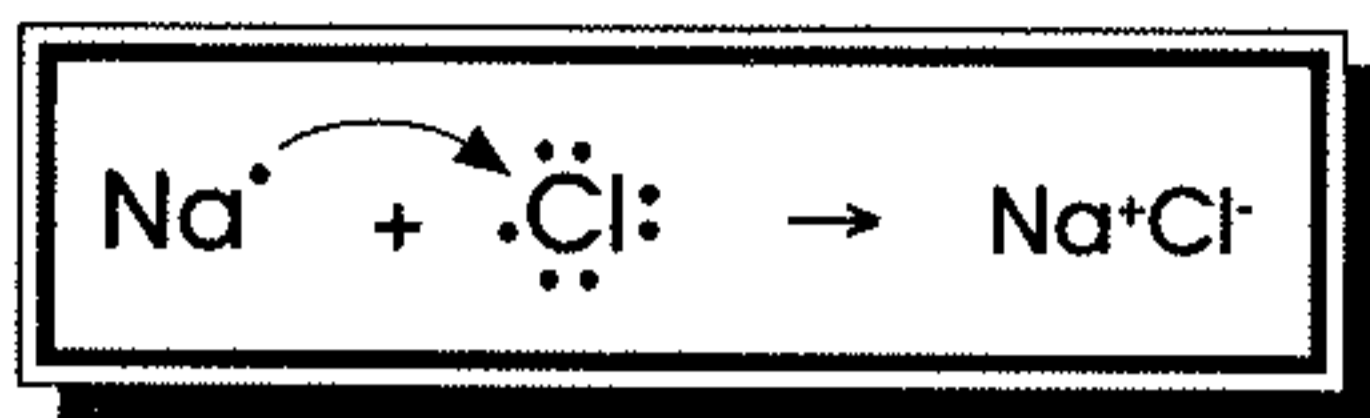


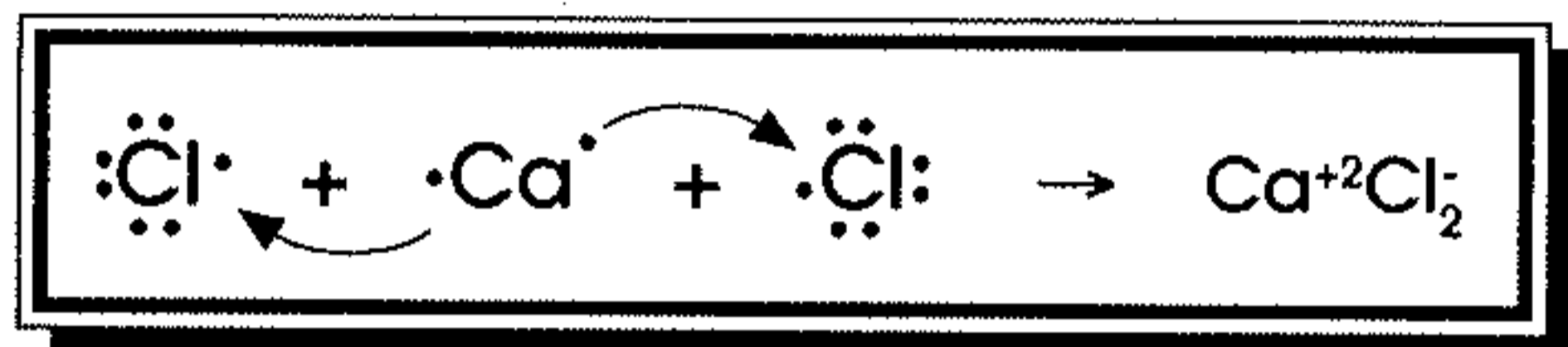
# IONIC BONDING

Name \_\_\_\_\_

Ionic bonding occurs when a metal transfers one or more electrons to a nonmetal in an effort to attain a stable octet of electrons. For example, the transfer of an electron from sodium to chlorine can be depicted by a Lewis dot diagram.



Calcium would need two chlorine atoms to get rid of its two valence electrons.

