

Review

- Determine the atomic masses of the following atoms.
 a) Cl b) N c) O d) F e) H f) S
- Determine the molecular masses of the following compounds.
 a) HNO₃ b) CaS c) MgCl₂
 d) carbon dioxide e) lithium bromide f) strontium phosphate
- Determine the molar masses of the following compounds.
 a) NaCl b) F₂ c) Mg(OH)₂
 d) iron (III) chloride e) sodium sulphide f) ammonium hydroxide
- Determine the number of moles present. Use correct significant figures!
 a) 7.06 g NaOH b) 235 g CaCO₃ c) 1.7 g H₂O
 d) 13.7 g O₂ e) 0.052 g AgNO₃ f) 15 g KMnO₄
 g) 20 g aluminum iodide h) 85.4 g magnesium bromide
- Determine the masses of the following. Use correct significant figures!
 a) 1.2 mol RbCl b) 0.569 mol O₂
 c) 8.75×10^{-6} mol sulphuric acid d) 4.687×10^{-3} mol iron (II) bromide
- Convert the following moles into molecules
 a) 1.3 mol H₂ b) 4.6 mol H₂SO₄
- Convert the following molecules into moles
 a) 6.02×10^{23} molecules CO b) 3.01×10^{23} molecules O₂
- Convert the following grams into molecules
 a) 30 g F₂ b) 24 g H₂O
 c) 312 g Li₂CO₃ d) 0.0035 g sodium chlorate
- Convert the following molecules into grams
 a) 4.2×10^{23} molecules CO b) 8.2223×10^{24} molecules Cl₂
 c) 6.02×10^{23} molecules KNO₃ d) 1.2×10^{23} molecules iron (III) chloride
- How many moles of oxygen in each of the following molecules?
 a) 3.6 mol H₂O b) 0.39 mol H₂SO₄
- How many moles of each molecule could you make if you had 7.2 mol of carbon atoms to work with?
 a) C₄H₁₀ b) C₆H₁₂O₆
- How many moles of the underlined atom are there in the following?
 a) 125 g NO₂ b) 0.046 g MgSO₄
 c) 2.9×10^{23} molecules NaCl d) 2.56×10^{24} molecules Lithium sulphite

13. What is the total number of atoms in 0.986 g of nitrogen dioxide?
14. What is the total number of atoms in 2.96 mol ammonium bromide?
15. Calculate the number of moles contained in the following. Assume all gases at STP.
 a) 50.0 L O₂ b) 10.6 L SO₂
16. Calculate the volume of the following gases at STP.
 a) 6.2 mol Cl₂ b) 0.235 mol B₂H₆
17. Calculate the mass of each of the following gases at STP
 a) 0.125 L CO₂ b) 6.54 mL nitrogen monoxide
18. Calculate the volume of each of the following gases at STP
 a) 1.0 g CH₄ b) 93 g carbon dioxide

tricky → 19. 0.40 mol of barium hydride contains how many grams of barium?

tricky → 20. In 15.8 g of water, there is enough hydrogen to make how many C₂H₆ molecules?

omit → 21. You have a beaker with 750.0 mL of 12.0 M HCl in it. You also have a beaker containing 13.9 mol NaCl. What is the total mass of chlorine present?

22. Determine the EF for C₇H₁₄O₇.

23. Determine the EF for a compound having a percent composition of 29.40 % calcium, 23.56 % sulphur and 47.04 % oxygen. What is the name of this compound?

NICE! → 24. Determine the EF for a compound that contains only carbon, hydrogen and oxygen. When it is burned, a 5.90 g sample yields 11.18 g of carbon dioxide and 3.66 g of water.

25. Determine the MF for a compound with a percent composition of 37.5 % carbon, 12.5 % hydrogen and 50.0 % oxygen. The molar mass of this compound is 96.0 g.

26. Calculate the percent composition of MgCO₃.

27. Calculate the percent of water in Ce₂(C₂O₄)₃•9H₂O

Note: - no density/volume questions → use previous WS
 (lots of questions)

~~_____~~
 Review all your material!

