Stoichiometry Test 2019 v1 ___/30 = ___ % Name: M

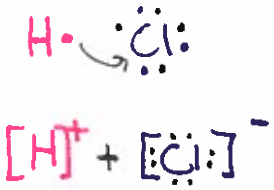
Use the periodic tables provided. **Show your work** and round final answer to the appropriate # of **significant figures**. Include **units**. Good luck ☺

1. Name the following compounds. (4)
   a. NaOH = sodium hydroxide
   b. $Al(NO_3)_3$ = aluminum nitrate
   c. Ni_2O_3 = nickel (III) oxide
   d. P_4S_5 = tetraphosphorus pentasulphide.

2. Give the chemical formula for: (4)
   a. Barium oxide = BaO
   b. Ammonium chloride = NH_4Cl
   c. Tricarbon octahydride = C_3H_8
   d. Iron (III) chloride = $FeCl_3$

3. Compounds containing ionic bonds separate into their respective ions when dissolved. Show the Lewis dot structures for the ions formed for the following ionic compounds. (2)

   a) HCl

   b) MgI_2

4. Show the Lewis dot structures for the covalent bonds and circle the full valences. (3)

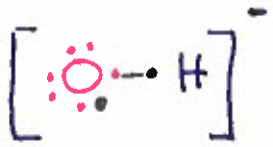
   a. N_2

   b. H_2O_2

   c. OH^-

5. Balance this reaction: 2 NH_3 + 3 CuO → 3 Cu + 1 N_2 + 3 H_2O (1)

6. Express 0.41 moles of isopropanol (rubbing alcohol), C_3H_8O, in grams. (2)

   $C_3 = 36.03$
   $H_8 = 8.08$
   $O = 16.00$
   60.11

   $\frac{1\,mol\ C_3H_8O}{0.41\,mol\ C_3H_8O} = \frac{60.11\,g}{x}$

   $x = 24.651\,g$

   25g of C_3H_8O

7. Convert 90.3 g of benzene, C_6H_6, into moles. (2)

   $C_6 = 72.06$
   $H_6 = 6.06$
   78.12

   $\frac{1\,mol\ C_6H_6}{x} = \frac{78.12\,g}{90.3\,g}$

   $x = 1.155914$

   1.16 moles of C_6H_6

/18

8. Silver sulfide (Ag_2S) is the common tarnish on silver objects. (4)

a. Balance the rxn: $4Ag_{(s)} + 2H_2S_{(g)} + 1O_{2(g)} \rightarrow 2Ag_2S_{(s)} + 2H_2O_{(l)}$

b. How many moles of Silver sulfide (Ag_2S) are produce when 15.4 moles of Ag react?

$$\frac{2\text{ mol } Ag_2S}{x} = \frac{4\text{ mol } Ag}{15.4\text{ mol } Ag}$$

$x = 7.70\text{ mol } Ag_2S$

7.70mol Ag_2S

9. What mass of iron is needed to react with 9.8g of sulfur? (4)

8 Fe + 1 S_8 → 8 FeS

55.85x8 = 446.8g 32.07x8 = 256.56

$$\frac{446.8\text{g Fe}}{x} = \frac{256.56\text{g } S_8}{9.8}$$

$x = 17.0667$

17g Fe

10. 2.50 moles of concentrated hydrochloric acid (HCl) was spilt on the counter. To neutralize its effect, one can add magnesium hydroxide ($Mg(OH)_2$) to produce magnesium chloride ($MgCl_2$) and water.

What mass of $Mg(OH)_2$ is required to neutralize 2.50moles of HCL? (4)

Write out the balanced equation first →

$2HCl + 1Mg(OH)_2 \rightarrow 1MgCl_2 + 2H_2O$

$$\frac{2\text{mol HCl}}{2.50\text{mol HCl}} = \frac{1\text{mol } Mg(OH)_2}{x}$$

$x = 1.25\text{ mol } Mg(OH)_2$

72.9g $Mg(OH)_2$

$$\frac{1\text{mol } Mg(OH)_2}{1.25\text{mol } Mg(OH)_2} = \frac{58.33\text{g}}{x}$$

$x = 72.9125$

/12

Stoichiometry Test 2019

v2 ___/30 = ___%

Name: _____

Use the periodic tables provided. **Show your work** and round final answer to the appropriate # of **significant figures.** Include **units.** Good luck ☺

