

Answer Key: Ch 1 & 2, Version A (24 pts)

1. 5499.3
2. 29
3. $(155 \text{ nm})(1 \text{ m} / 10^9 \text{ nm})(100 \text{ cm} / 1 \text{ m}) = 1.55 \cdot 10^{-5} \text{ cm}$
4. $(1.215 \text{ g} / 1 \text{ mL})(1 \text{ kg} / 1000 \text{ g})(1 \text{ mL} / 1 \text{ cm}^3)((100 \text{ cm})^3 / (1 \text{ m})^3) = 1215 \text{ kg/m}^3$
5. $^{\circ}\text{C} = \text{K} - 273.15$; $^{\circ}\text{C} = 178.0 - 273.15$; $^{\circ}\text{C} = -95.15 \rightarrow -95.2^{\circ}\text{C}$
6. $^{32}_{15}\text{P}^{3-}$
7. Sodium hydrogen phosphate or sodium biphosphate
8. Iron (III) oxide or ferric oxide
9. Ammonium sulfate
10. Chromium (III) fluoride or chromic fluoride
11. Cadmium hydroxide hexahydrate
12. Cesium chlorate
13. HI
14. KClO_4
15. LiNO_2
16. HBrO
17. $\text{Al}_2(\text{CO}_3)_3$
18. $\text{Hg}_2(\text{CN})_2$

Answer Key: Ch 1 & 2, Version A (40 pts)

1. 550.3
2. 24.2
3. $(5.07 \cdot 10^2 \mu\text{g})(1 \cdot 10^{-6} \text{ g} / 1 \mu\text{g})(1 \text{ dr} / 3.888 \text{ g})(3 \text{ scr} / 1 \text{ dr})(20 \text{ gr} / 1 \text{ scr}) = 7.82 \cdot 10^{-3} \text{ grains}$
4.
 - a. Gold foil
 - b. Radioactive decay of sample
 - c. Discovery of nucleus in center of positive charge
 - d. Some bounced back
5. Copper (III) iodide (typo: Cu^{3+} does not really exist, only +1 and +2)
6. Potassium hydrogen sulfate or potassium bisulfate
7. Tetrasulfur hexanitride
8. Sodium hypochlorite
9. Cesium cyanide trihydrate
10. Barium chromate
11. H_2S
12. AgMnO_4
13. ZnO_2
14. HBrO_4
15. $\text{Al}(\text{HCO}_3)_3$
16. $\text{Hg}_2(\text{SCN})_2$

Answer Key: Ch 1&2, Version B (24 pts)

1. $4554.667 \rightarrow 4600$
2. $11.173 \rightarrow 11.17$
3. $32.9 \text{ ug} (1 \text{ g} / 10^3 \text{ ug})(1 \text{ kg} / 1000 \text{ g}) = 3.29 \cdot 10^{-8}$
4. $(9.090 \text{ g} / 1 \text{ m}^3)(1000 \text{ mg} / 1 \text{ g})(1 \text{ m}^3 / (100 \text{ cm})^3)(1000 \text{ cm}^3 / 1 \text{ L}) = 9.090 \text{ mg/L}$
5. $\text{K} = ^{\circ}\text{C} + 273.15$
 $\text{K} = 32.15 + 273.15 = 305.25 \text{ K}$

6. ${}_{14}^{27}\text{Si}^{4+}$
7. HIO_3
8. Na_2SO_3
9. Mg_3N_2
10. $\text{Ca}(\text{NO}_3)_2$
11. $\text{Sn}(\text{O}_2)_2$
12. H_2SO_3
13. ammonium phosphide
14. mercury (II) bromide
15. barium hydrogen carbonate
16. lead (II) hydroxide pentahydrate
17. copper (II) oxide
18. silver permanganate

Answer Key: Ch 1&2, Version B (40 pts)

1. 470.250 → 470.3
2. 92.8744 → 92.9
3. $0.153 \text{ ng} (1 \times 10^{-9} \text{ g/ng})(1 \text{ yr}/0.0648 \text{ g})(1 \text{ pw}/24 \text{ yr})(1 \text{ troy oz}/20 \text{ pw}) = 4.92 \times 10^{-12} \text{ troy oz}$
4. – cathode ray tube
 - charge/mass ratio of e-
 - manipulate beam of e- with magnetic fields
 - negative charged particle = electron
5. cadmium (II) chloride
6. lithium dihydrogen phosphate
7. trinitrogen tetroxide
8. potassium hyposulfite
9. iron (III) nitride heptahydrate
10. calcium dichromate
11. H_3P
12. $\text{Sn}(\text{IO}_4)_2$
13. $\text{Co}(\text{O}_2)_2$ not CoO_4
14. HNO
15. $\text{Ga}(\text{HSO}_4)_3$
16. $\text{Hg}(\text{CNS})_2$

Answer Key: Ch 1 & 2, Version C (24 pts)

