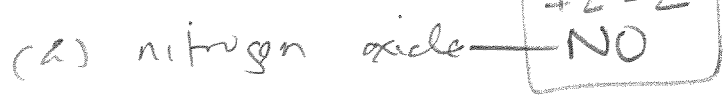


49 Ox. Numbers for

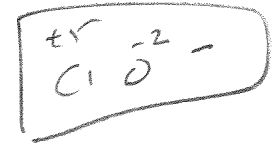


$0 = (2x) + (1(-2))$
 $x = +1$

[peroxide ion is O_2^{2-}]

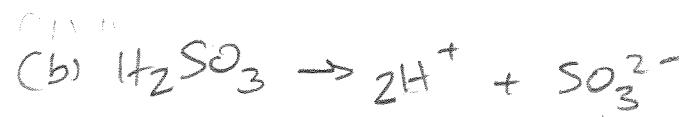
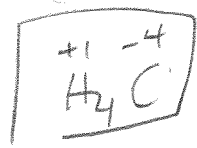
(d) ClO_3^-

$(-1) = (x) + (-6)$
 $x = +5$



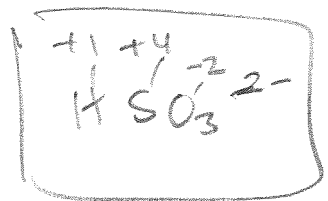
50 (a) methane H_4C (although commonly written CH_4)

$0 = (4) + (x)$ $x = -4$

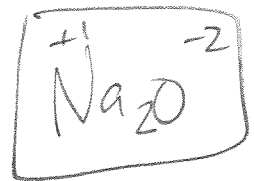


$(-2) = (x) + (3 \cdot -2)$

$-2 = x - 6$
 \downarrow
 $+4$



(c) $\text{Na}_2\text{O} \Rightarrow \text{O}^{-2} \Rightarrow$ each Na is +1



(50 cont.)

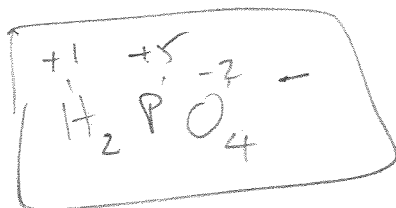


$$2H^+ \quad \swarrow \quad \searrow \quad PO_4^{3-} \rightarrow (-3) = (x) + (4 \cdot -2)$$

$$-3 = x - 8$$

$$\quad \quad \quad \swarrow \quad \searrow$$

$$\quad \quad \quad +5$$



51/52 Assign oxidation numbers to each element

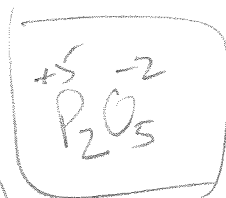
(51)(a) $P_2O_5 = (0) = (2x) + (-10)$

$+10 = 2x$

$+5 = x$

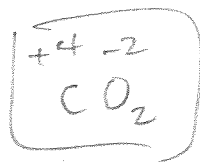
$P = +5$

$O = -2$



(c) $CO_3^{2-} = (-2) = (x) + (-6)$

$+4 = x$



(52)(d) NOF $F = -1$ (most electronegative)

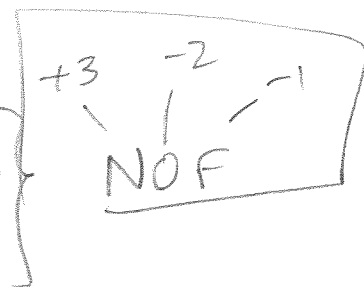
\uparrow 2nd most electronegative will also remove electrons from where it can = N

