

Orange

Quiz IV General Chemistry I Lecture Spring 14 Dr. Hahn 20 pts 2/25 T 8:30 am Form A quiz # _____

Name Key Name _____
(print name) (sign name) (I can't read some of your handwriting.)

Please show all work for full credit. If you show work you may also get partial credit.

1 For the molecule NaCl (molar mass = 58.45 g/mol), how many moles is 834.2 grams of the compound? (show work) (4 pts)

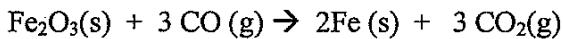
$$834.2 \text{ g NaCl} \times \frac{1 \text{ mol NaCl}}{58.45 \text{ g NaCl}} = 14.27 \text{ mol NaCl}$$

method B
 $m = \frac{0.616 \text{ mol H}_2\text{SO}_4}{0.0782 \text{ l}}$
 $m = 7.88 \text{ M}$

2 If the empirical formula for a molecule is AlCl₃ and the molecular formula mass is 265 g/mole, what is the molecular formula? (4 pts)

$$27.0 + 3(35.45) = 133.35$$
$$\frac{265}{133.35} = 1.99 \rightarrow (\text{AlCl}_3) \times 2 \rightarrow \text{Al}_2\text{Cl}_6 \text{ molecular formula}$$

3 For the reaction shown, what is the theoretical yield of the CO₂ if you start with 1.5 moles of Fe₂O₃(s). The formula mass of CO₂ is 44.01 g/mole. (6 pts)



$$1.5 \text{ mol Fe}_2\text{O}_3 \times \frac{3 \text{ mol CO}_2}{1 \text{ mol Fe}_2\text{O}_3} \times \frac{44.01 \text{ g CO}_2}{1 \text{ mol CO}_2} = 198.1$$

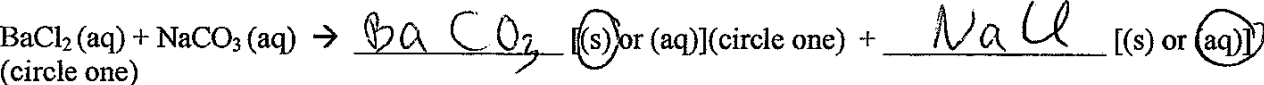
2 sig figs
→ 200 g CO₂

4 What is the molarity of a solution made by mixing 33.3 grams of H₂SO₄ (FW = 54.09 g/mole) in enough water to make up 78.2 mL of solution. (6 pts)

method A
 $\frac{33.3 \text{ g H}_2\text{SO}_4}{78.2 \text{ ml soln}} \times \frac{1 \text{ mol H}_2\text{SO}_4}{54.09 \text{ g H}_2\text{SO}_4} \times \frac{1000 \text{ ml}}{1 \text{ l soln}} = 7.87 \text{ M}$ or method B
 $78.2 \text{ ml} \times \frac{1}{1000 \text{ ml}} = 0.0782 \text{ l}$
 $\# \text{ moles} = \frac{33.3 \text{ g H}_2\text{SO}_4}{54.09 \text{ g H}_2\text{SO}_4} = 0.616 \text{ mol H}_2\text{SO}_4$

Extra Credit (3 pts): (a) Is the compound BaCO₃ [(soluble) or (insoluble)] (circle one) in water. (1 pt)

(b) Write out the molecular form of the following precipitation reaction giving the expected products by filling in the blanks with the expected product & then circling the molecule's state of solid or aqueous. The reaction does not need to be balanced. (2 pts, 1/2 pt each)



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 (print name) (sign name) (I can't read some of your handwriting.)

Please show all work for full credit. If you show work you may also get partial credit.

