

Name: _____

Period: _____

Seat#: _____

Directions: Any worksheet that is labeled with an * means it is suggested extra practice. We do not always have time to assign every possible worksheet that would be good practice for you to do. You can do this worksheet when you have extra time, when you finish something early, or to help you study for a quiz or a test. If and when you choose to do this Extra Practice worksheet, please do the work on binder paper. You will include this paper stapled into your Rainbow Packet when you turn it in, even if you didn't do any of this. We want to make sure we keep it where it belongs so you can do it later if you want to (or need to). If you did the work on binder paper you can include that in your Rainbow Packet after this worksheet. If we end up with extra class time then portions of this may turn into required work. If that happens you will be told which problems are turned into required. Remember there is tons of other extra practice on the class website...and the entire internet! See me if you need help finding practice on a topic you are struggling with.

Note Some of these are really nasty...redox equations get awful really fast! Just go slow, use lots of binder paper, show each step, double check your counting, if you get really stuck then erase and start over.

Balance these reactions. Some are in acidic solution, some are in basic solution. Some answers are provided in italics. I do NOT have a full worked out key for these, or answers to the ones without answers provided.

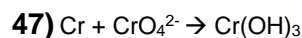
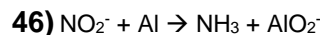
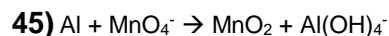
Acidic Solution

- 1) $\text{ClO}_3^- + \text{SO}_2 \rightarrow \text{SO}_4^{2-} + \text{Cl}^-$
 $\text{H}_2\text{O} + \text{ClO}_3^- + 3\text{SO}_2 \rightarrow 3\text{SO}_4^{2-} + \text{Cl}^- + 6\text{H}^+$
- 2) $\text{H}_2\text{S} + \text{NO}_3^- \rightarrow \text{S}_8 + \text{NO}$
 $16\text{H}^+ + 24\text{H}_2\text{S} + 16\text{NO}_3^- \rightarrow 3\text{S}_8 + 16\text{NO} + 32\text{H}_2\text{O}$
- 3) $\text{MnO}_4^- + \text{H}_2\text{S} \rightarrow \text{Mn}^{2+} + \text{S}_8$
 $48\text{H}^+ + 16\text{MnO}_4^- + 40\text{H}_2\text{S} \rightarrow 16\text{Mn}^{2+} + 5\text{S}_8 + 64\text{H}_2\text{O}$
- 4) $\text{Cu} + \text{SO}_4^{2-} \rightarrow \text{Cu}^{2+} + \text{SO}_2$
 $4\text{H}^+ + \text{Cu} + \text{SO}_4^{2-} \rightarrow \text{Cu}^{2+} + \text{SO}_2 + 2\text{H}_2\text{O}$
- 5) $\text{MnO}_4^- + \text{CH}_3\text{OH} \rightarrow \text{CH}_3\text{COOH} + \text{Mn}^{2+}$
- 6) $\text{Cr}_2\text{O}_7^{2-} + \text{Fe}^{2+} \rightarrow \text{Cr}^{3+} + \text{Fe}^{3+}$
- 7) $\text{HNO}_2 \rightarrow \text{NO} + \text{NO}_2$
- 8) $\text{H}_2\text{C}_2\text{O}_4 + \text{MnO}_4^- \rightarrow \text{CO}_2 + \text{Mn}^{2+}$
- 9) $\text{O}_2 + \text{As} \rightarrow \text{HASO}_2 + \text{H}_2\text{O}$
- 10) $\text{NO}_2 \rightarrow \text{NO}_3^- + \text{NO}$
- 11) $\text{ClO}_4^- + \text{Cl}^- \rightarrow \text{ClO}^- + \text{Cl}_2$
- 12) $\text{H}_5\text{IO}_6 + \text{Cr} \rightarrow \text{IO}_3^- + \text{Cr}^{3+}$
- 13) $\text{Fe} + \text{HCl} \rightarrow \text{HFeCl}_4 + \text{H}_2$
- 14) $\text{NO}_3^- + \text{H}_2\text{O}_2 \rightarrow \text{NO} + \text{O}_2$
- 15) $\text{BrO}_3^- + \text{Fe}^{2+} \rightarrow \text{Br}^- + \text{Fe}^{3+}$
- 16) $\text{Cr}_2\text{O}_7^{2-} + \text{C}_2\text{H}_4\text{O} \rightarrow \text{CH}_3\text{COOH} + \text{Cr}^{3+}$
- 17) $\text{MnO}_4^- + \text{C}_2\text{H}_4\text{O} \rightarrow \text{CH}_3\text{COOH} + \text{MnO}_2$
- 18) $\text{Zn} + \text{NO}_3^- \rightarrow \text{NH}_4^+ + \text{Zn}^{2+}$
- 19) $\text{HBr} + \text{SO}_4^{2-} \rightarrow \text{SO}_2 + \text{Br}_2$
- 20) $\text{NO}_3^- + \text{I}_2 \rightarrow \text{IO}_3^- + \text{NO}_2$
- 21) $\text{CuS} + \text{NO}_3^- \rightarrow \text{NO} + \text{Cu}^{2+} + \text{HSO}_4^-$
- 22) $\text{I}^- + \text{ClO}^- \rightarrow \text{I}_3^- + \text{Cl}^-$