$O = -2$

So

$0 = (N) + (-2) + (-1)$

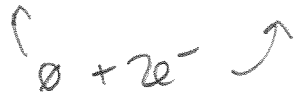
$+3 = N$



53/54

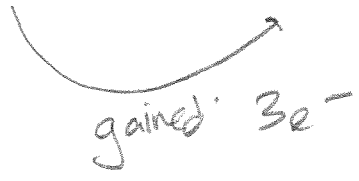
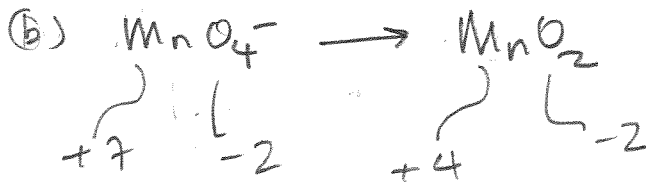
oxidation or reduction

(LEO says GER) §4

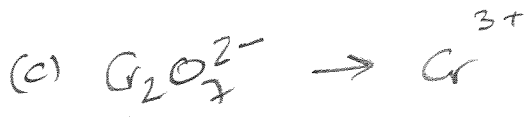


(yes, it's not balanced)

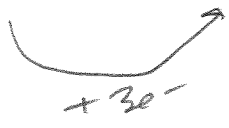
gain electrons = reduction



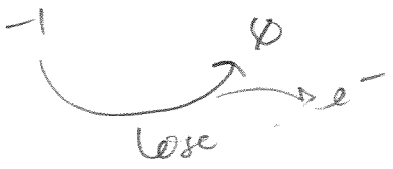
gain electrons = reduction



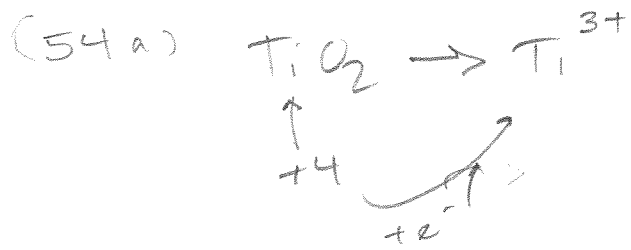
$(-2) = (2x) + (-14)$



reduction

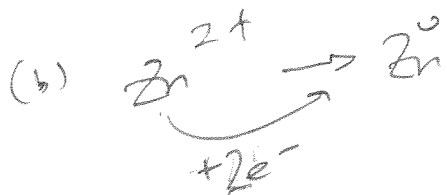


lose electron = oxidation



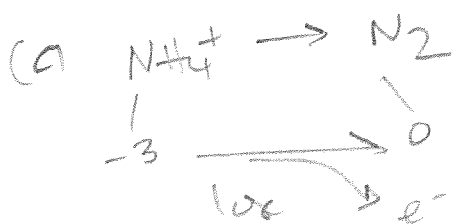
GERE

reduction



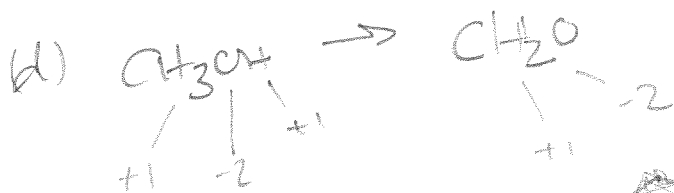
GERE

reduction



LEO

oxidation



$$\phi = (C) + (4 \cdot +1) + 1(-2)$$

\downarrow
 $+4$
 -2

$$\phi = (C) + (+2)$$

$$\phi = (C) + (+2) + (-2)$$

$$\phi = 0$$

