The Ultimate Nomenclature Review

Part A — Simple binary ionic compounds

i. Provide names for the following binary compounds:

1. KBr Potassium Bromide
2. $ZnCl_2$ Zinc Chloride
3. Al_2N_3 Aluminum Nitride
4. Na_2S Sodium Sulphide
5. Ca_3P_2 Calcium Phosphide
6. Be_3N_2 Beryllium Nitride
7. RbClRubidium Chloride
8. FrClFrancium Chloride
9. BaSeBarium Selenide
10. AgClSilver Chloride

11. General naming rule for simple binary ionic compounds:
_____ Metal_____ _____ Non-Metal + -ide____

ii. Provide formulae for the following binary compounds:

1. Calcium FluorideCaF_2
2. Aluminum OxideAl_2O_3
3. Potassium ChlorideKCl
4. Zinc SulphideZnS
5. Sodium FluorideNaF
6. Silver IodideAgI
7. Magnesium OxideMgO
8. Strontium ChlorideNaCl
9. Calcium PhosphideCa_3P_2
10. Strontium OxideSrO
11. Lithium SulphideLi_2S
12. Barium Chloride$BaCl_2$

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13. State the general rule to determine the formula of simple binary ionic compounds:
____ Crossover Rule with Valence Numbers_____

Part B — Simple binary ionic compounds With More than one Valence

i. Provide names for the following binary compounds:

Formula	'STOCK' or IUPAC System	Classical System (if possible)
1. $PbCl_2$	Lead (II) Chloride	Plumbous Chloride
2. Fe_2O_3	Iron (III) Oxide	Ferric Oxide
3. $SnCl_2$	Tin (II) Chloride	Stannous Chloride
4. MnF_3	Manganese (III) Fluoride	N/A

Formula	'STOCK' or IUPAC System	Classical System (if possible)
5. CuO	Copper (II) Oxide	Cupric Oxide
6. Cu_2S	Copper (I) Sulphide	Cuprous Sulphide
7. RhO	Rhodium (II) Oxide	N/A
8. $AuBr_3$	Gold (III) Bromide	Auric Bromide
9. Sb_2S_5	Antimony (V) Sulphide	Stibinic Sulphide
10. HgO	Mercury (II) Oxide	Mercuric Oxide

11. How can you tell when to use the stockor both stock and classical systems?
_If metal has exactly 2 valence, both, if 3 or more, only stock_____

ii. Provide formulae for the following binary compounds:

1. Mercury (I) Oxide Hg_2O
2. Copper (II) Sulphide CuS
3. Iron (III) Oxide Fe_2O_3
4. Manganese (IV) Fluoride MgF_2
5. Gold (III) Oxide Au_2O_3
6. Iron (II) Bromide $FeBr_2$
7. Cobalt (II) Nitride CoN
8. Tin (IV) Oxide SnO_2
9. Cupric Nitride Cu_3N_2
10. Mercurous Oxide Hg_2O
11. Stannic Chloride $SnCl_4$
12. Ferric Sulphide Fe_2S_3
13. Plumbous Bromide $PbBr_2$
14. Auric Phosphide AuP
15. Stibinous Hydride SbH_3
16. Cuprous Phosphide Cu_3P

Part C — Simple Binary Covalent Compounds

i. Provide names for the following covalent compounds:

1. NF_3 Nitrogen Trifluoride
2. XeO_3 Xenon Trioxide
3. OF_2 Oxygen DiFluoride
4. N_2O_5 Nitrogen Pentoxide
5. $AsBr_3$ Arsenic Tribromide
6. H_2Te Dihydrogen Telluride
7. CO_2 Carbon Dioxide
8. SF_6 Sulphur Hexafluoride
9. $N_{2(g)}$ Nitrogen Gas
10. P_4O_{10} Tetraphosphorous Decoxide
11. CCl_4 Carbon Tetrachloride
12. PH_3 Phosphorous Trihydride