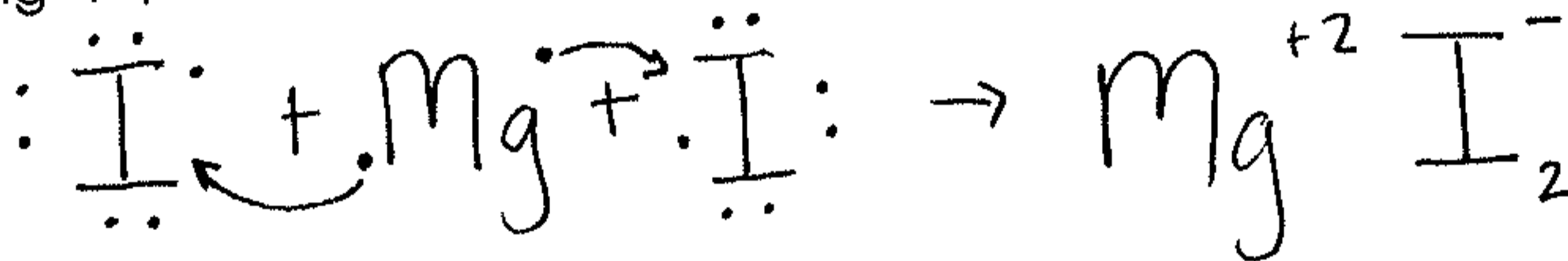


Show the transfer of electrons in the following combinations.