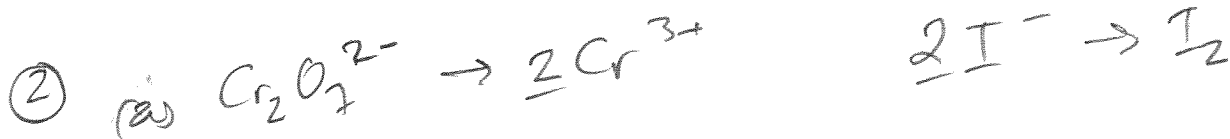
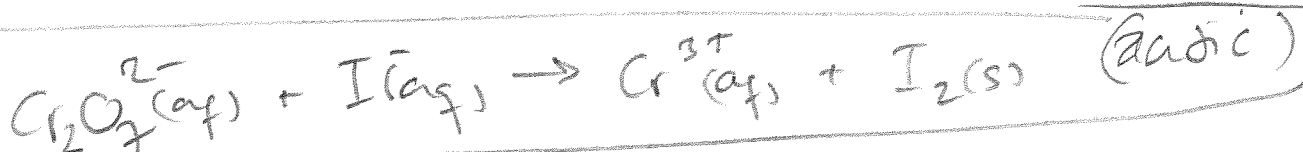


LEO

oxidation

Balancing Redox Rxns in Acidic

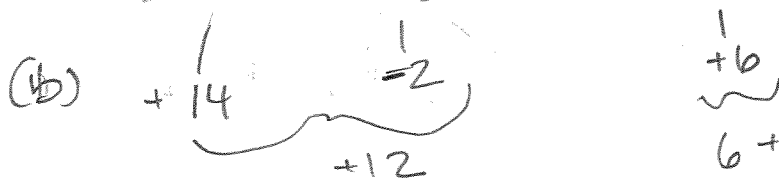
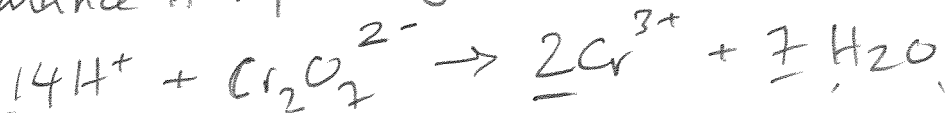
- ① half-reactions
- ② balance — (a) atoms (using ^(b) H^+ & H_2O) ^(c) e^-
- ③ multiply each half-rxn by integer so e^- 's balance
- ④ add half reactions



balance "O" by adding H_2O

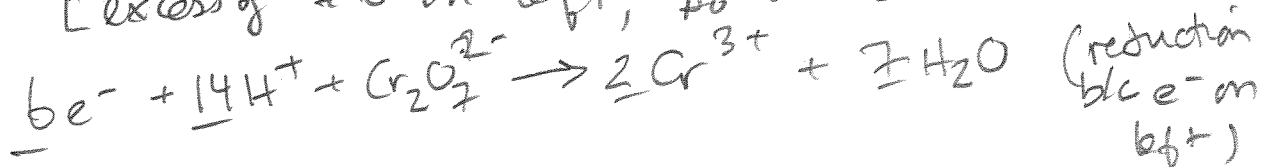


balance H by adding H^+ (acid environment)

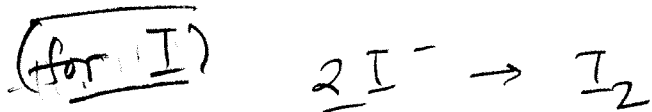


[excess of +6 on left, so add $6e^-$ on left]

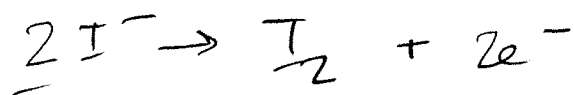
for Cr



(acidic 2)



- (2) (a) (balanced above)
(b) no O's so no H_2O 's needed
(c) no H's so no H^+ 's
(d) charge balance:



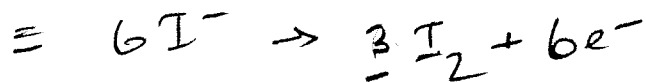
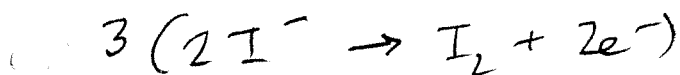
(oxidation
b/c electrons
lost, on right)