1. Name the following compounds. (4)

a. BaO = Barium oxide

b. NH_4Cl = ammonium chloride.

c. Ni_2O_3 = nickel(III) oxide

d. SeF_6 = selenium hexafluoride

2. Give the chemical formula for: (4)

a. Sodium hydroxide = NaOH

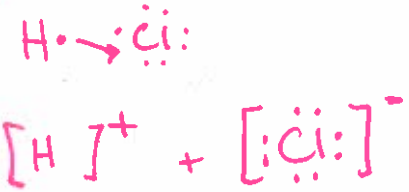
b. Beriłium chloride = $BeCl_2$

c. Tricarbon octahydride = C_3H_8

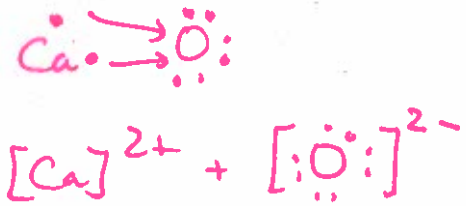
d. Iron (III) nitrate = $Fe(NO_3)_3$

3. Show the Lewis dot structures for the ions formed for the following ionic compounds. (2)

a) ~~O2~~ HCl



b) CaO



4. Show the Lewis dot structures for the covalent bonds and circle the full valences. (3)

a. O_2

b. H_2O_2

c. OH^-

5. Balance this reaction: 2 NH_3 + 3 CuO → 3 Cu + 1 N_2 + 3 H_2O (1)

6. Express 0.81 moles of isopropanol (rubbing alcohol), C_3H_8O, in grams. (2)

mm C_3H_8O = 60.11 g/mol

$$\frac{1\ mol\ C_3H_8O}{0.81\ mol\ C_3H_8O} = \frac{60.11\ g}{x}$$

$x = 48.6891$

2SF

49 g C_3H_8O

7. Convert 98.3 g of benzene, C_6H_6, into moles. (2)

mm C_6H_6 = 78.12 g/mol

$$\frac{1\ mol\ C_6H_6}{x} = \frac{78.12\ g}{98.3\ g}$$

$x = 1.25832\ mol$

3SF **1.26 g C_6H_6**

/18

8. Silver sulfide (Ag_2S) is the common tarnish on silver objects. (4)

a. Balance the rxn: $4\ Ag_{(s)} + 2\ H_2S_{(g)} + 1\ O_{2(g)} \rightarrow 2\ Ag_2S_{(s)} + 2\ H_2O_{(l)}$

b. How many moles of silver sulfide (Ag_2S) are produce when 16.4 moles of silver (Ag) react?

$$\frac{2\ mol\ Ag_2S}{x} = \frac{4\ mol\ Ag}{16.4\ mol\ Ag}$$

$x = 8.20\ mol\ Ag_2S$

35 F

8.20 mol Ag_2S

9. What mass of iron (Fe) is needed to react with 8.8g of sulfur (S_8)? (4)

$8\ Fe + 1\ S_8 \rightarrow 8\ FeS$

$55.85 \times 8 = 446.80$ $\quad 32.07 \times 8 = 256.56$

$$\frac{446.80\ g\ Fe}{x} = \frac{256.56\ g\ S_8}{8.8\ g}$$

$x = 15.325\ 23\ g\ Fe$

25 F

15 g Fe

10. 2.84 moles of concentrated hydrochloric acid (HCl) was spilt on the counter. To neutralize its effect, one can add magnesium hydroxide ($Mg(OH)_2$) to produce magnesium chloride ($MgCl_2$) and water.

What mass of $Mg(OH)_2$ is required to neutralize 2.84 moles of HCL? (4)

Write out the balanced equation first → $2HCl + 1Mg(OH)_2 \rightarrow 1MgCl_2 + 2H_2O$

$$\frac{2\ mol\ HCl}{2.84\ mol\ HCl} = \frac{1\ mol\ Mg(OH)_2}{x} \qquad x = 1.42\ mol\ Mg(OH)_2$$

$$\frac{1\ mol\ Mg(OH)_2}{1.42\ mol\ Mg(OH)_2} = \frac{58.33\ g}{x} \qquad x = 82.8286$$

35 F

82.8 g $Mg(OH)_2$

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