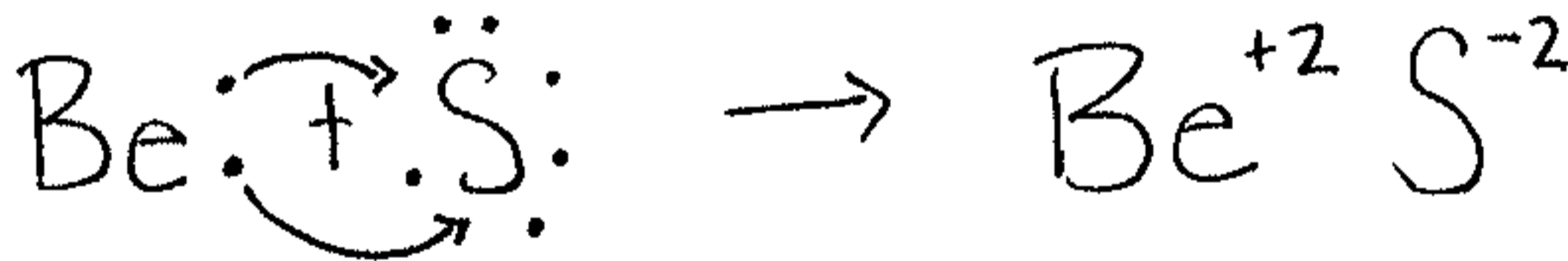
1. K + F



2. Mg + I



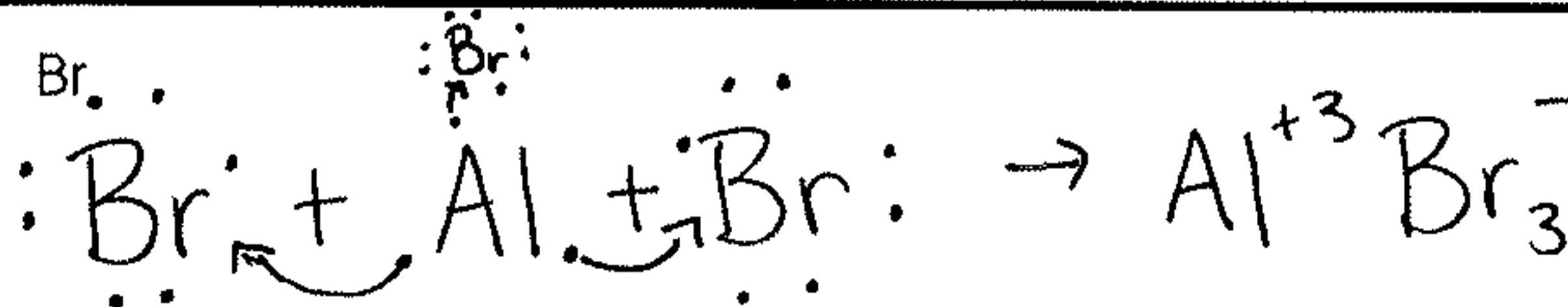
3. Be + S



4. Na + O



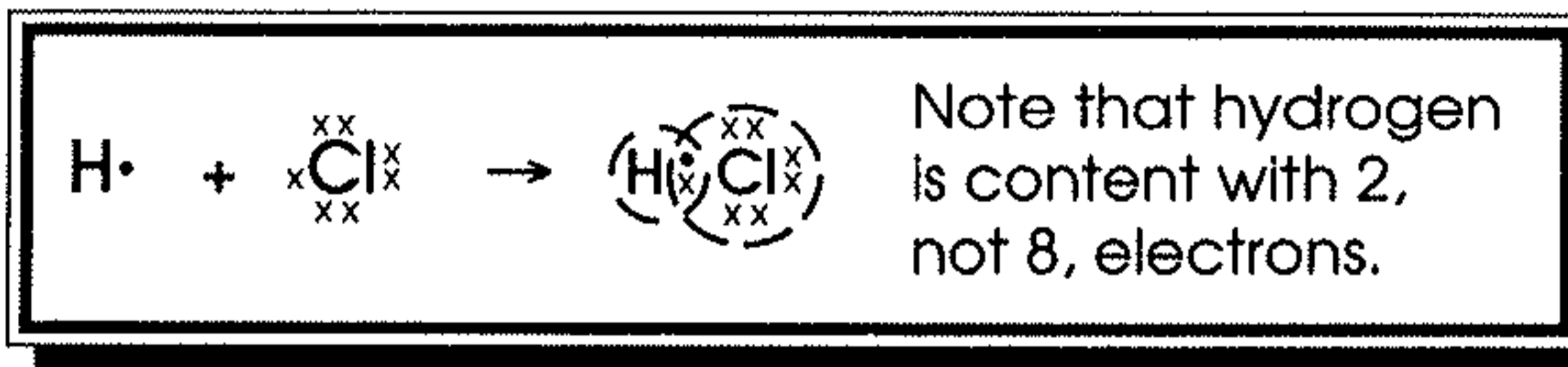
5. Al + Br



