Unit 6 – Moles & Chem Quantities Twitter Review Questions

U6-1: Associate the following substances to its appropriate unit (particles) used:
   A) Element
   B) Molecular Compound
   C) Ionic Compound

    - Answer: A) Atom   B) Molecule   C) Formula Unit

U6-2: A(n) _____ formula represents the lowest/simplest ratio of atoms.

    - Answer: Empirical

U6-3: A(n) _____ formula represents the total ratio of atoms.

    - Answer: Molecular

U6-4: How many oxygen atoms are present in one formula unit of barium phosphate?

    - Answer: 8 oxygen atoms

U6-5: How many phosphorus atoms are in one molecule of diphosphorus pentoxide?

    - Answer: 2 phosphorus atoms

U6-6: How many sulfate ions are in one formula unit of aluminum sulfate?

    - Answer: 3 sulfate ions

U6-7: Calculate the molar mass of calcium, Ca. (Include correct unit)

    - Answer: Ca = 40.08 g/mol

U6-8: Calculate the molar mass of iron (III) chloride. (Include correct unit)

    - Answer: $FeCl_3$ = 162.2 g/mol

U6-9: Calculate the molar mass of xenon pentachloride, XeCl5. (Include correct unit)

    - Answer: $XeCl_5$ = 308.54 g/mol

U6-10: Which of the following is an example of a formula unit?
   A) NaCl
   B) CH4
   C) C6H12O6
   D) SO2

    - Answer: A) NaCl

U6-11: Which of the following is an example of a molecule?
   A) Ba(NO3)2
   B) Fe2S3
   C) BF3
   D) Al2O3

   - Answer: C) BF_3

U6-12: Conversion of grams BaS to S^2- ions:
   A) mass → molec → ion
   B) mass → mole → ion
   C) mass → mole → molec → ion
   D) mass → mole → f.u. → ion

   - Answer: D) mass → mole → f.u. → ion

U6-13: Determine the empirical formula of C4H10.

   - Answer: E.F. = C_2H_5

U6-14: Calculate the percent composition of water in the hydrate, copper (II) sulfate pentahydrate.

   - Answer: [(90.08 g/mol $5H_2O$) / (249.7 g/mol $CuSO_4$ • $5H_2O$)] = 36.1% H_2O

U6-15: What is the correct formula for the hydrate, calcium chloride dihydrate?

   - Answer: $CaCl_2$ • $2H_2O$

U6-16: How many moles of sulfur trioxide are in 4.56 x 10^24 molecules? (Include value, unit, substance formula in answer).

   - Answer: 7.57 mol SO_3

U6-17: How many formula units of calcium sulfate are in 2.90 moles? (Include value, unit, substance formula in answer).

   - Answer: 1.75×10^{24} f.u. $CaSO_4$

U6-18: How many molecules of carbon dioxide are in 2.40 moles? (Include value, unit, substance formula in answer).

   - Answer: 1.44×10^{24} molecules CO_2

U6-19: How many grams of methane gas, CH4, are in 13.4 moles? (Include value, unit, substance formula in answer).

   - Answer: 215 g CH_4

U6-20: How many moles of aluminum iodide are present in 275 grams? (Include value, unit, substance formula in answer).

- Answer: 0.675 mol AlI_3

U6-21: How many grams of rubidium chloride are in 8.66 x 10^26 formula units? (Include value, unit, substance formula in answer).

- Answer: 1.74×10^5 g RbCl

U6-22: How many grams of butane, C4H10, are in 25.3 x 10^28 molecules? (Include value, unit, substance formula in answer).

- Answer: 2.44×10^7 g C_4H_{10}

U6-23: How many molecules of pentane, C5H12, are in 0.211 grams? (Include value, unit, substance formula in answer).

- Answer: 1.76×10^{21} molecules C_5H_{12}

U6-24: How many formula units of strontium carbonate are in 6.30 x 10^6 grams? (Include value, unit, substance formula in answer).

- Answer: 2.57×10^{28} f.u. $SrCO_3$

U6-25: How many atoms of aluminum are in 5.25 grams of aluminum sulfate – Al2(SO4)3 ? (Include value, unit, substance formula in answer).

- Answer: 1.85×10^{22} atoms Al

U6-26: How many total atoms are in 4.45 moles of methane, CH4? (Include value, unit, substance formula in answer).

- Answer: 1.34×10^{25} atoms CH_4

U6-27: Determine the percent composition of EACH element in calcium chloride, CaCl2.

- Answer: Ca = 36.1%   Cl = 63.9%

U6-28: Determine the percent composition of nitrogen in magnesium nitrate.

- Answer: N = 18.9%

U6-29: Determine the empirical formula of a compound that contains 32.4% Na, 22.6% S, and 45.0% O.

- Answer: E.F. = Na_2SO_4

U6-30: Determine the empirical formula of a compound that contains 58.8 g carbon, 9.80 g hydrogen, and 31.4 g oxygen.

- Answer: E.F. = $C_5H_{10}O_2$

U6-31: A 15.7 g sample of a hydrate, magnesium carbonate, was heated. The mass after heating was 7.58 g. What is the formula of the hydrate?

- Answer: $MgCO_3 \cdot 5H_2O$

U6-32:
   A) What is the formula of a hydrate that is 90.7% strontium oxalate (SrC2O4) and 9.30% water?
   B) What is the full name of this hydrate?

- Answer: A) $SrC_2O_4 \cdot 1H_2O$ B) Strontium Oxalate Monohydrate

U6-33: Determine the molecular formula of a compound whose empirical formula is C3H7 and a molecular mass of 86.0 g/mol.

- Answer: M.F. = C_6H_{14}

U6-34: Determine the molecular formula of a compound whose empirical formula is P2O5 and a molecular mass of 284 g/mol.

- Answer: M.F. = P_4O_{10}

U6-35: Determine the molecular formula of a compound that contains 56.4% P and 43.7% O and a molecular mass of 220. g/mol.

- Answer: E.F. = P_2O_3 &   M.F. = P_4O_6