

CH 221 “Mass, Moles, Atoms” Study Questions

1. What is the molar mass of ammonium sulfate?
2. What is the molar mass of cobalt(II) iodide hexahydrate?
3. Calculate the number of moles in 0.41 g of titanium.
4. What is the mass of 1.0×10^9 carbon atoms?
5. The density of carbon tetrachloride is 1.59 g/mL. How many Cl atoms are present in 55 mL of carbon tetrachloride?
6. The molar mass of cesium is 132.9 g/mol. What is the mass of a single Cs atom?
7. The density of lithium is 0.546 g/cm³. What volume is occupied by 1.96×10^{23} atoms of Li?
8. What is the mass percentage of oxygen in acetic acid, HCH₃CO₂?
9. Which of the following could be an empirical formula? C₆H₁₀, B₄H₁₀, NO₃, AsCl₅.
10. Benzene has an empirical formula of CH. If the molar mass of benzene is 78.11 g/mol, what is the molecular formula for benzene?
11. Toluene is 91.25% C and 8.75% H. Determine the empirical formula for toluene.
Hint: 8/7 = 1.14
12. The compound azulene is 93.71% C with the remainder hydrogen, and it has a molar mass of 128.16 g/mol. Calculate the empirical formula and molecular formula for azulene. *Hint: 5/4 = 1.25*

Answers appear on the next page

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1. 132.1 g/mol
2. 420.8 g/mol
3. 8.6×10^{-3} mol
4. 2.0×10^{-14} g
5. 1.4×10^{24} atoms
6. 2.207×10^{-22} g
7. 4.14 cm^3
8. 53.29%
9. NO_3 and AsCl_5 could be empirical formulas.
10. C_6H_6
11. C_7H_8
12. C_5H_4 (EF) and C_{10}H_8 (MF)