

AP Chemistry 2019-2020

Introduction

Advanced Placement Chemistry is a college level course; **THIS IS freshman level college chemistry**. You will need to be dedicated and work very hard if you are to be successful. Don't let any of this intimidate you or discourage you, just be prepared to work hard and to be challenged. The following assignment is meant to serve as a review of the concepts covered in high school general chemistry.

Summer Assignment

1. **UT Quest Assignment:** You must register on the UT quest site and join the class with name AHS AP Chem 2019 and unique ID 20193. Please due this by May 22nd, because I need to approve your enrollment and after school is out I will not be checking the system regularly. If you have enrolled in the Auburn School System during the summer, please email me (maaglan@auburnschools.org) that you have requested enrollment so that I can approve you. This assignment will be taken as a 150 pt classwork/homework grade in this class. It is due by 8 am August 8th; the first day of school. Please remember that UT quest does not use significant figures but a 1% error system for grading open ended answers, so you should answer with a minimum of 4 significant figures unless it is a question that specifically is asking about significant figures.

2. **First Day Test.** Knowing your element symbols and names, transition metal charges and polyatomic ion names and charges, as well as inorganic nomenclature is essential for success in learning the concepts covered in the course. Do not wait until the night before school begins. **The first day test will cover the following.**

- Know your element symbols and names. The entire periodic table is open game this year. AP will only provide you with a periodic table similar to the one you are already familiar with in my class, but you are expected to know all elements through Uranium (92).
- Polyatomic Ions (including name, symbol and charge, list attached)
- Variable Valences for Transition Metals (list attached)
- Rules for Naming Acids (<http://www.chemteam.info/Nomenclature/Acid-Nomenclature.html>)
- Rules for naming ionic and covalent compounds
(http://chemwiki.ucdavis.edu/Physical_Chemistry/Quantum_Mechanics/09._The_Hydrogen_Atom/Atomic_Theory/Chemical_Compounds/Nomenclature_of_Inorganic_Compounds)

The following pages contain the list of polyatomics and common cations, as well as some nomenclature practice sheets with answers. There is nothing to hand in the first day, the test on the first day will tell me if you spent the time to review and learn your nomenclature.

THE ONLY MATERIAL ON THE FIRST DAY TEST IS ELEMENT AND POLYATOMIC ION NAMES/SYMBOLS AND NOMENCLATURE. Other material covered in the UT assignment is not on the test.

Have a great summer, I am looking forward to an exciting and rewarding year!

Common Polyatomic Ions

acetate	$C_2H_3O_2^-$
ammonium	NH_4^+
arsenate	AsO_4^{3-}
arsenite	AsO_3^{3-}
	$C_7H_5O_2^-$
bromate	BrO_3^-
carbonate	CO_3^{2-}
chlorate	ClO_3^-
chromate	CrO_4^{2-}
cyanide	CN^-
dichromate	$Cr_2O_7^{2-}$
dihydrogen phosphate	$H_2PO_4^-$
dihydrogen phosphite	$H_2PO_3^-$
hydrogen carbonate	HCO_3^-
hydrogen phosphate	HPO_4^{2-}
hydrogen phosphite	HPO_3^{2-}
hydrogen sulfate	HSO_4^-
hydrogen sulfide	HS^-
hydrogen sulfite	HSO_3^-
hydroxide	OH^-
hypochlorite	ClO^-
iodate	IO_3^-
nitrate	NO_3^-
nitrite	NO_2^-
oxalate	$C_2O_4^{2-}$
perchlorate	ClO_4^-
permanganate	MnO_4^-
peroxide	O_2^{2-}
phosphate	PO_4^{3-}
phosphite	PO_3^{3-}
sulfate	SO_4^{2-}
sulfite	SO_3^{2-}
thiocyanate	SCN^-
thiosulfate	$S_2O_3^{2-}$

Remember	
ite = fewer O's	
ate = more O's	
ClO^-	hypochlorite
ClO_2^-	chlorite
ClO_3^-	chlorate
ClO_4^-	perchlorate
$H_2PO_3^-$	dihydrogen phosphite
$H_2PO_4^-$	dihydrogen phosphate
HCO_3^-	hydrogen carbonate
HPO_3^{2-}	hydrogen phosphite
HPO_4^{2-}	hydrogen phosphate
HSO_3^-	hydrogen sulfite
HSO_4^-	hydrogen sulfate
PO_3^{3-}	phosphite
PO_4^{3-}	phosphate

(bicarbonate)

bisulfite

bisulfate

Common Ions

CATIONS (+ve)