(Cr & I)

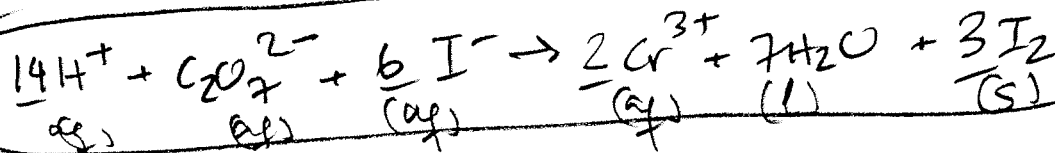
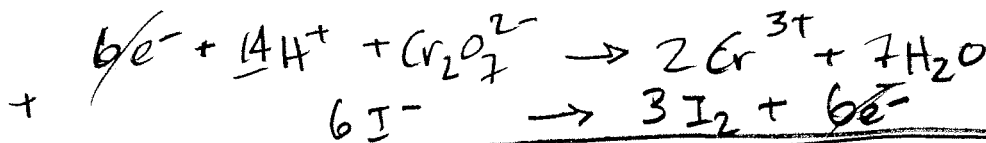
(3) multiply by integers so e's balance)

(Cr rxn needs' $6e^-$)

I rxn (as its) loses $2e^-$, so:



(4) Add $\frac{1}{2}$ rxns & simplify

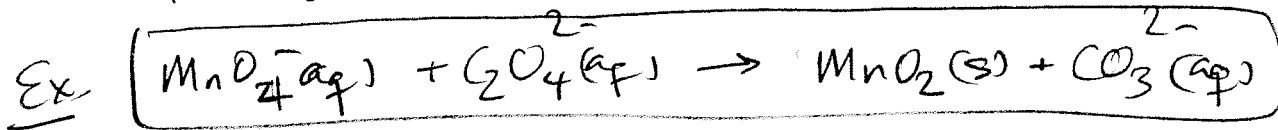


check atoms - they balance!

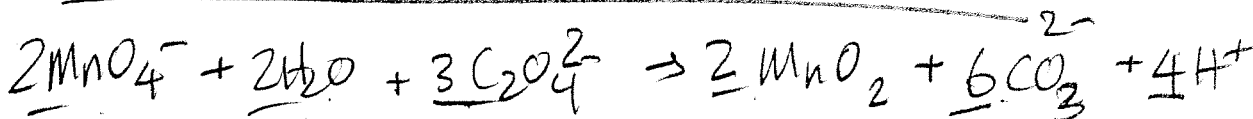
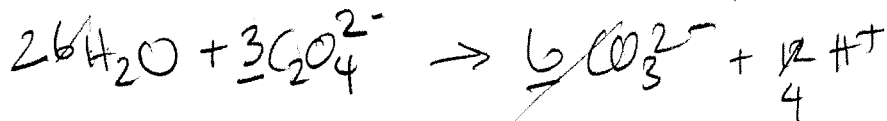
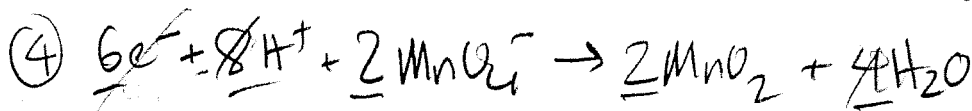
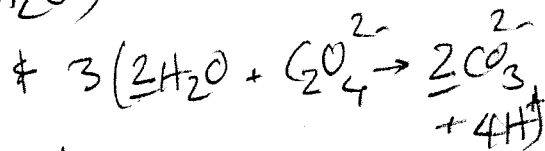
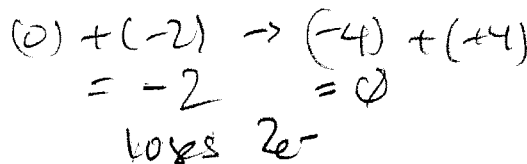
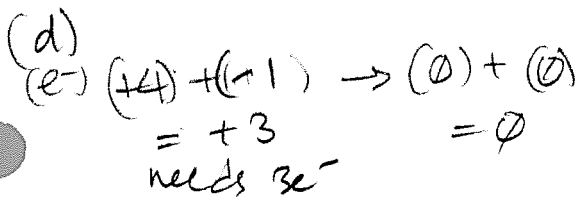
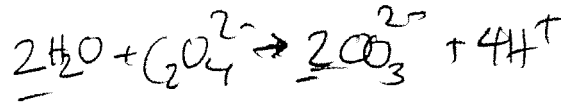
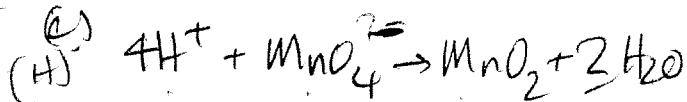
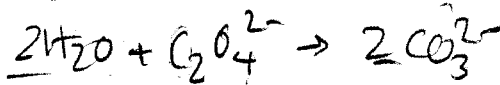
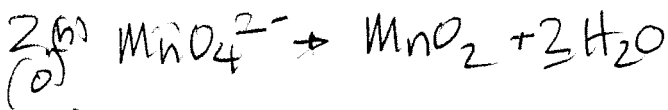
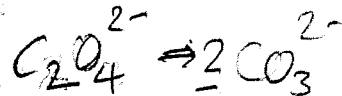
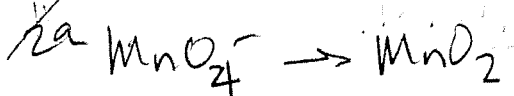
Balancing Redox Reactions (basic solutions)

