

Name: _____

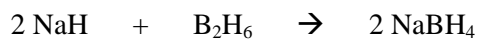
Chem 1110, Spring 2011
Test 2A

Part 1: Multiple Choice (60 pts): Clearly circle the correct answer.

- Which one of the following compounds is soluble in water?
A) FeCO_3
B) Na_2CO_3
C) CaSO_4
D) AgBr
E) None of these is soluble in water.
- What is the net ionic equation for the reaction of H_2SO_4 with NH_3 ?
A) $\text{H}_2\text{SO}_4 + 2 \text{NH}_3 \rightarrow 2 \text{NH}_4\text{SO}_4$
B) $\text{H}_2\text{SO}_4 + 2 \text{NH}_3 \rightarrow 2 \text{NH}_4^+ + \text{SO}_4^{2-}$
C) $2 \text{H}^+ + \text{SO}_4^{2-} + 2 \text{NH}_3 \rightarrow 2 \text{NH}_4\text{SO}_4$
D) $\text{H}_2^+ + 2 \text{NH}_3 \rightarrow 2 \text{NH}_4^+$
E) $\text{H}^+ + \text{NH}_3 \rightarrow \text{NH}_4^+$
- What volume of 0.450 M HCl is needed to make 250. mL of 0.112M HCl?
A) 62.2 mL
B) 16.1 mL
C) 10.0 mL
D) 250. mL
E) None of these.
- What is the molecular formula for a compound with molar mass of 360.3 g/mol and an empirical formula of $\text{C}_7\text{H}_4\text{O}_2$?
A) $\text{C}_7\text{H}_4\text{O}_2$
B) $\text{C}_{14}\text{H}_8\text{O}_6$
C) $\text{C}_{16}\text{H}_8\text{O}_{10}$
D) $\text{C}_{18}\text{H}_{16}\text{O}_8$
E) $\text{C}_{21}\text{H}_{12}\text{O}_6$
- What is the percent of oxygen in $\text{Fe}(\text{NO}_3)_2 \cdot 2\text{H}_2\text{O}$? (MM of $\text{Fe}(\text{NO}_3)_2 \cdot 2\text{H}_2\text{O} = 215.90$ g/mol)
A) 7.411% O
B) 22.23% O
C) 44.47% O
D) 59.29% O
E) None of these
- Which one of the pairs of compounds below are all insoluble in water?
A) $\text{Fe}(\text{NO}_3)_2$ and PbCl_2
B) FePO_4 and CaSO_4
C) $\text{Mg}(\text{OH})_2$ and $\text{Ca}(\text{OH})_2$
D) MgCl_2 and NaCl
E) FeSO_4 and BaCO_3

7. What is the percent yield of a reaction that has a theoretical yield of 87.8g and an actual yield of 64.3g?
- A) 1.37%
 B) 13.7%
 C) 26.8%
 D) 36.5%
 E) 73.2%
8. What is the net ionic equation for the reaction of sodium nitrate with calcium hydroxide?
- A) $\text{Ca}^{2+} + 2 \text{NO}_3^- \rightarrow \text{Ca}(\text{NO}_3)_2 (\text{s})$
 B) $\text{Na}^+ + \text{NO}_3^- \rightarrow \text{NaNO}_3 (\text{s})$
 C) $\text{Ca}^{2+} + 2 \text{OH}^- \rightarrow \text{Ca}(\text{OH})_2 (\text{s})$
 D) $\text{Na}^{2+} + \text{OH}^- \rightarrow \text{NaOH} (\text{s})$
 E) There is no reaction.
9. Which of the following set of numbers balances the equation below?
- $$\underline{\hspace{1cm}} \text{As}_4\text{S}_6 + \underline{\hspace{1cm}} \text{O}_2 \rightarrow \underline{\hspace{1cm}} \text{As}_4\text{O}_6 + \underline{\hspace{1cm}} \text{SO}_2$$
- A) 1, 1, 1, 1
 B) 2, 1, 2, 1
 C) 2, 2, 2, 5
 D) 1, 9, 1, 6
 E) None of these
10. How many atoms of oxygen are in 3.0 mol of SO_2 ?
- A) 3 atoms O
 B) 6 atoms O
 C) $1.8 \text{ E}24$ atoms O
 D) $3.6 \text{ E}24$ atoms O
 E) $1.0 \text{ E}-23$ atoms O
11. What is the concentration of a solution made by dissolving 0.525 mol NaCl in 125 mL of water?
- A) 0.00420 M
 B) 4.20 M
 C) 0.238 M
 D) 2.38 M
 E) 65.6 M
12. Which of the following is NOT a strong base?
- A) $\text{Ca}(\text{OH})_2$
 B) $\text{Cu}(\text{OH})_2$
 C) $\text{Ba}(\text{OH})_2$
 D) $\text{Sr}(\text{OH})_2$
 E) LiOH
13. What are the spectator ions in the reaction of zinc(II) acetate with sodium carbonate?
- A) Zn^{2+} and $\text{C}_2\text{H}_3\text{O}_2^-$
 B) Na^+ and CO_3^{2-}
 C) Zn^{2+} and CO_3^{2-}
 D) Na^+ and $\text{C}_2\text{H}_3\text{O}_2^-$
 E) CO_3^{2-} and $\text{C}_2\text{H}_3\text{O}_2^-$