1 For the molecule NaCl, (with molar mass = 58.45 g/mol), how many moles is 38.2 grams of the compound? (show work) (4 pts)

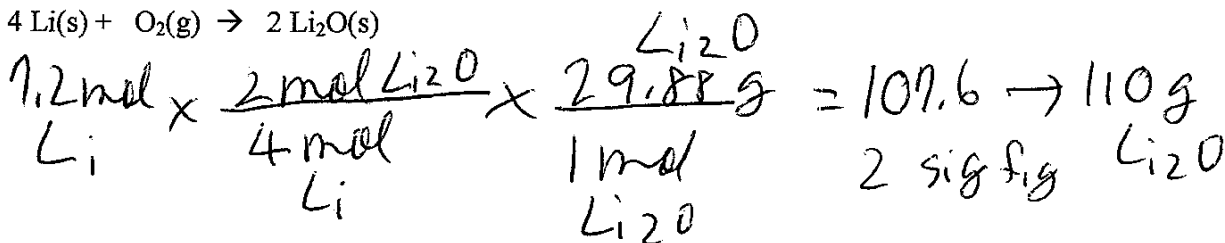
$$38.2 \text{ g NaCl} \times \frac{1 \text{ mol NaCl}}{58.45 \text{ g NaCl}} = 0.654 \text{ mol NaCl}$$

2 If the empirical formula for a molecule is CH and the molecular formula mass is 26.3 g/mol, what is the molecular formula? (4 pts)

empirical formula mass = $12.01 + 1.01 = 13.02$

$$\frac{26.3}{13.02} = 2.0 \quad (\text{CH}) \times 2 = \text{C}_2\text{H}_2 \text{ molecular formula}$$

3 For the reaction shown, what is the theoretical yield of the Li₂O, if you start with 7.2 moles of Li(s). The formula mass of Li₂O is 29.88 g/mole. (6 pts)



4 What is the molarity of a solution made by mixing 84.5 grams of NaOH (FW = 40.01 g/mole) in enough water to make up 277 mL of solution. (6 pts)

method A: $\frac{84.5 \text{ g NaOH}}{277 \text{ mL}} \times \frac{1 \text{ mol NaOH}}{40.01 \text{ g NaOH}} \times \frac{1000 \text{ mL}}{1 \text{ L}} = 7.62 \text{ M}$

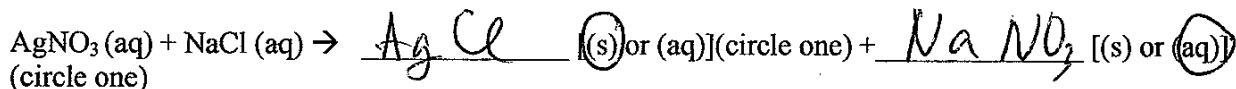
method B: $\frac{84.5 \text{ g NaOH}}{40.01 \text{ g NaOH}} = 2.11 \text{ mol NaOH}$

soln = $\frac{277 \text{ mL}}{1000 \text{ mL}} = 0.277 \text{ L}$

m = $\frac{2.11 \text{ mol NaOH}}{0.277 \text{ L}} = 7.62 \text{ M}$

Extra Credit (3 pts): (a) Is the compound AgNO₃ [(soluble) or (insoluble)] (circle one) in water. (1 pt)

(b) Write out the molecular form of the following precipitation reaction giving the expected products by filling in the blanks with the expected product & then circling the molecule's state of solid or aqueous. The reaction does not need to be balanced. (2 pts, 1/2 pt each)



Green

Quiz IV General Chemistry I Lecture Spring 14 Dr. Hahn 20 pts 2/25 T 9:55 am Form A quiz # _____

Name Kely Name _____
(print name) (sign name) (I can't read some of your handwriting.)

Please show all work for full credit. If you show work you may also get partial credit.