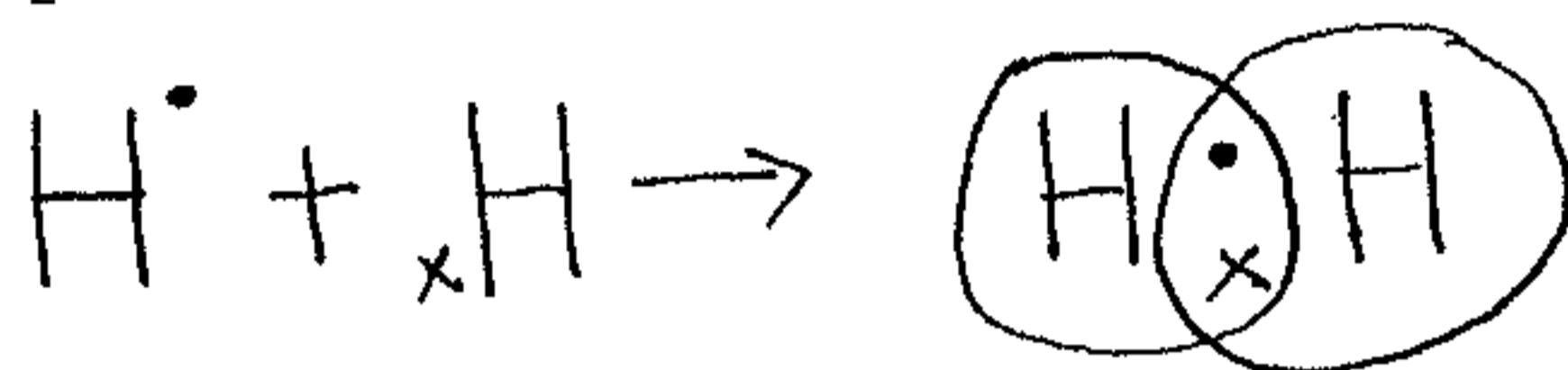
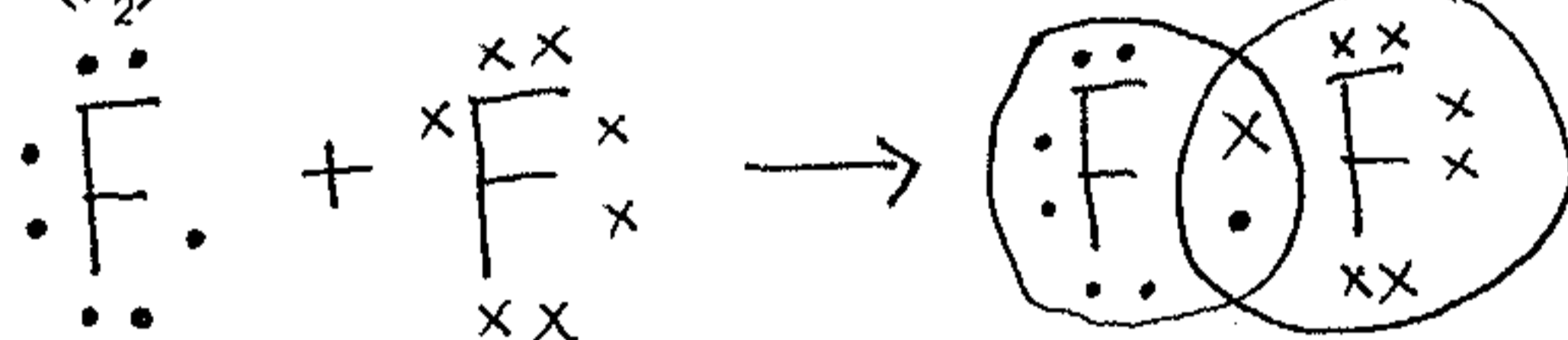
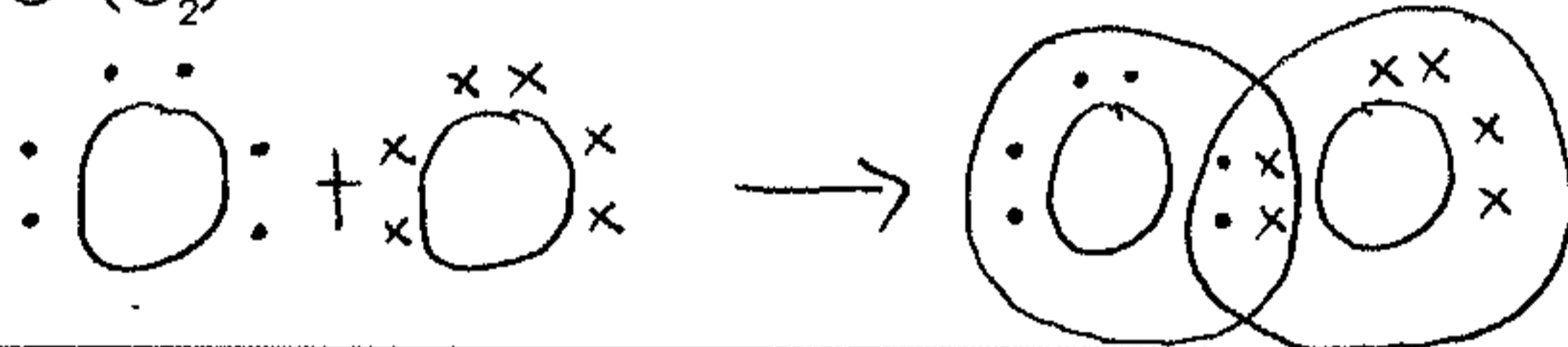
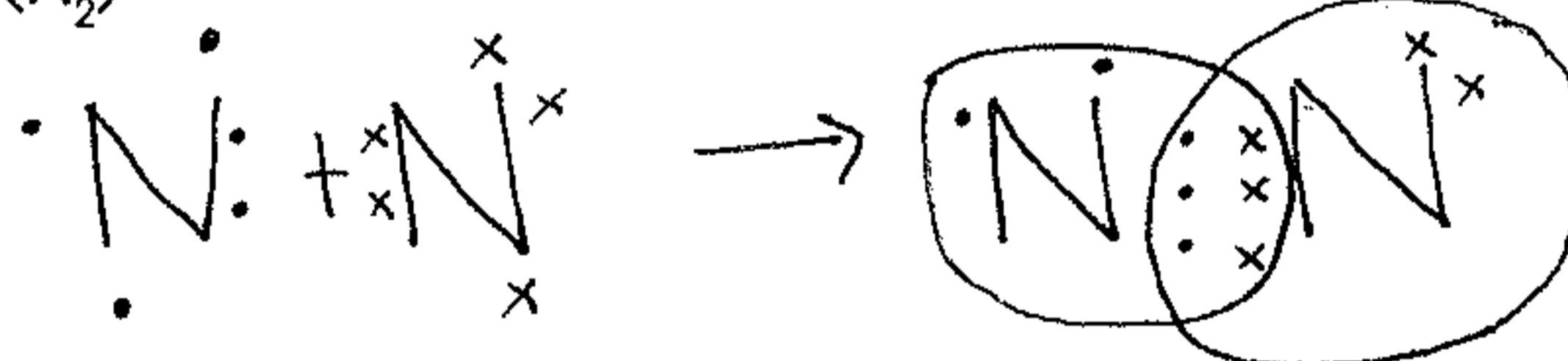
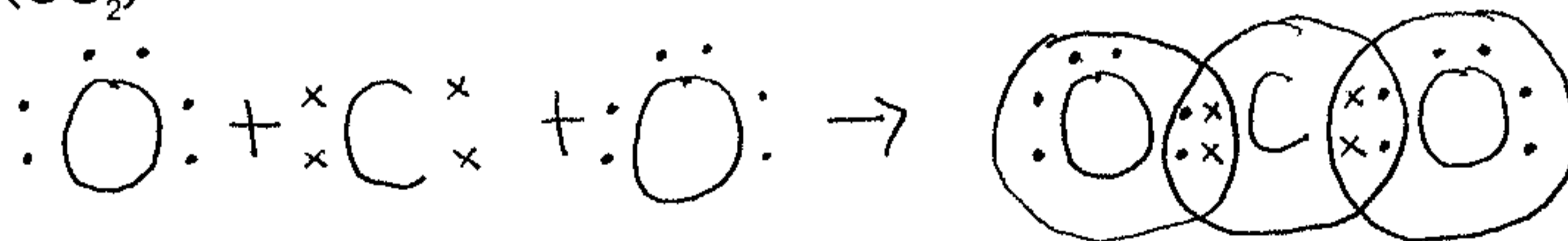
# COVALENT BONDING