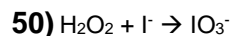
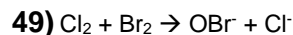
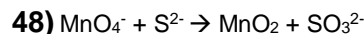
- 23) $\text{As}_2\text{O}_3 + \text{NO}_3^- \rightarrow \text{H}_3\text{AsO}_4 + \text{NO}$
- 24) $\text{Br}^- + \text{MnO}_4^- \rightarrow \text{Br}_2 + \text{Mn}^{2+}$
- 25) $\text{CH}_3\text{OH} + \text{Cr}_2\text{O}_7^{2-} \rightarrow \text{CH}_2\text{O} + \text{Cr}^{3+}$
- 26) $\text{Mn}^{2+} + \text{BiO}_3^- \rightarrow \text{Bi}^{3+} + \text{MnO}_4^-$
- 27) $\text{S}_8 + \text{NO}_3^- \rightarrow \text{SO}_3^{2-} + \text{NO}$
- 28) $\text{H}_3\text{AsO}_4 + \text{Zn} \rightarrow \text{AsH}_3 + \text{Zn}^{2+}$
- 29) $\text{P}_4 + \text{Cr}_2\text{O}_7^{2-} \rightarrow \text{H}_3\text{PO}_4 + \text{Cr}^{3+}$

Basic Solution

- 30) $\text{NH}_3 + \text{ClO}^- \rightarrow \text{N}_2\text{H}_4 + \text{Cl}^-$
 $2\text{NH}_3 + \text{ClO}^- \rightarrow \text{N}_2\text{H}_4 + \text{Cl}^- + \text{H}_2\text{O}$
- 31) $\text{Au} + \text{O}_2 + \text{CN}^- \rightarrow \text{Au}(\text{CN})_2^- + \text{H}_2\text{O}_2$
 $2\text{H}_2\text{O} + 2\text{Au} + \text{O}_2 + 4\text{CN}^- \rightarrow 2\text{Au}(\text{CN})_2^- + \text{H}_2\text{O}_2 + 2\text{OH}^-$
- 32) $\text{AlH}_4^- + \text{H}_2\text{CO} \rightarrow \text{Al}^{3+} + \text{CH}_3\text{OH}$
 $4\text{H}_2\text{O} + \text{AlH}_4^- + 4\text{H}_2\text{CO} \rightarrow \text{Al}^{3+} + 4\text{CH}_3\text{OH} + 4\text{OH}^-$
- 33) $\text{Se} + \text{Cr}(\text{OH})_3 \rightarrow \text{Cr} + \text{SeO}_3^{2-}$
 $6\text{OH}^- + 3\text{Se} + 4\text{Cr}(\text{OH})_3 \rightarrow 4\text{Cr} + 3\text{SeO}_3^{2-} + 9\text{H}_2\text{O}$
- 34) $\text{Br}^- + \text{MnO}_4^- \rightarrow \text{MnO}_2 + \text{BrO}_3^-$
- 35) $\text{H}_2\text{O}_2 + \text{Cl}_2\text{O}_7 \rightarrow \text{ClO}_2^- + \text{O}_2$
- 36) $\text{Fe} + \text{NiO}_2 \rightarrow \text{Fe}(\text{OH})_2 + \text{Ni}(\text{OH})_2$
- 37) $\text{MnO}_4^- + \text{H}_2\text{O}_2 \rightarrow \text{MnO}_2 + \text{O}_2$
- 38) $\text{Zn} + \text{BrO}_4^- \rightarrow [\text{Zn}(\text{OH})_4]^{2-} + \text{Br}^-$
- 39) $\text{MnO}_4^- + \text{S}^{2-} \rightarrow \text{MnO}_2 + \text{S}_8$
- 40) $\text{Pb}(\text{OH})_4^{2-} + \text{ClO}^- \rightarrow \text{PbO}_2 + \text{Cl}^-$
- 41) $\text{Ti}_2\text{O}_3 + \text{NH}_2\text{OH} \rightarrow \text{TiOH} + \text{N}_2$
- 42) $\text{Fe}(\text{OH})_2 + \text{CrO}_4^{2-} \rightarrow \text{Fe}_2\text{O}_3 + \text{Cr}(\text{OH})_4^-$
- 43) $\text{Br}_2 \rightarrow \text{Br}^- + \text{BrO}_3^-$
- 44) $\text{ClO}_2^- + \text{H}_2\text{O} \rightarrow \text{ClO}_2 + \text{OH}^-$



Note: Cr(OH)₃ is found in BOTH half reactions!



Note: IO₃⁻ is found in both half reactions!

