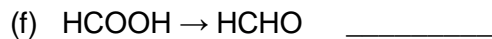
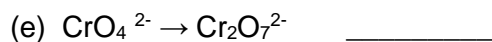
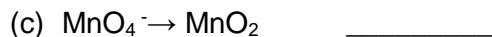
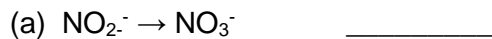


**Balancing
Oxidation-Reduction
Reactions**

Name : _____

APPLICATION OF PRINCIPLES

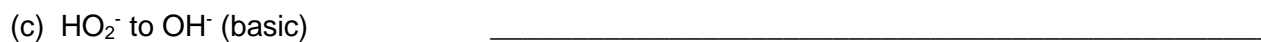
1. Show the change in oxidation number (give number of electrons gained or lost *per atom*: e.g., 3e-gained) in the following reactions:



2. Write the half-reaction equation for the oxidation of



3. Write the half-reaction equation for the following:



4. Write the half-reaction equation for the following:



(b) ClO_3^- to Cl^- (acidic) _____

(c) ClO^- to ClO_4^- (acidic) _____

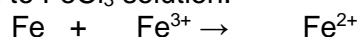
(d) $\text{Cr}_2\text{O}_7^{2-}$ to Cr^{3+} (acidic) _____

(e) HCOOH to CO_2 (acidic) _____

(f) CH_3NO_2 to CH_3NH_2 (acidic) _____

5. Given the reactants and products, write balanced net ionic equations for the following reactions. (Supply H_2O , H^+ , or OH^- as needed.)

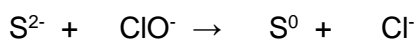
(a) Iron filings are added to FeCl_3 solution.



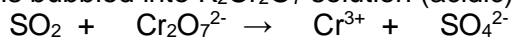
(b) Bismuth metal is dissolved in hot concentrated HNO_3 and a brown gas is given off.



(c) A mixture of Na_2S , NaClO , and NaOH solutions is warmed, giving a suspended precipitate.



(d) SO_2 gas is bubbled into $\text{K}_2\text{Cr}_2\text{O}_7$ solution (acidic).



6. Give the formula of a product (derived from the first-named substance) that may be formed in the following reactions. (Note, in the example that any lower oxidation state compound is possible: but not any higher one. Some are more probable than others.)

Example. H_2SO_3 is treated with a reducing agent. S. S_2^{2-} . H_2S

- (a) HClO_2 is treated with a reducing agent. _____
 - (b) H_2SO_3 is treated with an oxidizing agent. _____
 - (c) SnCl_4 is treated with zinc dust. _____
 - (d) $\text{Cr}_2\text{O}_7^{2-}$ is treated with SnCl_2 . _____
 - (e) KMnO_4 is treated with FeSO_4 . _____
 - (f) MnO_2 is treated with concentrated HCl . _____
-

7. Predict the products and write balanced net ionic equations for the following reactions.

(g) SnCl_2 is added to KMnO_4 solution (acidic) forming Mn^{2+} .

(h) Zinc dust is treated with dilute HNO_3 forming NH_4^+ .

(i) Oxalate in CaC_2O_4 is oxidized to CO_2 by KMnO_4 in acidic solution, forming Mn^{2+} .