Name	Symbol/ Formula	Alternative*
Aluminum	Al^{3+}	
Ammonium	NH_4^+	
Arsenic (III)	As^{3+}	
Arsenic (V)	As^{5+}	
Barium	Ba^{2+}	
Bismuth (III)	Bi^{3+}	
Bismuth (V)	Bi^{5+}	
Cadmium	Cd^{2+}	
Calcium	Ca^{2+}	
Chromium (II)	Cr^{2+}	
Chromium (III)	Cr^{3+}	
Cobalt (II)	Co^{2+}	
Cobalt (III)	Co^{3+}	
<u>Copper (I)</u>	Cu^+	(Cuprous)
<u>Copper (II)</u>	Cu^{2+}	(Cupric)
Hydrogen	H^+	
Hydronium	H_3O^+	
<u>Iron (II)</u>	Fe^{2+}	(Ferrous)
<u>Iron (III)</u>	Fe^{3+}	(Ferric)
<u>Lead (II)</u>	Pb^{2+}	(Plumbous)
<u>Lead (IV)</u>	Pb^{4+}	(Plumbic)
Lithium	Li^+	
Magnesium	Mg^{2+}	
Manganese (II)	Mn^{2+}	
Manganese (IV)	Mn^{4+}	
<u>Mercury (I)</u>	Hg_2^{2+}	(Mercurous)
<u>Mercury (II)</u>	Hg^{2+}	(Mercuric)
Nickel (II)	Ni^{2+}	
Potassium	K^+	
Silver	Ag^+	
Sodium	Na^+	
Strontium	Sr^{2+}	
<u>Tin (II)</u>	Sn^{2+}	(Stannous)
<u>Tin (IV)</u>	Sn^{4+}	(Stannic)
Zinc	Zn^{2+}	

AP CHEMISTRY NOMENCLATURE WORKSHEET

Chemical Formula Nomenclature Practice:

Use the stock form for the transition metals.

Give the formula for the following:

- sulfur dioxide _____
- sodium thiosulfate _____
- ammonium phosphate _____
- potassium chlorate _____
- lithium hydroxide _____
- zinc nitrite _____
- sodium sulfate _____
- cobalt (IV) bisulfite _____
- cadmium nitrate _____
- nitrogen monoxide _____
- hydrogen peroxide _____
- carbon monoxide _____
- silicon dioxide _____
- copper (I) bromide _____
- iron (II) chromate _____
- mercury (I) fluoride _____
- carbon tetrachloride _____
- carbon dioxide _____
- cobalt (II) chloride _____
- aluminum carbonate _____
- diphosphorus pentaoxide _____
- cesium oxalate _____
- nickel (II) sulfite _____
- barium hypochlorite _____
- phosphorus pentachloride _____
- manganese(VII)oxide _____
- copper (II) sulfate _____
- nitrogen dioxide _____
- mercury (II) chloride _____
- tin (II) bromide _____
- silver iodide _____
- magnesium bisulfite _____
- silicon disulfide _____
- beryllium iodate _____
- platinum (IV) cyanide _____
- tungsten (IV) thiosulfate _____
- dinitrogen monoxide _____
- iron III oxide _____
- gold (III) chloride _____
- strontium sulfide _____
- uranium (VI) fluoride _____
- lead (II) bicarbonate _____
- Tin (IV) fluoride _____
- sodium dichromate _____
- water _____
- lead (II) peroxide _____
- calcium phosphide _____
- rubidium chromate _____
- nickel (II) chlorate _____
- magnesium nitride _____

CHEMISTRY NOMENCLATURE WORKSHEET

- | | | | |
|-----------------------------|-------|----------------------------|-------|
| 51. ammonium sulfide | _____ | 74. mercury (I) acetate | _____ |
| 52. aluminum phosphide | _____ | 75. calcium bisulfate | _____ |
| 53. zinc dichromate | _____ | 76. lithium hydride | _____ |
| 54. aluminum hydride | _____ | 77. lithium chlorate | _____ |
| 55. strontium phosphate | _____ | 78. cupric perchlorate | _____ |
| 56. tin (II) phosphate | _____ | 79. gold (III) perchlorate | _____ |
| 57. chromium (III) nitrate | _____ | 80. aluminum bisulfite | _____ |
| 58. cobalt (II) chlorate | _____ | 81. iron (II) phosphate | _____ |
| 59. cesium cyanide | _____ | 82. copper (II) chloride | _____ |
| 60. bismuth (III) bisulfate | _____ | 83. ammonium nitrate | _____ |
| 61. magnesium chlorite | _____ | 84. mercury (I) sulfate | _____ |
| 62. arsenic trichloride | _____ | 85. cesium nitrite | _____ |
| 63. tin (II) oxide | _____ | 86. sodium bisulfate | _____ |
| 64. lead (II) perchlorate | _____ | 87. hydrochloric acid | _____ |
| 65. iron (II) bromide | _____ | 88. sulfuric acid | _____ |
| 66. silver sulfite | _____ | 89. phosphoric acid | _____ |
| 67. potassium permanganate | _____ | 90. perchloric acid | _____ |
| 68. tin (IV) sulfate | _____ | 91. hydrobromic acid | _____ |
| 69. cobalt (IV) fluoride | _____ | 92. tin (IV) permanganate | _____ |
| 70. cesium bromate | _____ | 93. hydroiodic acid | _____ |
| 71. iron (III) dichromate | _____ | 94. nitric acid | _____ |
| 72. beryllium iodide | _____ | 95. magnesium dichromate | _____ |
| 73. copper (I) carbonate | _____ | | |

