CHEMISTRY 2.7

## WORKSHEET ONE

## REDOX \#1

1. State the oxidation number of the underlined element in each of the following species.
(a) $\underline{\mathrm{HCl}}$ $\qquad$
(b) $\quad \mathrm{CO}_{2}$ $\qquad$
(c) $\mathrm{SO}_{3}{ }^{2-}$

(d) $\underline{\mathrm{CO}}$ $\qquad$
(e) KI $\qquad$
(f) $\mathrm{H}_{2} \underline{\mathrm{O}}_{2}$ $\qquad$
(g) $\mathrm{Cr}\left(\mathrm{NO}_{3}\right)_{3}$ $\qquad$
(h) $\quad \underline{B r}_{2}$ $\qquad$
(i) $\mathrm{H}_{2} \mathrm{SO}_{4}$ $\qquad$
(j) $\quad \mathrm{FeSO}_{4}$ $\qquad$
(k) $\quad \underline{\mathrm{Fe}_{2}}\left(\mathrm{CO}_{3}\right)_{3}$ $\qquad$
(1) $\mathrm{KMnO}_{4}$ $\qquad$
(m) $\underline{\mathrm{MnI}}_{2}$ $\qquad$
(n) CaO
(o) $\mathrm{Cr}_{2} \mathrm{O}_{7}{ }^{2-}$ $\qquad$
(p) $\mathrm{H}_{2} \mathrm{O}_{3}^{-}$ $\qquad$
(q) $\underline{\mathrm{ZnO}}$ $\qquad$
(r) $\quad \underline{H}_{2} \mathrm{O}$
$\qquad$
2. State whether each of the following examples is an oxidation or a reduction reaction.
(a) Gain of oxygen.
(b) Gain of hydrogen.
(c) An element becoming a negative ion.
(d) An atom that increases its oxidation number. $\qquad$
3. State whether each of the following reactions is an oxidation or a reduction reaction.
(a) $\mathrm{O}_{2}$ to $\mathrm{O}^{2-}$
(b) $\mathrm{I}_{2}$ to $\mathrm{I}^{-}$
(c) Mg to $\mathrm{Mg}^{2+}$ $\qquad$
(d) $\mathrm{HSO}_{3}{ }^{-}$to $\mathrm{SO}_{4}{ }^{2-}$ $\qquad$
(e) $\mathrm{Fe}^{3+}$ to $\mathrm{Fe}^{2+}$ $\qquad$
(f) $\mathrm{Br}^{-}$to $\mathrm{Br}_{2}$ $\qquad$
(g) $\quad \mathrm{Cr}_{2} \mathrm{O}_{7}^{2-}$ to $\mathrm{Cr}^{3+}$ $\qquad$
(h) $\mathrm{MnO}_{4}^{-}$to $\mathrm{Mn}^{2+}$ $\qquad$
(i) $\mathrm{Cl}_{2}$ to $\mathrm{Cl}^{-}$
(j) $\mathrm{H}^{+}$to $\mathrm{H}_{2}$
$\qquad$
$\qquad$
4. For each of the reactions that follow write the balanced ion-electron half equation.
(a) Cu to $\mathrm{Cu}^{2+}$ $\qquad$
(b) $\mathrm{Fe}^{2+}$ to $\mathrm{Fe}^{3+}$ $\qquad$
(c) $\mathrm{SO}_{3}{ }^{2-}$ to $\mathrm{SO}_{4}{ }^{2-}$
(d) $\mathrm{Cr}_{2} \mathrm{O}_{7}{ }^{2-}$ to $\mathrm{Cr}^{3+}$ $\qquad$
(e) $\mathrm{MnO}_{4}^{-}$to $\mathrm{Mn}^{2+}$
5. For each of the following reactions, state which element is acting as the oxidant and which is acting as the reductant (extension)
(a) $\mathrm{H}_{2}+\mathrm{I}_{2} \rightarrow 2 \mathrm{HI}$
(b) $\mathrm{Fe}+2 \mathrm{HCl} \rightarrow \mathrm{FeCl}_{2}+\mathrm{H}_{2}$ $\qquad$
(c) $\mathrm{Mg}+\mathrm{Cu}^{2+}{ }_{(\text {aq })} \rightarrow \mathrm{Mg}^{2+}{ }_{(\text {aq })}+\mathrm{Cu}$ $\qquad$
(d) $\quad 2 \mathrm{Fe}^{2+}{ }_{\text {(aq) }}+\mathrm{I}_{2} \rightarrow 2 \mathrm{Fe}^{3+}{ }_{\text {(aq) }}+2 \mathrm{I}_{\text {(aq) }}$ $\qquad$
6. For each of the following reactions, state which element is being oxidised and which is being reduced.
(a) $\mathrm{Cl}_{2}+2 \mathrm{Br}_{\text {(aq) }}^{-} \rightarrow 2 \mathrm{Cl}_{\text {(aq) }}^{-}+\mathrm{Br}_{2}$ $\qquad$
(b) $\mathrm{Zn}+2 \mathrm{HCl} \rightarrow \mathrm{ZnCl}_{2}+\mathrm{H}_{2}$ $\qquad$
(c) $\quad \mathrm{SO}_{2}+\mathrm{O}_{2} \rightarrow \mathrm{SO}_{3}$ $\qquad$
(d) $\mathrm{Mg}+\mathrm{Cu}^{2+}{ }_{\text {(aq) }} \rightarrow \mathrm{Mg}^{2+}{ }_{(\text {aq })}+\mathrm{Cu}$ $\qquad$
(e) $\quad \mathrm{SO}_{3}{ }^{2-}{ }_{(\mathrm{aq})}+\mathrm{H}_{2} \mathrm{O}+2 \mathrm{Fe}^{3+}{ }_{(\mathrm{aq})} \rightarrow \mathrm{SO}_{4}{ }^{2-}{ }_{(\mathrm{aq})}+2 \mathrm{H}^{+}{ }_{(\mathrm{aq})}+2 \mathrm{Fe}^{2+}{ }_{(\mathrm{aq})}$ $\qquad$
(f)
$\mathrm{Cr}_{2} \mathrm{O}_{7}{ }^{2-}{ }_{(\mathrm{aq})}+14 \mathrm{H}^{+}{ }_{(\mathrm{aq})}+6 \mathrm{Br}^{-}{ }_{(\mathrm{aq})} \rightarrow 2 \mathrm{Cr}^{3+}{ }_{(\mathrm{aq})}+7 \mathrm{H}_{2} \mathrm{O}+3 \mathrm{Br}_{2}$ $\qquad$
7. Referring to Question 6 explain your reasoning for
(a) $\qquad$
$\qquad$
$\qquad$
(c) $\qquad$
$\qquad$
$\qquad$
(d) $\qquad$
$\qquad$
$\qquad$
