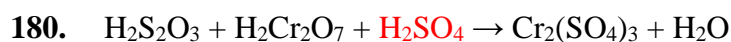
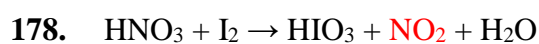
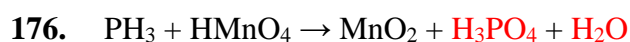
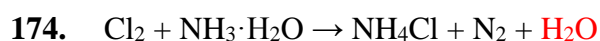
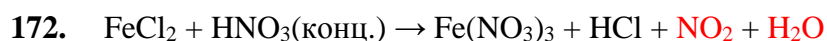
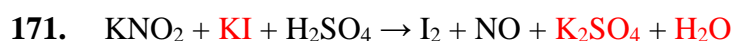
157.  $\text{Al}_2\text{S}_3 + \text{HNO}_3(\text{конц.}) \rightarrow \text{S} + \text{NO}_2 + \text{Al}(\text{NO}_3)_3 + \text{H}_2\text{O}$
158.  $\text{P}_2\text{O}_3 + \text{HNO}_3 + \text{H}_2\text{O} \rightarrow \text{NO} + \text{H}_3\text{PO}_4$
159.  $\text{KMnO}_4 + \text{NH}_3 \rightarrow \text{MnO}_2 + \text{N}_2 + \text{KOH} + \text{H}_2\text{O}$
160.  $\text{NO}_2 + \text{P}_2\text{O}_3 + \text{KOH} \rightarrow \text{NO} + \text{K}_2\text{HPO}_4 + \text{H}_2\text{O}$



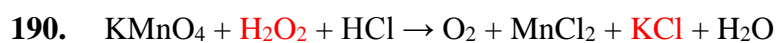
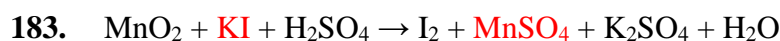
2009



2008



Задания разных лет



192.  $\text{FeCl}_2 + \text{H}_2\text{O}_2 + \text{KOH} \rightarrow \text{Fe}(\text{OH})_3 + \text{KCl} + \text{H}_2\text{O}$
193.  $\text{Na}_2\text{Cr}_2\text{O}_7 + \text{HBr} \rightarrow \text{CrBr}_3 + \text{NaBr} + \text{Br}_2 + \text{H}_2\text{O}$
194.  $\text{HClO}_3 + \text{P} \rightarrow \text{HCl} + \text{H}_3\text{PO}_4$
195.  $\text{KClO} + \text{NH}_3 \rightarrow \text{N}_2 + \text{KCl} + \text{H}_2\text{O}$
196.  $\text{NaBr} + \text{NaBrO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Br}_2 + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
197.  $\text{NaI} + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{H}_2\text{S} + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
198.  $\text{Fe} + \text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + \text{Cr}_2(\text{SO}_4)_3 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
199.  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{HCl} \rightarrow \text{Cl}_2 + \text{KCl} + \text{CrCl}_3 + \text{H}_2\text{O}$
200.  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{KI} + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{Cr}_2(\text{SO}_4)_3 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
201.  $\text{MnSO}_4 + \text{H}_2\text{O}_2 + \text{NaOH} \rightarrow \text{MnO}_2 + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
202.  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{FeCl}_2 + \text{HCl} \rightarrow \text{FeCl}_3 + \text{CrCl}_3 + \text{KCl} + \text{H}_2\text{O}$
203.  $\text{KI} + \text{KIO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
204.  $\text{S} + \text{Ba}(\text{OH})_2 \rightarrow \text{BaS} + \text{BaSO}_3 + \text{H}_2\text{O}$
205.  $\text{P} + \text{HNO}_3 + \text{H}_2\text{O} \rightarrow \text{H}_3\text{PO}_4 + \text{NO}$
206.  $\text{NaMnO}_4 + \text{Na}_2\text{SO}_3 + \text{NaOH} \rightarrow \text{Na}_2\text{MnO}_4 + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
207.  $\text{MnSO}_4 + \text{NaClO} + \text{NaOH} \rightarrow \text{MnO}_2 + \text{NaCl} + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
208.  $\text{FeSO}_4 + \text{MnO}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + \text{MnSO}_4 + \text{H}_2\text{O}$
209.  $\text{FeSO}_4 + \text{H}_2\text{O}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + \text{H}_2\text{O}$
210.  $\text{KMnO}_4 + \text{Na}_2\text{S} + \text{H}_2\text{SO}_4 \rightarrow \text{S} + \text{MnSO}_4 + \text{Na}_2\text{SO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
211.  $\text{KMnO}_4 + \text{K}_2\text{S} + \text{H}_2\text{O} \rightarrow \text{S} + \text{MnO}_2 + \text{KOH}$
212.  $\text{K}_2\text{CrO}_4 + \text{H}_2\text{S} + \text{H}_2\text{O} \rightarrow \text{Cr}(\text{OH})_3 + \text{S} + \text{KOH}$
213.  $\text{HMnO}_4 + \text{H}_2\text{S} \rightarrow \text{S} + \text{MnO}_2 + \text{H}_2\text{O}$
214.  $\text{HClO}_4 + \text{NO} + \text{H}_2\text{O} \rightarrow \text{HNO}_3 + \text{HCl}$
215.  $\text{B} + \text{HNO}_3 + \text{HF} \rightarrow \text{HBF}_4 + \text{NO}_2 + \text{H}_2\text{O}$
216.  $\text{Si} + \text{HNO}_3 + \text{HF} \rightarrow \text{H}_2\text{SiF}_6 + \text{NO} + \text{H}_2\text{O}$
217.  $\text{K}_2\text{CrO}_4 + (\text{NH}_4)_2\text{S} + \text{KOH} + \text{H}_2\text{O} \rightarrow \text{K}_3[\text{Cr}(\text{OH})_6] + \text{S} + \text{NH}_3$
218.  $\text{Na}_3[\text{Cr}(\text{OH})_6] + \text{H}_2\text{O}_2 \rightarrow \text{Na}_2\text{CrO}_4 + \text{NaOH} + \text{H}_2\text{O}$
219.  $\text{Be} + \text{NaOH} + \text{H}_2\text{O} \rightarrow \text{Na}_2[\text{Be}(\text{OH})_4] + \text{H}_2$