1 For the molecule Na_2SO_4 , (with molar mass = 142.07 g/mol), how many moles is 78.4 grams of the compound? (show work) (4 pts)

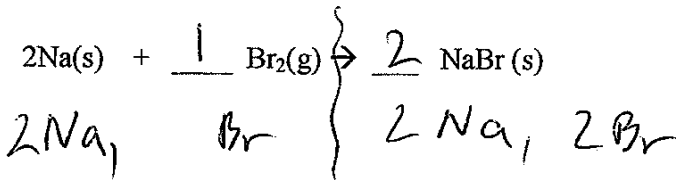
$$\frac{78.4 \text{ g}}{\text{Na}_2\text{SO}_4} \times \frac{1 \text{ mol Na}_2\text{SO}_4}{142.07 \text{ g Na}_2\text{SO}_4} = 0.552 \text{ mol Na}_2\text{SO}_4$$

2 For the molecule SO_2 what is the percent by mass of the sulfur? (molecular weight or MW SO_2 64.07 g/mole) (4 pts)

S atomic mass = 32.07 g/mol

$$\% \text{ mass S} = \left[\frac{(32.07 \text{ g S})}{64.07 \text{ g SO}_2} \right] \times 100 = 50.05\% \text{ in SO}_2$$

3 Balance the following reaction by filling in the blanks. Please show how many of each type of atom is in both sides of the equation after you complete balancing the reaction for full credit. (6 pts)



4 If the molarity of a solution is 1.2 M and you have 250.0 mL of the solution, how many grams of NaCl do you have? (FW of NaCl is 58.45 g/mole) (6 pts)

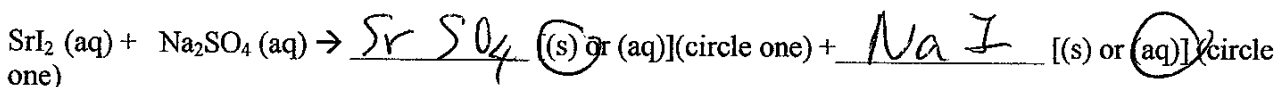
$$250.0 \text{ mL soln} \times \frac{1.2 \text{ mol NaCl}}{1000 \text{ mL}} \times \frac{58.45 \text{ g NaCl}}{1 \text{ mol NaCl}} = 17.5 \text{ grams (2 sig fig - 18 g)}$$

or

$$250.0 \text{ mL soln} \times \frac{1 \text{ L}}{1000 \text{ mL}} \times \frac{1.2 \text{ mol NaCl}}{1 \text{ L soln}} \times \frac{58.45 \text{ g NaCl}}{1 \text{ mol NaCl}} = 17.5 \text{ grams}$$

Extra Credit (3 pts): (a) Is the compound SrSO_4 [(soluble) or (insoluble)] (circle one) in water. (1 pt)

(b) Write out the molecular form of the following precipitation reaction giving the expected products by filling in the blanks with the expected product & then circling the molecule's state of solid or aqueous. The reaction does not need to be balanced. (2 pts, 1/2 pt each)



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Please show all work for full credit. If you show work you may also get partial credit.

1 For the molecule Na_2SO_4 , (with molar mass = 142.07 g/mol), how many moles is 12.4 grams of the compound? (show work) (4 pts)

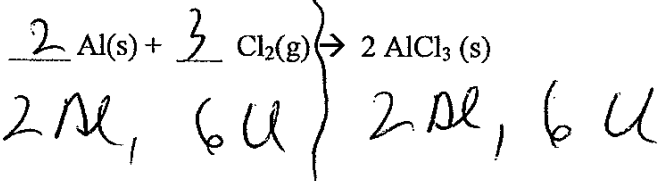
$$12.4 \text{ g Na}_2\text{SO}_4 \times \frac{1 \text{ mol Na}_2\text{SO}_4}{142.07 \text{ g Na}_2\text{SO}_4} = 0.0873 \text{ mol Na}_2\text{SO}_4$$

2 For the molecule CH_4 what is the percent by mass of the hydrogen? (molecular weight or MW CH_4 is 16.05 g/mole) (4 pts)

$$1.01 \times 4 = 4.04 \text{ g H in CH}_4 \text{ mole}$$

$$\% \text{ H} = \left(\frac{4.04 \text{ g H}}{16.05 \text{ g CH}_4} \right) \times 100 = 25.2 \% \text{ H in CH}_4$$

3 Balance the following reaction by filling in the blanks. Please show how many of each type of atom is in both sides of the equation after you complete balancing the reaction for full credit. (6 pts)