13. PBr_5 Potassium Pentabromide

14. SCl_2 Sulphur Dichloride

15. IF_2 Iodide Difluoride

16. BF_3 Boron Trifluoride

11. Name the first 10 prefixes for the covalent compound naming system:
Mono (only for oxygen), di, tri, tetra, penta, hexa, hepta, octa, nona, deca

ii. Provide formulae for the following covalent compounds:

1. Radon Tetrafluoride RbF_4
2. Carbon Disulphide CS_2
3. Nitrogen Triiodide NI_3
4. Dinitrogen Triiodide N_2I_3
5. Tetraphosphorus Pentoxide P_4O_5
6. Tricarbon Octahydride C_3H_8
7. Dihydrogen Monoxide H_2O
8. Sulphur Hexachloride SCl_6
9. Silicon Dioxide SiO_2
10. Silicon Dioxide SiO_2

iii. Fill in the blanks in the table below:

Formula	Name
1. N_2I_2	Dinitrogen diiodide
2. P_2O_5	Diphosphorous Pentoxide
3. SF_6	Sulphur Hexafluoride
4. CaO	Carbon Monoxide

Part D — Compounds With Polyatomic Ions

i. Provide (all of the possible) names for the following binary compounds:

1. $Ba(OH)_2$ Barium Hydroxide
2. NH_4Cl Ammonium Chloride
3. FeC_2O_4 Iron (II) Oxalate / Ferrous
4. $LiClO_3$ Lithium Chlorate
5. $(NH_4)_3PO_4$ Ammonium Phosphate
6. $CaCO_3$ Calcium Carbonate
7. $CoSO_4$ Colbalt (II) Sulphate / Colbaltous
8. $Fe(NO_3)_2$ Iron (II) Nitrate / Ferrous
9. $NaHCO_3$ Sodium Bicarbonate
10. Cs_2SO_3 Cesium Sulphite
11. LiCN Lithium Cyanide
12. $(CH_3COO)_4Pb$ Lead (IV) Acetate / Plumbic
13. $(NH_4)_2S$ Ammonium Sulphate
14. $CuSO_4 . 5 H_2O$ Copper (II) Sulphate Pentahydrate /-ic

15. $KBrO_4$ Potassium Perbromate
16. $Sn_2(MnO_4)$ Tin (IV) Manganate / Stannic
17. $PbCO_3$ Lead (II) Carbonate / Plumbous
18. $LiHSO_4$ Lithium Hydrogen Sulphate/bisulphate
19. $K_2Cr_2O_7$ Potassium Dichromate
20. $Sn_3(PO_4)_2$ Tin (II) Phosphate / Stannous

ii. Provide formulae for the following binary compounds:

1. Sodium Nitrate $NaNO_3$
2. Lead (II) Chlorate $Pb(ClO_3)_2$
3. Iron (II) Sulphate $FeSO_4$
4. Lead (II) Phosphate $Pb_3(PO4)_2$
5. Copper (II) Acetate $(CH_3COO)_2Cu$
6. Potassium Nitrate KNO_3
7. Calcium Phosphate $Ca_3(PO_4)_2$
8. Zinc Sulphate $ZnSO_4$
9. Potassium Dichromate $K_2Cr_2O_7$
10. Beryllium Nitrite $Be(NO_2)_2$
11. Potassium Permanganate $KMnO_4$
12. Potassium Permanganate $KMnO_4$
13. Ammonium Cyanide NH_4CN
14. Stannous Bromide $SnBr_2$
15. Stannic Hydride SnH_4
16. Sodium Chromate Tetrahydrate $NaCrO_4 . 4\ H_2O$

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Part E — Binary acids and Oxyacids and their related Radicals

i. Provide the correct name and related radical for the following acids (if possible)