Key

Chem 11

Review

- Determine the atomic masses of the following atoms.
 a) Cl 35.5 amu b) N 14.0 amu c) O 16.0 amu d) F 19.0 amu e) H 1.0 amu f) S 32.1 amu
- Determine the molecular masses of the following compounds.
 a) HNO₃ 63 amu b) CaS 72.2 amu c) MgCl₂ 95.3 amu
 d) carbon dioxide CO₂ = 44.0 amu e) lithium bromide LiBr = 86.8 amu f) strontium phosphate Sr₃(PO₄)₂ = 452.8 amu
- Determine the molar masses of the following compounds.
 a) NaCl 58.5 g b) F₂ 38.0 g c) Mg(OH)₂ 58.3 g
 d) iron (III) chloride FeCl₃ = 162.3 g e) sodium sulphide Na₂S = 78.1 g f) ammonium hydroxide NH₄OH = 35.0 g
- Determine the number of moles present. Use correct significant figures!
 a) 7.06 g NaOH = 0.177 mol b) 235 g CaCO₃ = 2.35 mol c) 1.7 g H₂O = 0.094 mol
 d) 13.7 g O₂ = 0.428 mol e) 0.052 g AgNO₃ = 3.1 x 10⁻⁴ mol f) 15 g KMnO₄ = 0.045 mol
 g) 20 g aluminum iodide (AlI₃) = 0.05 mol h) 85.4 g magnesium bromide (MgBr₂) = 0.464 mol
- Determine the masses of the following. Use correct significant figures!
 a) 1.2 mol RbCl = 150 g b) 0.569 mol O₂ = 18.2 g
 c) 8.75 x 10⁻⁵ mol sulphuric acid 8.58 x 10⁻⁴ g H₂SO₄ d) 4.687 x 10⁻³ mol iron (II) bromide = 1.011 g FeBr₂
- Convert the following moles into molecules
 a) 1.3 mol H₂ = 7.8 x 10²³ molecules b) 4.6 mol H₂SO₄ = 2.8 x 10²⁴ molecules
- Convert the following molecules into moles
 a) 6.02 x 10²³ molecules CO 1.00 moles b) 3.01 x 10²³ molecules O₂ 0.500 moles
- Convert the following grams into molecules
 a) 30 g F₂ 5 x 10²³ molecules b) 24 g H₂O 8.0 x 10²³ molecules
 c) 312 g Li₂CO₃ 2.55 x 10²⁴ molecules d) 0.0035 g sodium chlorate NaClO₃ 2.0 x 10¹⁹ molecules
- Convert the following molecules into grams
 a) 4.2 x 10²³ molecules CO = 2.0 x 10¹ g b) 8.2223 x 10²⁴ molecules Cl₂ = 9.70 x 10² g
 c) 6.02 x 10²³ molecules KNO₃ 101 g d) 1.2 x 10²³ molecules iron (III) chloride FeCl₃ 32 g
- How many moles of oxygen in each of the following molecules?
 a) 3.6 mol H₂O = 3.6 mol O b) 0.39 mol H₂SO₄ 1.6 mol O
- How many moles of each molecule could you make if you had 7.2 mol of carbon atoms to work with?
 a) C₄H₁₀ 1.8 mol b) C₆H₁₂O₆ 1.2 mol
- How many moles of the underlined atom are there in the following?
 a) 125 g NO₂ = 2.72 moles N
 b) 0.046 g MgSO₄ = 3.8 x 10⁻⁴ mol Mg
 c) 2.9 x 10²³ molecules NaCl 0.48 moles Na
 d) 2.56 x 10²⁴ molecules lithium sulphite Li₂SO₃ 8.50 mol Li

units are amu

units are g

13. What is the total number of atoms in 0.986 g of nitrogen dioxide? $\text{NO}_2 = 3 \text{ atoms}$
 $3.87 \times 10^{22} \text{ atoms}$
14. What is the total number of atoms in 2.96 mol ammonium bromide? NH_4Br
 $1.07 \times 10^{25} \text{ atoms}$
15. Calculate the number of moles contained in the following. Assume all gases at STP.
 a) 50.0 L O_2 2.23 mols b) 10.6 L SO_2 0.473 mols
16. Calculate the volume of the following gases at STP.
 a) 6.2 mol Cl_2 140 b) 0.235 mol B_2H_6 5.26 L
17. Calculate the mass of each of the following gases at STP
 a) 0.125 L CO_2 0.246 g b) 6.54 mL nitrogen monoxide
 $8.76 \times 10^{-3} \text{ g}$
18. Calculate the volume of each of the following gases at STP
 a) 1.0 g CH_4 1.4 L b) 93 g carbon dioxide
 47 L
19. 0.40 mol of barium hydride contains how many grams of barium? 55 g
 BaH_2
20. In 15.8 g of water, there is enough hydrogen to make how many C_2H_6 molecules? ~~1.76 x 10²³ molecules~~
21. You have a beaker with 750.0 mL of 12.0 M HCl in it. You also have a beaker containing 13.9 mol NaCl. What is the total mass of chlorine present?

$$20) \text{ ?\#}_{\text{C}_2\text{H}_6} \text{ molecules} = 15.8 \text{ g H}_2\text{O} \times \frac{1 \text{ mol H}_2\text{O}}{18.0 \text{ g}} \times \frac{2 \text{ mol H}}{1 \text{ mol H}_2\text{O}} \times \frac{1 \text{ mol C}_2\text{H}_6}{6 \text{ mol H}} \times \frac{6.02 \times 10^{23} \text{ molecules}}{1 \text{ mol C}_2\text{H}_6}$$

$$= 1.76 \times 10^{23} \text{ molecules C}_2\text{H}_6 \text{ sweet!}$$

22) Reduce to lowest terms $\rightarrow \text{CH}_2\text{O}$

23) CaSO_4 (calcium sulphate)

24) 11.18 g CO_2 is 27.27% C \therefore 3.049 g of Carbon
 3.66 g H_2O is 11.1% H \therefore 0.407 g of H
 Oxygen is the rest of 5.90 g sample = $5.90 - 3.049 - 0.407 = 2.444 \text{ g}$
 - can't start with O as it is added when burned.

$$\therefore \text{EF} = \underline{\underline{\text{C}_5\text{O}_3\text{H}_8}}$$

25) EF = CH_4O \therefore MF = $\underline{\underline{\text{C}_3\text{H}_{12}\text{O}_3}}$
 (32.0 g) goes into 96, three times

26) %Mg = 28.8%
 %C = 14.2%
 %O = 56.9%

27) 22.9% H_2O