Repeat steps for acidic solutions

Then add OH^- and cancel excess H_2O



(1) Balance atoms other than O & H

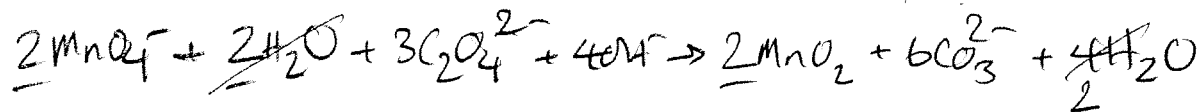
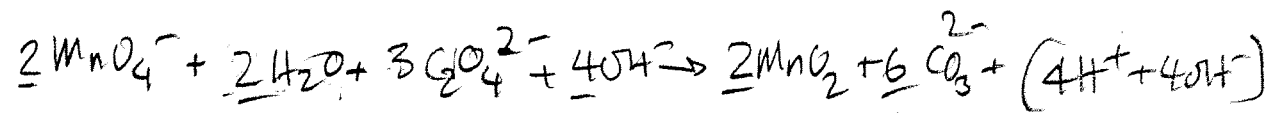


⑤ add OH^- to neutralize H^+ & cancel excess H^+

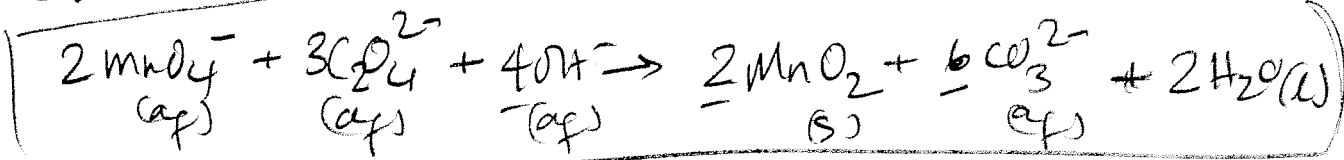
(adding 4OH^- to both sides forms $4\text{H}_2\text{O}$ on right)



basic (2)



⇒



check

