Chem - Practice: Nomenclature

1. Name the following:

a) KI
b) CaI_2
c) Li_3N
d) $LiNO_3$
e) $Al(NO_3)_3$
f) Cu_2SO_4
g) $CuSO_4$
h) $GaPO_4$
i) Ga_3PO_4
j) Al_2O_3
k) CO
l) CO_2
m) SO_3
n) ICl
o) N_2O_4

2. Give a chemical formula for the following:

a) rubidium bromide
b) Aluminum sulfide
c) indium chloride
d) thallium (I) chloride
e) bismuth (III) iodide
f) sodium arsenide
g) lead phosphate
h) silicon dioxide
i) dinitrogen pentoxide.

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1. All compounds from a to j contain either a metal + a non-metal or a molecular ion & so are IONIC.

a) KI : I : group VII ⇒ $I^{\ominus}$ iodide ion
∴ 1* K must be $K^{\oplus}$. group I, so potassium ion

∴ potassium iodide

b) CaI_2 I : group VII ⇒ $I^{\ominus}$ iodide ion. Two of them ⇒ 2- total
Ca : must be Ca^{2+}. Group II ⇒ calcium ion

∴ calcium iodide

c) Li_3N : N : group V ⇒ N^{3-} nitride ion
∴ need total of 3+, so each Li must be Li^{+}. lithium ion

∴ lithium nitride

d) $LiNO_3$: $NO_3^{\ominus}$ · nitrate ion (from the "memorize" list)
∴ Li^{+} : lithium ion

∴ lithium nitrate

e) $Al(NO_3)_3$: NO_3^{-} : nitrate ion. there are 3 of them ⇒ 3- total

∴ Al must be Al^{3+}. Al in group III, so aluminum ion

∴ Aluminum nitrate

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1 f) Cu_2SO_4 : SO_4^{2-} sulfate ion ⇒ total of −2

∴ total of +2, on two copper - so Cu^+ : copper I ion

∴ Copper (I) sulfate

g) $CuSO_4$: SO_4^{2-} sulfate ion ⇒ total of −2
∴ total of +2 on one copper ⇒ Cu^{2+} copper (II) ion

∴ Copper (II) sulfate

h) $GaPO_4$: PO_4^{3-} phosphate ion ⇒ total of −3
∴ total of +3, on one gallium ⇒ Ga^{3+}. group III - gallium ion

∴ Gallium phosphate

i) Ga_3PO_4 : PO_4^{3-} as above ⇒ total −3
∴ total of +3, on three gallium ⇒ Ga^+. group III - gallium (I) ion

∴ Gallium (I) phosphate

j) Al_2O_3 : O - group VI ⇒ O^{2-} oxide ion ∴ total 6−
total of 6+, on 2 Al ⇒ Al^{3+}. group III : aluminum ion

∴ Aluminum oxide

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1 k-o are all two non-metal elements ⇒ covalent

1k) CO : One carbon & one oxygen : Carbon monoxide

l) CO_2 : One carbon & two oxygen : Carbon dioxide

m) SO_3 : One sulfur & three oxygen : Sulfur trioxide

n) ICl : One iodine & one chloride : Iodine monochloride

o) N_2O_4 : Two nitrogen & four oxygen : Dinitrogen tetroxide

2. a) rubidium - group I ⇒ Rb^+
bromide - group VII ⇒ Br^-
$\}$ $(Rb^+)_1(Br^-)_1$ ⇒ RbBr

b) Aluminum: group III ⇒ Al^{3+}
sulfide : group VI ⇒ S^{2-}
$\}$ $(Al^{3+})_2(S^{2-})_3$: Al_2S_3

c) Indium ~~chloride~~ group III ⇒ In^{3+}
chloride: group VII ⇒ Cl^-
$\}$ $(In^{3+})_1(Cl^-)_3$: $InCl_3$

d) thallium (I) ~~ch~~ : must be Tl^+
chloride: group VII Cl^-
$(Tl^+)_1(Cl^-)_1$ ⇒ TlCl

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2 e) bismuth (III) $\Rightarrow Bi^{3+}$
iodide : group VII $\Rightarrow I^-$
$\Big\} (Bi^{3+})_1 (I^-)_3 : BiI_3$

f) sodium : group I $\Rightarrow Na^+$
arsenide : group V $\Rightarrow As^{3-}$
$\Big\} (Na^+)_3 (As^{3-})_1 : Na_3As$

g) ~~sodium~~

h) silicon dioxide : (prefix $\Rightarrow$ covalent!) SiO_2

i) dinitrogen pentoxide (" " ") N_2O_5

g) lead is in group IV $\therefore$ lead = Pb^{4+}
phosphate : PO_4^{3-}
$\Big\} (Pb^{4+})_3 (PO_4^{3-})_4$
$\Rightarrow Pb_3(PO_4)_4$