1. 0.014
2. 661.9
3. $(1.20 \text{ dm})(10 \text{ cm} / 1 \text{ dm})(10 \text{ mm} / 1 \text{ cm}) = 120. \text{ mm}$
4. $(3.843 \text{ kg} / 1 \text{ cm}^3)(1000 \text{ cm}^3 / 1 \text{ L})(1000 \text{ g} / 1 \text{ kg}) = 3.843 \times 10^6 \text{ g/L}$
5. $\text{K} = ^\circ\text{C} + 273.15 = -7.1 + 273.15$; $\text{K} = 266.05 \rightarrow 266.0 \text{ K}$
6. ${}_{20}^{39}\text{Ca}^{2+}$
7. HClO_4
8. K_2CO_2
9. MnS
10. $\text{Ba}_3(\text{PO}_4)_2$
11. $\text{Zn}(\text{SCN})_2$
12. HBr

13. Cobalt (II) oxide or cobaltous oxide
14. Aluminum iodide
15. Strontium hydrogen phosphate or strontium biphosphate
16. Iron (III) hydroxide dihydrate or ferric hydroxide dihydrate
17. Ammonium chloride
18. Cesium chromate

Answer Key: Ch 1 & 2, Version I (33 pts)

1. 149.0
2. 7.45
3. Heterogeneous = not uniform; homogeneous = uniform
4. Sodium hyponitrite
5. Ammonium sulfide
6. Octabromine trichloride
7. Hydrocyanic acid or hydrogen cyanide
8. Molybdenum (VI) chlorite heptahydrate
9. Nickel iodide
10. H₂O
11. Li₂Cr₂O₇
12. RbO₂
13. VF₅
14. Al₂(HBO₃)₃
15. Sn(SCN)₂

Answer Key: Ch 1&2, Version J (33 pts)

1. $9718.5/102.3=95 \rightarrow 9718/102.3=95.00$
2. $10644.62/389.20=27.35 \rightarrow 10640/389.20 \rightarrow 27.35$
3. molecular = actual ratio
empirical = simplest ratio
4. potassium hypoborite
5. lithium sodium hydrogen arsenate
6. pentaiodine tetranitride
7. acetic acid
8. tungsten (IV) thiocyanate nonahydrate
9. zinc phosphide
10. H₃N or NH₃ (ammonia)
11. RaCrO₄
12. BeO₂
13. TiI₃
14. Ca(H₂PO₄)₂
15. Pb(NO₂)₂

Answer Key: Ch 1 & 2, Version K (33 pts)

1. 85.50
2. 2
3. Millikan = oil drop determine e⁻ charge therefore also m_e; Thomson = Determine e⁻/m ratio
4. Boron hypochlorite
5. Rubidium beryllium phosphate
6. Trisulfur nonachloride

- Oxalic acid or hydrogen oxalate
- Palladium (IV) isothiocyanate heptahydrate
- Copper (III) selenide (typo: Cu^{3+} does not really exist, only +1 and +2)
- CH_4
- FrMnO_4
- BeO_2
- ScF_3
- KH_2BO_3
- $\text{Cr}_2(\text{SO}_4)_3$

Answer Key: Ch 1 & 2, Version M (33 pts)

- 15.6
- 381,000 or 3.81×10^5
- Molecular = $\text{C}_6\text{H}_{12}\text{O}_6$; empirical = CH_2O
- Cadmium dihydrogen phosphate
- Mercury (I) dichromate or mercurous dichromate
- Octasulfur heptaiodide
- Hydroiodic acid
- Uranium (VI) nitrate monohydrate
- Cobaltous nitride
- H_2SeO_3
- FrCNS
- PbMnO_4 (actually it is $\text{Pb}(\text{MnO}_3)_2$)
- $\text{Y}_2(\text{SO}_4)_3$
- SnCO_2
- K_2HAsO_4

Answer Key: Ch 1 & 2, Version N (33 pts)

- 500.2 (5.0000×10)-4652.50 = 20357.50 \rightarrow 20360 = 2.036×10^4
- 3.80×10^5 -48.5-400-5623.352 = 373929.148 = 374000 = 3.74×10^5
- mass # = 39 = sum of p+n
 atomic mass = $20(\text{mass n}) + 19(\text{mass p}) =$
 $20(1.673 \times 10^{-24}) + 19(1.675 \times 10^{-24}) = 39.311$
 1.007amu 1.009 amu
- zinc hydrogen percarbonate
- mercury (II) peroxide (mercuric)
- tetraselenium monoiodide
- hydrofluoric acid
- gold (I) or aurous hypobromite hexahydrate
- cuprous sulfide
- H_3BO_2
- $\text{Ra}(\text{C}_2\text{H}_3\text{O}_2)_2$
- $\text{Sn}(\text{Mn})_2)_4$
- $\text{Pt}(\text{CN})_2$
- XeF_4
- NH_4HSO_4

Please let me know if you find any mistakes, and thanks to Sunggoan Ji and Tina Gong, Class of 2006 for typing these.