Name \_\_\_\_\_

Covalent bonding occurs when two or more nonmetals share electrons, attempting to attain a stable octet of electrons at least part of the time. For example:



Show how covalent bonding occurs in each of the following pairs of atoms. Atoms may share one, two or three pairs of electrons.

 1. H + H (H<sub>2</sub>)

 2. F + F (F<sub>2</sub>)

 3. O + O (O<sub>2</sub>)

 4. N + N (N<sub>2</sub>)

 5. C + O (CO<sub>2</sub>)

 6. H + O (H<sub>2</sub>O)


# TYPES OF CHEMICAL BONDS

Name \_\_\_\_\_

Classify the following compounds as ionic (metal + nonmetal), covalent (nonmetal + nonmetal) or both (compound containing a polyatomic ion).

1.  $\text{CaCl}_2$  ionic11.  $\text{MgO}$  ionic2.  $\text{CO}_2$  covalent12.  $\text{NH}_4\text{Cl}$  both3.  $\text{H}_2\text{O}$  covalent13.  $\text{HCl}$  covalent4.  $\text{BaSO}_4$  both14.  $\text{KI}$  ionic5.  $\text{K}_2\text{O}$  ionic15.  $\text{NaOH}$  both6.  $\text{NaF}$  ionic16.  $\text{NO}_2$  covalent7.  $\text{Na}_2\text{CO}_3$  both17.  $\text{AlPO}_4$  both8.  $\text{CH}_4$  covalent18.  $\text{FeCl}_3$  ionic9.  $\text{SO}_3$  covalent19.  $\text{P}_2\text{O}_5$  covalent10.  $\text{LiBr}$  ionic20.  $\text{N}_2\text{O}_3$  covalent

# WRITING FORMULAS (CRISS-CROSS METHOD)

Name KEY

Write the formulas of the compounds produced from the listed ions.

