

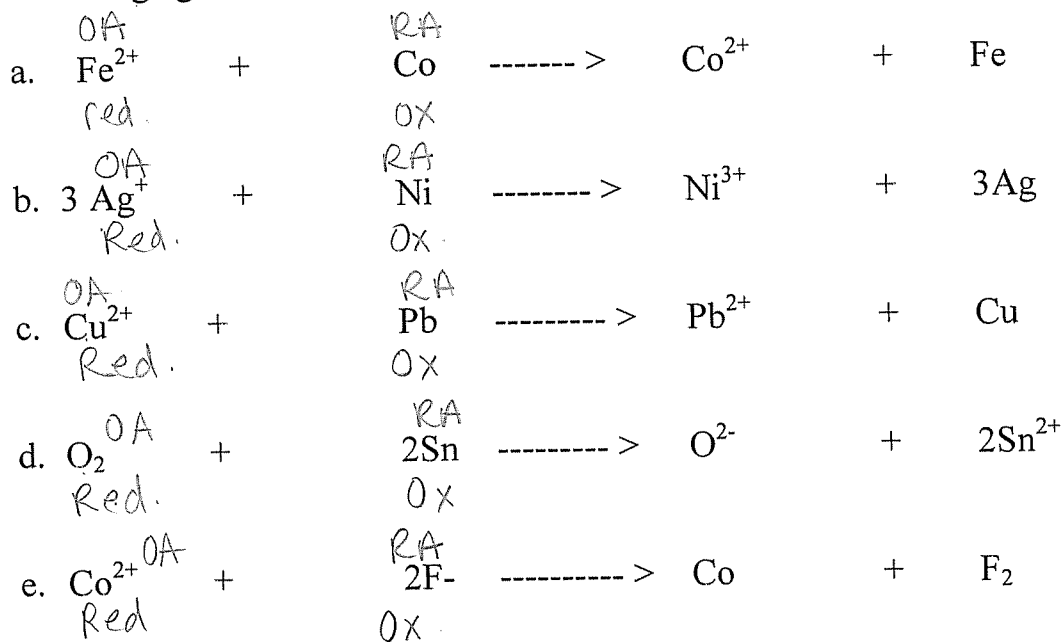
WORKSHEET 5.1

Introduction to Redox Reactions and Half Reactions

1. Define the following:

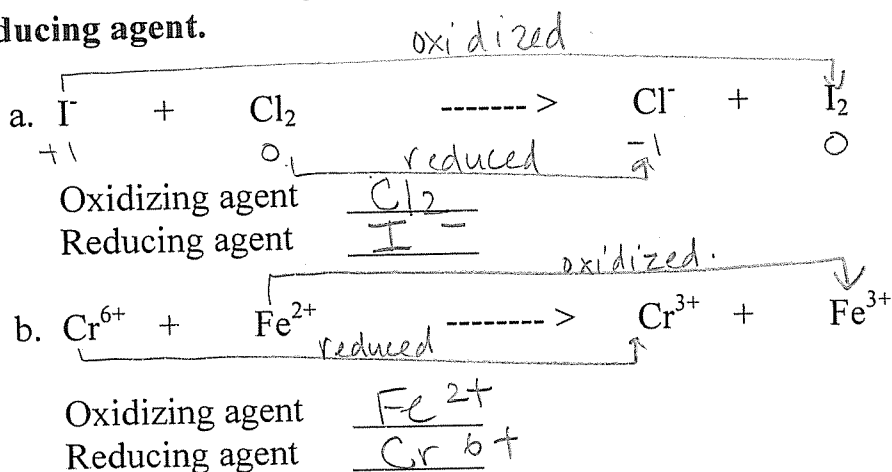
- a. Oxidation - when a species loses electrons (charge becomes more positive)
- b. Reduction - when a species gains electrons (charge becomes more negative).
- c. Oxidizing Agent - species being reduced.
- d. Reducing Agent - species being oxidized.

2. Label the species that is reduced, that is oxidized, the reducing agent and the oxidizing agent.



3. In question 3a, which species loses electrons? "Co" loses 2 e⁻
4. In question 3b, which species gains electrons? "Ag⁺" gains 1 e⁻

5. In each of the following reactions, identify the oxidizing agent and the reducing agent.



6. State the oxidation number of each of the elements that is underlined.

- | | |
|--|---------------------------------------|
| a) $\underline{N}H_3$ <u>-3</u> | l) $H_2\underline{S}O_4$ <u>+6</u> |
| b) $Zn\underline{S}O_3$ <u>+4</u> | m) $Al(OH)\underline{3}$ <u>+3</u> |
| c) $\underline{N}a$ <u>0</u> | n) $\underline{C}l_2$ <u>0</u> |
| d) $Ag\underline{N}O_3$ <u>+5</u> | o) $\underline{C}lO_4^-$ <u>+7</u> |
| e) $\underline{S}O_2$ <u>+4</u> | p) $K_2\underline{C}r_2O_4$ <u>+3</u> |
| +1(x)(-6)=-2 f) $H\underline{P}O_3^{2-}$ <u>+3</u> | q) $K_2\underline{C}r_2O_7$ <u>+6</u> |
| g) $\underline{Mn}O_2$ <u>+4</u> | r) $\underline{N}H_4^+$ <u>-3</u> |
| h) $\underline{Pb}O_2$ <u>+4</u> | s) $\underline{F}eO$ <u>+2</u> |
| i) $K_2\underline{S}O_4$ <u>+6</u> | t) $\underline{S}iO_4^+$ <u>-2</u> |
| peroxide j) $Na_2\underline{O}_2$ <u>-1</u> | u) $\underline{C}lO_3^-$ <u>+5</u> |
| k) $Na\underline{I}O_3$ <u>+5</u>
+1 -6 | v) $Na\underline{H}$ <u>-1</u> |

$$NH_4^+ \\ x(+4) = +1 \\ x = -3$$

7. What is the oxidation number of carbon in each of the following substances?

- | | |
|------------------------------|--|
| a) CO <u>+2</u> | c) C <u>0</u> |
| b) CO ₂ <u>+4</u> | d) CO ₃ ²⁻ <u>+4</u> |
- $$x \cdot 3(-2) = -2 \\ x - 6 = -2 \\ x = +4$$

8. Determine if each of the following changes is oxidation, reduction or neither.

