

CHEM 1105
Sample Final Exam 1 ANSWERS

- mercury(I) nitrate
 - magnesium acetate
 - ammonium carbonate
 - calcium hydroxide
 - HClO_4
 - H_2S
 - $\text{Ba}_3(\text{PO}_4)_2$
 - $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
- $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH}(aq) + \text{H}_2(g)$
 - $3\text{Pb}(\text{NO}_3)_2(aq) + 2\text{Na}_3\text{PO}_4(aq) \rightarrow \text{Pb}_3(\text{PO}_4)_2(s) + 6\text{NaNO}_3(aq)$
 - $\text{H}_2\text{SO}_4(aq) + 2\text{KOH}(aq) \rightarrow \text{K}_2\text{SO}_4(aq) + 2\text{H}_2\text{O}(l)$
- $3\text{Pb}^{2+}(aq) + 2\text{PO}_4^{3-}(aq) \rightarrow \text{Pb}_3(\text{PO}_4)_2(s)$
- 79 protons, 118 neutrons, 76 electrons, +3
 - $^{79}\text{As}_{33}^{3+}$, 30 electrons
 - $^{32}\text{S}_{16}^{2-}$, -2
 - $^{204}\text{Tl}_{81}^+$, 80 electrons
- Eu-151 = 48.01% and Eu-153 = 51.99%
- Empirical formula is CHCl
Molecular formula is $\text{C}_2\text{H}_2\text{Cl}_2$
- 146 g Fe_2O_3
 - 0.732 mol/L
- 3.34 mol H_2O_2
 - 35.8 g HNO_3
 - 27.4 g HNO_3
- 0.154 M
 - 1.51%
- $2\text{C}(\text{graphite}) + 3\text{H}_2(g) + \frac{1}{2}\text{O}_2(g) \rightarrow \text{C}_2\text{H}_5\text{OH}(l)$
- 1405.6 kJ
- 66.9 kJ/mol
- +4
 - +5
 - +3
 - +6
- $3\text{As}_2\text{O}_3 + 4\text{NO}_3^- + 4\text{H}^+ + 7\text{H}_2\text{O} \rightarrow 6\text{H}_3\text{AsO}_4 + 4\text{NO}$

15. a) $K = [\text{NH}_3][\text{H}_2\text{S}]$
b) $K = [\text{Ca}^{2+}][\text{OH}^-]^2$
16. $\text{Ni(s)} + 4\text{CO(g)} \rightleftharpoons \text{NiCO}_4\text{(g)}$
17. $[\text{H}_2] = [\text{Br}_2] = 1.03 \times 10^{-5}$ and $[\text{HBr}] = 1.20$
18. a) decrease
b) increase
c) increase
d) no change
e) decrease
f) decrease
g) increase
h) decrease
19. a) HPO_4^{2-} b) O^{2-} c) CH_3NH_3^+ d) HSO_4^-
20. Water is neutral because $[\text{H}_3\text{O}^+] = [\text{OH}^-]$
21. $\text{pH} = 11.13$ and $\text{pOH} = 2.87$ and $\% \text{ ionization} = 1.34$
22. $K_a = 0.108$
23. $\text{pH} = 9.18$
24. a) $\text{pH} = 4.74$
b) $\text{pH} = 9.79$
25. 150 g/mol