	Cl <sup>-</sup>	CO <sub>3</sub> <sup>-2</sup>	OH <sup>-</sup>	SO <sub>4</sub> <sup>-2</sup>	PO <sub>4</sub> <sup>-3</sup>	NO <sub>3</sub> <sup>-</sup>
Na <sup>+</sup>	NaCl	Na <sub>2</sub> CO <sub>3</sub>	NaOH	Na <sub>2</sub> SO <sub>4</sub>	Na <sub>3</sub> PO <sub>4</sub>	NaNO <sub>3</sub>
NH <sub>4</sub> <sup>+</sup>	NH <sub>4</sub> Cl	(NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub>	NH <sub>4</sub> OH	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	(NH <sub>4</sub> ) <sub>3</sub> PO <sub>4</sub>	NH <sub>4</sub> NO <sub>3</sub>
K <sup>+</sup>	KCl	K <sub>2</sub> CO <sub>3</sub>	KOH	K <sub>2</sub> SO <sub>4</sub>	K <sub>3</sub> PO <sub>4</sub>	KNO <sub>3</sub>
Ca <sup>+2</sup>	CaCl <sub>2</sub>	CaCO <sub>3</sub>	Ca(OH) <sub>2</sub>	CaSO <sub>4</sub>	Ca <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	Ca(NO <sub>3</sub> ) <sub>2</sub>
Mg <sup>+2</sup>	MgCl <sub>2</sub>	MgCO <sub>3</sub>	Mg(OH) <sub>2</sub>	MgSO <sub>4</sub>	Mg <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	Mg(NO <sub>3</sub> ) <sub>2</sub>
Zn <sup>+2</sup>	ZnCl <sub>2</sub>	ZnCO <sub>3</sub>	Zn(OH) <sub>2</sub>	ZnSO <sub>4</sub>	Zn <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	Zn(NO <sub>3</sub> ) <sub>2</sub>
Fe <sup>+3</sup>	FeCl <sub>3</sub>	Fe <sub>2</sub> (CO <sub>3</sub> ) <sub>3</sub>	Fe(OH) <sub>3</sub>	Fe <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>	FePO <sub>4</sub>	Fe(NO <sub>3</sub> ) <sub>3</sub>
Al <sup>+3</sup>	AlCl <sub>3</sub>	Al <sub>2</sub> (CO <sub>3</sub> ) <sub>3</sub>	Al(OH) <sub>3</sub>	Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>	AlPO <sub>4</sub>	Al(NO <sub>3</sub> ) <sub>3</sub>
Co <sup>+3</sup>	CoCl <sub>3</sub>	Co <sub>2</sub> (CO <sub>3</sub> ) <sub>3</sub>	Co(OH) <sub>3</sub>	Co <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>	CoPO <sub>4</sub>	Co(NO <sub>3</sub> ) <sub>3</sub>
Fe <sup>+2</sup>	FeCl <sub>2</sub>	FeCO <sub>3</sub>	Fe(OH) <sub>2</sub>	FeSO <sub>4</sub>	Fe <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	Fe(NO <sub>3</sub> ) <sub>2</sub>
H <sup>+</sup>	HCl	H <sub>2</sub> CO <sub>3</sub>	H <sub>2</sub> O	H <sub>2</sub> SO <sub>4</sub>	H <sub>3</sub> PO <sub>4</sub>	HNO <sub>3</sub>

# NAMING IONIC COMPOUNDS

Name \_\_\_\_\_

Name the following compounds using the Stock Naming System.