4. (15 pts) Sodium borohydride (NaBH_4) is used industrially in many organic syntheses. One way to prepare it is by reacting sodium hydride with gaseous diborane (B_2H_6). How many grams of NaBH_4 can be prepared by reacting 7.98 g of NaH with 6.92g of B_2H_6 . (MM of NaH = 24.00 g/mol, MM of B_2H_6 = 27.66 g/mol, MM of NaBH_4 = 37.83 g/mol)



Extra Credit (2 pts): What is the limiting reactant? _____

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| | IA | | | | | | | | | | | | | | | | | | | VIIIA | |
| 1 | H 1.008 | | | | | | | | | | | | | | | | | | | | He 4.00 |
| 2 | Li 6.94 | Be 9.01 | | | | | | | | | | | | | | | | | | | |
| 3 | Na 22.99 | Mg 24.31 | | | | | | | | | | | | | | | | | | | |
| 4 | K 39.10 | Ca 40.08 | Sc 44.96 | Ti 47.90 | V 50.94 | Cr 52.00 | Mn 54.94 | Fe 55.85 | Co 58.93 | Ni 58.71 | Cu 63.55 | Zn 65.37 | Ga 69.72 | Ge 72.59 | As 74.92 | Se 78.96 | Br 79.90 | Kr 83.80 | | | |
| 5 | Rb 85.47 | Sr 87.62 | Y 88.91 | Zr 91.22 | Nb 92.91 | Mo 95.94 | Tc [98] | Ru 101.1 | Rh 102.9 | Pd 106.4 | Ag 107.9 | Cd 112.40 | In 114.8 | Sn 118.7 | Sb 121.8 | Te 127.60 | I 126.90 | Xe 131.30 | | | |
| 6 | Cs 132.9 | Ba 137.3 | Lu 175 | Hf 178.5 | Ta 181 | W 183.9 | Re 186.2 | Os 190.2 | Ir 192.2 | Pt 195.1 | Au 197 | Hg 200.59 | Tl 204.4 | Pb 207.2 | Bi 209 | Po [209] | At [210] | Rn [222] | | | |
| 7 | Fr [223] | Ra [226] | Lr [262] | Rf [267] | Db [268] | Sg [271] | Bh [272] | Hs [270] | Mt [276] | Ds [281] | Rg [280] | Uub [285] | Uut [284] | Uuq [289] | Uup [288] | Uuh [293] | | | | Uuo [294] | |
| | | | | | | | | | | | | | | | | | | | | | |
| | La 138.9 | Ce 140.1 | Pr 140.9 | Nd 144.2 | Pm [145] | Sm 150.4 | Eu 152 | Gd 157.3 | Tb 158.9 | Dy 162.5 | Ho 164.93 | Er 167.3 | Tm 168.9 | Yb 173 | | | | | | | |
| | Ac [227] | Th 232 | Pa [231] | U 238 | Np [237] | Pu [244] | Am [243] | Cm [247] | Bk [247] | Cf [251] | Es [252] | Fm [257] | Md [258] | No [259] | | | | | | | |