4 If the molarity of a solution is 0.50 M and you have 125 mL of the solution, how many grams of HBr do you have? (FW of HBr is 80.92 g/mole) (6 pts)

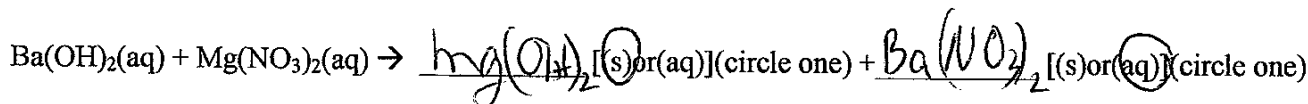
$$125 \text{ mL soln} \times \frac{0.50 \text{ mol HBr}}{1000 \text{ mL soln}} \times \frac{80.92 \text{ g HBr}}{1 \text{ mol HBr}} = 5.1 \text{ g HBr}$$

or

$$125 \text{ mL soln} \times \frac{1 \text{ L soln}}{1000 \text{ mL}} \times \frac{0.50 \text{ mol HBr}}{1 \text{ L soln}} \times \frac{80.92 \text{ g HBr}}{1 \text{ mol HBr}} = 5.1 \text{ g HBr}$$

Extra Credit (3 pts): (a) Is the compound $\text{Mg}(\text{OH})_2$ [(soluble) or (insoluble)] (circle one) in water. (1 pt)

(b) Write out the molecular form of the following precipitation reaction giving the expected products by filling in the blanks with the expected product & then circling the molecule's state of solid or aqueous. The reaction does not need to be balanced. (2 pts, 1/2 pt each)



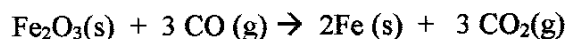
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2 If the empirical formula for a molecule is AlCl_3 and the molecular formula mass is 265 g/mole, what is the molecular formula? (4 pts)

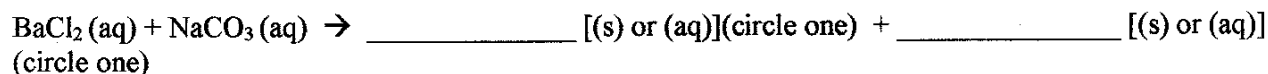
3 For the reaction shown, what is the theoretical yield of the CO_2 ^{M. grams} if you start with 1.5 moles of $\text{Fe}_2\text{O}_3(\text{s})$. The formula mass of CO_2 is 44.01 g/mole. (6 pts)



4 What is the molarity of a solution made by mixing 33.3 grams of H_2SO_4 (FW = 54.09 g/mole) in enough water to make up 78.2 mL of solution. (6 pts)

Extra Credit (3 pts): (a) Is the compound BaCO_3 [(soluble) or (insoluble)] (circle one) in water. (1 pt)

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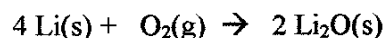
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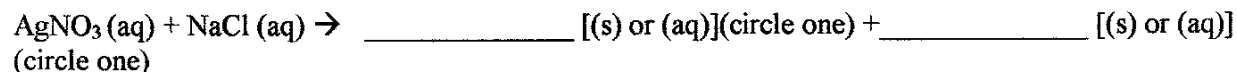
in grams
^



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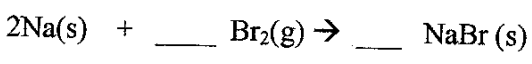
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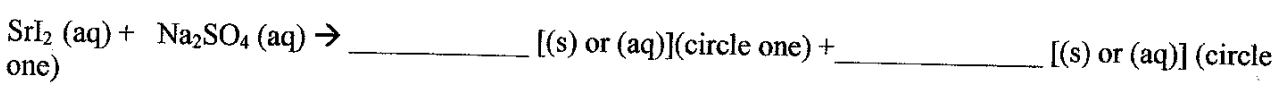
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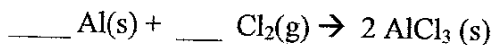
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