Formula	Acid Name	Radical Name
1. $HNO_{2(aq)}$	Nitrous Acid	Nitrite
2. $H_3AsO_{4(aq)}$	Arsenic Acid	Arsenate
3. $H_2Te_{(aq)}$	Hydrotelluric Acid	telluride
4. $H_2SO_{3(aq)}$	Sulphurous Acid	Sulphite
5. $HI_{(aq)}$	Hydroiodic Acid	Iodide
6. $H_2Se_{(aq)}$	Hydroselenic Acid	selenide
7. $HBrO_{4(aq)}$	Perbromic Acid	Perbromate
8. $HCl_{(aq)}$	Hydrochloric Acid	chloride
9. $H_4SiO_{4(aq)}$	Silicic Acid	Silicate
10. $CH_3COOH_{(aq)}$	Acetic Acid	acetate

11. Name the Famous Five Acids and write down their corresponding formulas:
Chloric: $HClO_3$, Nitric: HNO_3, Carbonic: H_2CO_3, Sulphuric: H_2SO_4, Phosphoric: H_3PO_4

ii. Provide formulae for the following acids:

1. Telluric Acid $H_2TeO_{4(aq)}$
2. Bromic Acid $HBrO_{3(aq)}$
3. Hydrofluoric Acid $HF_{(aq)}$
4. Hydrosulphuric Acid $H_2S_{(aq)}$
5. Nitric Acid $HNO_{3(aq)}$
6. Perchloric Acid $HClO_{4(aq)}$
7. Phosphorous acid $H_3PO_{3(aq)}$
8. Hypoiodous Acid $HIO_{(aq)}$
9. Chlorous Acid $HClO_{2(aq)}$
12. Selenous Acid $H_2SeO_{3(aq)}$

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Part F — PRACTICE QUIZ

The following practice quiz will consist of different compounds and acids, mixed-up.

1. Correctly name (**Stock** system, and **ClassicalNameif possible**) the following compounds:

Formula	'STOCK' or IUPAC System	Classical System
a. Fe_2S_3	Iron (III) Sulphide	Ferric Sulphide
b. $Sn_2(MnO_4)_3$	Tin (III) Manganate	Stannous Manganate
c. XeO_3	Xenon Trioxide	N/A
d. N_2O_5	Dinitrogen Pentoxide	N/A
e. $CuSO_4 . 5 H_20$	Copper (II) Sulphate Pentahydrate	Cupric Sulphate Pentahydrate
f. $KClO_4$	Potassium Perchlorate	N/A
g. $HCl_{(aq)}$	Hydrochloric Acid	N/A
h. $HBrO_{4(aq)}$	Perbromic Acid	N/A
i. $NaHCO_3$	Sodium Bicarbonate	Sodium hydrogen carbonate
j. $(NH_4)_2S$	Ammonium Sulphide	N/A
k. $CH_3COOH_{(aq)}$	Ethanoic acid	Acetic Acid

2. Correctly write the formulas of the compounds:

a. Lead (II) Oxide PbO
b. Lithium Bisulphate $LiHSO_4$
c. Hydroiodic Acid $HI_{(aq)}$
d. Mercury (I) Iodide HgI

e. Plumbous Carbonate $PbCO_3$

f. Diphosphorous Tetroxide P_2O_4

g. Telluric Acid $H_2TeO_{4(aq)}$

h. Cupric Nitride Cu_3N_2

i. Carbon Disulphide CS_2

j. Barium Hydroxide Octahydrate $Ba(OH)_2 .8H_2O$

k. Dihydrogen Monoxide H_2O

l. Carbonic Acid $H_2CO_{3(aq)}$

m. Phosphorus Acid $H_3PO_{3(aq)}$

n. Perbromic Acid $HBrO_{4(aq)}$

Bonus: What are the chemical differences between ammonia and ammonium?

Ammonia, NH_3, is an inorganic compound, covalent that has one nitrogen and three hydrogen atoms per molecule, it is a colourless gas with a pungent odour; it is uncharged, whereas the ammonium ion, NH_4^+ is a charged cation, a polyatomic ion, that has one nitrogen and four hydrogens, and can form ionic compounds