1.  $\text{CaCO}_3$  calcium carbonate
2.  $\text{KCl}$  potassium chloride
3.  $\text{FeSO}_4$  iron (II) sulfate
4.  $\text{LiBr}$  lithium bromide
5.  $\text{MgCl}_2$  magnesium chloride
6.  $\text{FeCl}_3$  iron (III) chloride
7.  $\text{Zn}_3(\text{PO}_4)_2$  zinc phosphate
8.  $\text{NH}_4\text{NO}_3$  ammonium nitrate
9.  $\text{Al}(\text{OH})_3$  aluminum hydroxide
10.  $\text{CuC}_2\text{H}_3\text{O}_2$  copper (I) acetate
11.  $\text{PbSO}_3$  lead (II) sulfite
12.  $\text{NaClO}_3$  sodium chlorate
13.  $\text{CaC}_2\text{O}_4$  calcium oxalate
14.  $\text{Fe}_2\text{O}_3$  iron (III) oxide
15.  $(\text{NH}_4)_3\text{PO}_4$  ammonium phosphate
16.  $\text{NaHSO}_4$  sodium hydrogen sulfate
17.  $\text{Hg}_2\text{Cl}_2$  mercury (I) chloride
18.  $\text{Mg}(\text{NO}_2)_2$  magnesium nitrite
19.  $\text{CuSO}_4$  copper (II) sulfate
20.  $\text{NaHCO}_3$  sodium hydrogen carbonate
21.  $\text{NiBr}_3$  nickel (III) bromide
22.  $\text{Be}(\text{NO}_3)_2$  beryllium nitrate
23.  $\text{ZnSO}_4$  zinc sulfate
24.  $\text{AuCl}_3$  gold (III) chloride
25.  $\text{KMnO}_4$  potassium permanganate

# NAMING MOLECULAR COMPOUNDS

Name \_\_\_\_\_

Name the following covalent compounds.

1.  $\text{CO}_2$  Carbon dioxide
2.  $\text{CO}$  Carbon monoxide
3.  $\text{SO}_2$  Sulfur dioxide
4.  $\text{SO}_3$  Sulfur trioxide
5.  $\text{N}_2\text{O}$  dinitrogen monoxide
6.  $\text{NO}$  nitrogen monoxide
7.  $\text{N}_2\text{O}_3$  dinitrogen trioxide
8.  $\text{NO}_2$  nitrogen dioxide
9.  $\text{N}_2\text{O}_4$  dinitrogen tetroxide
10.  $\text{N}_2\text{O}_5$  dinitrogen pentoxide
11.  $\text{PCl}_3$  phosphorus trichloride
12.  $\text{PCl}_5$  phosphorus pentachloride
13.  $\text{NH}_3$  ammonia
14.  $\text{SCl}_6$  Sulfur hexachloride
15.  $\text{P}_2\text{O}_5$  diphosphorus pentoxide
16.  $\text{CCl}_4$  Carbon tetrachloride
17.  $\text{SiO}_2$  Silicon dioxide
18.  $\text{CS}_2$  carbon disulfide
19.  $\text{OF}_2$  oxygen difluoride
20.  $\text{PBr}_3$  phosphorus tribromide

# WRITING FORMULAS FROM NAMES

Name \_\_\_\_\_

Write the formulas of the following compounds.

1. ammonium phosphate  $(\text{NH}_4)_3\text{PO}_4$
2. Iron (II) oxide  $\text{FeO}$
3. iron (III) oxide  $\text{Fe}_2\text{O}_3$
4. carbon monoxide  $\text{CO}$
5. calcium chloride  $\text{CaCl}_2$
6. potassium nitrate  $\text{KNO}_3$
7. magnesium hydroxide  $\text{Mg}(\text{OH})_2$
8. aluminum sulfate  $\text{Al}_2(\text{SO}_4)_3$
9. copper (II) sulfate  $\text{CuSO}_4$
10. lead (IV) chromate ~~Pb~~  $\text{Pb}(\text{CrO}_4)_2$
11. diphosphorus pentoxide  $\text{P}_2\text{O}_5$
12. potassium permanganate  $\text{KMnO}_4$
13. sodium hydrogen carbonate  $\text{NaHCO}_3$
14. zinc nitrate  $\text{Zn}(\text{NO}_3)_2$
15. aluminum sulfite  $\text{Al}_2(\text{SO}_3)_3$