CHEMISTRY 1A NOMENCLATURE WORKSHEET

Give the names of the following compounds

- | | | | |
|---|-------|--|-------|
| 1. NaCl | _____ | 23. AgC ₂ H ₃ O ₂ | _____ |
| 2. AgNO ₃ | _____ | 24. Cr ₂ O ₃ | _____ |
| 3. BaCrO ₄ | _____ | 25. KBr | _____ |
| 4. KOH | _____ | 26. Cd(HSO ₄) ₂ | _____ |
| 5. ZnSO ₄ | _____ | 27. CO ₂ | _____ |
| 6. MgBr ₂ | _____ | 28. H ₂ O ₂ | _____ |
| 7. Al ₂ O ₃ | _____ | 29. CaSO ₄ | _____ |
| 8. CdCl ₂ | _____ | 30. Ni ₃ (PO ₄) ₂ | _____ |
| 9. NH ₄ I | _____ | 31. AsF ₃ | _____ |
| 10. Fe(OH) ₃ | _____ | 32. Co ₃ (AsO ₄) ₂ | _____ |
| 11. Ba ₃ (PO ₄) ₂ | _____ | 33. ZnCr ₂ O ₇ | _____ |
| 12. KClO ₃ | _____ | 34. KCN | _____ |
| 13. Na ₂ CO ₃ | _____ | 35. Bi(NO ₃) ₃ | _____ |
| 14. (NH ₄) ₂ C ₂ O ₄ | _____ | 36. CaH ₂ | _____ |
| 15. (NH ₄) ₂ CO ₃ | _____ | 37. SnS ₂ | _____ |
| 16. NiF ₂ | _____ | 38. Cr ₂ (SO ₄) ₃ | _____ |
| 17. Zn(ClO ₃) ₂ | _____ | 39. Hg(BrO ₃) ₂ | _____ |
| 18. Ca(OH) ₂ | _____ | 40. N ₂ O ₄ | _____ |
| 19. BaSO ₃ | _____ | 41. Pb(HCO ₃) ₂ | _____ |
| 20. AlCl ₃ | _____ | 42. Na ₂ Cr ₂ O ₇ | _____ |
| 21. Cu ₂ CO ₃ | _____ | 43. PbO ₂ | _____ |
| 22. FeO | _____ | (2 possible names) | _____ |

CHEMISTRY NOMENCLATURE WORKSHEET

Chemical Formula Nomenclature Practice:

Complete these in lab and on your own time for practice. You should complete this by Sunday.
Use the stock form for the transition metals.

Give the formula for the following:

- | | | | |
|------------------------------|---|-------------------------------|--|
| 1. sulfur dioxide | <u>SO₂</u> | 26. manganese(VII)oxide | <u>Mn₂O₇</u> |
| 2. sodium thiosulfate | <u>Na₂S₂O₃</u> | 27. copper (II) sulfate | <u>CuSO₄</u> |
| 3. ammonium phosphate | <u>(NH₄)₃PO₄</u> | 28. nitrogen dioxide | <u>NO₂</u> |
| 4. potassium chlorate | <u>KClO₃</u> | 29. mercury (II) chloride | <u>HgCl₂</u> |
| 5. lithium hydroxide | <u>LiOH</u> | 30. tin (II) bromide | <u>SnBr₂</u> |
| 6. zinc nitrite | <u>Zn(NO₂)₂</u> | 31. silver iodide | <u>AgI</u> |
| 7. sodium sulfate | <u>Na₂SO₄</u> | 32. magnesium bisulfite | <u>Mg(HSO₃)₂</u> |
| 8. cobalt (IV) bisulfite | <u>Co(HSO₃)₄</u> | 33. carbon disulfide | <u>CS₂</u> |
| 9. cadmium nitrate | <u>Cd(NO₃)₂</u> | 34. beryllium periodate | <u>Be(IO₄)₂</u> |
| 10. nitrogen monoxide | <u>NO</u> | 35. platinum (IV) cyanide | <u>Pt(CN)₄</u> |
| 11. hydrogen peroxide | <u>H₂O₂</u> | 36. tungsten (IV) thiosulfate | <u>W(S₂O₃)₂</u> |
| 12. carbon monoxide | <u>CO</u> | 37. dinitrogen monoxide | <u>N₂O</u> |
| 13. silicon dioxide | <u>SiO₂</u> | 38. ferric oxide | <u>Fe₂O₃</u> |
| 14. copper (I) bromide | <u>CuBr</u> | 39. gold (III) chloride | <u>AuCl₃</u> |
| 15. iron (II) chromate | <u>FeCrO₄</u> | 40. strontium sulfide | <u>SrS</u> |
| 16. mercury (I) fluoride | <u>Hg₂F₂</u> | 41. uranium (VI) fluoride | <u>UF₆</u> |
| 17. carbon tetrachloride | <u>CCl₄</u> | 42. lead (II) bicarbonate | <u>Pb(HCO₃)₂</u> |
| 18. carbon dioxide | <u>CO₂</u> | 43. stannic fluoride | <u>SnF₄</u> |
| 19. cobalt (II) chloride | <u>CoCl₂</u> | 44. sodium dichromate | <u>Na₂Cr₂O₇</u> |
| 20. aluminum carbonate | <u>Al₂(CO₃)₃</u> | 45. water | <u>H₂O</u> |
| 21. diphosphorus pentaoxide | <u>P₂O₅</u> | 46. lead (II) peroxide | <u>PbO₂</u> |
| 22. cesium oxalate | <u>Cs₂C₂O₄</u> | 47. calcium carbide | <u>Ca₂C</u> |
| 23. nickel (II) sulfite | <u>NiSO₃</u> | 48. rubidium chromate | <u>Rb₂CrO₄</u> |
| 24. barium hypochlorite | <u>Ba(ClO)₂</u> | 49. nickel (II) chlorate | <u>Ni(ClO₃)₂</u> |
| 25. phosphorus pentachloride | <u>PCl₅</u> | 50. magnesium nitride | <u>Mg₃N₂</u> |

CHEMISTRY NOMENCLATURE WORKSHEET

- | | | | |
|-----------------------------|--|----------------------------|--|
| 51. ammonium sulfide | <u> (NH₄)₂S </u> | 74. mercury (I) acetate | <u> Hg₂(C₂H₃O₂)₂ </u> |
| 52. aluminum phosphide | <u> AlP </u> | 75. calcium bisulfate | <u> Ca(HSO₄)₂ </u> |
| 53. zinc dichromate | <u> ZnCr₂O₇ </u> | 76. lithium hydride | <u> LiH </u> |
| 54. aluminum hydride | <u> AlH₃ </u> | 77. lithium chlorate | <u> LiClO₃ </u> |
| 55. strontium phosphate | <u> Sr₃(PO₄)₂ </u> | 78. cupric perchlorate | <u> Cu(ClO₄)₂ </u> |
| 56. tin (II) phosphate | <u> Sn₃(PO₄)₂ </u> | 79. gold (III) perchlorate | <u> Au(ClO₄)₃ </u> |
| 57. chromium (III) nitrate | <u> Cr(NO₃)₃ </u> | 80. aluminum bisulfite | <u> Al(HSO₃)₃ </u> |
| 58. cobalt (II) chlorate | <u> Co(ClO₃)₂ </u> | 81. iron (II) phosphate | <u> Fe₃(PO₄)₂ </u> |
| 59. cesium cyanide | <u> CsCN </u> | 82. copper (II) chloride | <u> CuCl₂ </u> |
| 60. bismuth (III) bisulfate | <u> Bi(HSO₄)₃ </u> | 83. ammonium nitrate | <u> NH₄NO₃ </u> |
| 61. magnesium chlorite | <u> Mg(ClO₂)₂ </u> | 84. mercury (I) sulfate | <u> Hg₂SO₄ </u> |
| 62. arsenic trichloride | <u> AsCl₃ </u> | 85. cesium nitrite | <u> CsNO₂ </u> |
| 63. tin (II) oxide | <u> SnO </u> | 86. sodium bisulfate | <u> NaHSO₄ </u> |
| 64. lead (II) perchlorate | <u> Pb(ClO₄)₂ </u> | 87. hydrochloric acid | <u> HCl (aq) </u> |
| 65. iron (II) bromide | <u> FeBr₂ </u> | 88. sulfuric acid | <u> H₂SO₄ (aq) </u> |
| 66. silver sulfite | <u> Ag₂SO₃ </u> | 89. phosphoric acid | <u> H₃PO₄ (aq) </u> |
| 67. potassium permanganate | <u> KMnO₄ </u> | 90. perchloric acid | <u> HClO₄ (aq) </u> |
| 68. tin (IV) sulfate | <u> Sn(SO₄)₂ </u> | 91. hydrobromic acid | <u> HBr (aq) </u> |
| 69. cobalt (IV) fluoride | <u> CoF₄ </u> | 92. tin (IV) permanganate | <u> Sn(MnO₄)₄ </u> |
| 70. cesium bromate | <u> CsBrO₃ </u> | 93. hydroiodic acid | <u> HI (aq) </u> |
| 71. iron (III) dichromate | <u> Fe₂(Cr₂O₇)₃ </u> | 94. nitric acid | <u> HNO₃ (aq) </u> |
| 72. beryllium iodide | <u> BeI₂ </u> | 95. magnesium dichromate | <u> MgCr₂O₇ </u> |
| 73. copper (I) carbonate | <u> Cu₂CO₃ </u> | | |

CHEMISTRY NOMENCLATURE WORKSHEET

Give the names of the following compounds

- | | | | |
|---|------------------------------|--|--------------------------------|
| 1. NaCl | ___sodium chloride_____ | 23. AgC ₂ H ₃ O ₂ | ___silver acetate_____ |
| 2. AgNO ₃ | ___silver nitrate_____ | 24. Cr ₂ O ₃ | ___chromium (III) oxide_____ |
| 3. BaCrO ₄ | ___barium chromate_____ | 25. KBr | ___potassium bromide_____ |
| 4. KOH | ___potassium hydroxide_____ | 26. Cd(HSO ₄) ₂ | ___cadmium bisulfate_____ |
| 5. ZnSO ₄ | ___zinc sulfate_____ | 27. CO ₂ | ___carbon dioxide_____ |
| 6. MgBr ₂ | ___magnesium bromide_____ | 28. H ₂ O ₂ | ___hydrogen peroxide_____ |
| 7. Al ₂ O ₃ | ___aluminum oxide_____ | 29. CaSO ₄ | ___calcium sulfate_____ |
| 8. CdCl ₂ | ___cadmium chloride_____ | 30. Ni ₃ (PO ₄) ₂ | ___nickel (II) phosphate_____ |
| 9. NH ₄ I | ___ammonium iodide_____ | 31. AsF ₃ | ___arsenic trifluoride_____ |
| 10. Fe(OH) ₃ | ___iron (III) hydroxide_____ | 32. Co ₃ (AsO ₄) ₂ | ___cobalt (II) arsenate_____ |
| 11. Ba ₃ (PO ₄) ₂ | ___barium phosphate_____ | 33. ZnCr ₂ O ₇ | ___zinc dichromate_____ |
| 12. KClO ₃ | ___potassium chlorate_____ | 34. KCN | ___potassium cyanide_____ |
| 13. Na ₂ CO ₃ | ___sodium carbonate_____ | 35. Bi(NO ₃) ₃ | ___bismuth (III) nitrate_____ |
| 14. (NH ₄) ₂ C ₂ O ₄ | ___ammonium oxalate_____ | 36. CaH ₂ | ___calcium hydride_____ |
| 15. (NH ₄) ₂ CO ₃ | ___ammonium carbonate_____ | 37. SnS ₂ | ___tin (IV) sulfide_____ |
| 16. NiF ₂ | ___nickel (II) fluoride_____ | 38. Cr ₂ (SO ₄) ₃ | ___chromium (III) sulfate_____ |
| 17. Zn(ClO ₃) ₂ | ___zinc chlorate_____ | 39. Hg(BrO ₃) ₂ | ___mercury (II) bromate_____ |
| 18. Ca(OH) ₂ | ___calcium hydroxide_____ | 40. N ₂ O ₄ | ___dinitrogen tetroxide_____ |
| 19. BaSO ₃ | ___barium sulfite_____ | 41. Pb(HCO ₃) ₂ | ___lead (II) bicarbonate_____ |
| 20. AlCl ₃ | ___aluminum chloride_____ | 42. Na ₂ Cr ₂ O ₇ | ___sodium dichromate_____ |
| 21. Cu ₂ CO ₃ | ___copper (I) carbonate_____ | 43. PbO ₂ | ___lead (IV) oxide_____ |
| 22. FeO | ___iron (II) oxide_____ | (2 possible names) | ___lead (II) peroxide_____ |