

These problems are intended to *supplement* the problems in the textbook, not *replace* them.

Questions

1. What is the atomic mass of copper, Cu ?
2. How many grams are there in 36.34 moles of Cu ?
3. How many moles are there in 3.7×10^5 grams of Cu ?
4. How many copper atoms are there in 92.56 moles of Cu ?
5. How many copper atoms are there in 0.104 grams of Cu ?

6. What is the molar mass of bromine pentafluoride, BrF₅ ?
7. How many grams are there in 0.04651 moles of BrF₅ ?
8. How many moles are there in 89.443 grams of BrF₅ ?
9. How many fluorine atoms are there in 13 BrF₅ molecules ?
10. How many total atoms are there in 13 BrF₅ molecules ?
11. How many BrF₅ molecules are there in 9.164 moles of BrF₅ ?
12. How many fluorine atoms are there in 4.4×10^6 moles of BrF₅ ?
13. How many BrF₅ molecules are there in 435 grams of BrF₅ ?
14. How many fluorine atoms are there in 0.0064 grams of BrF₅ ?

15. What is the molar mass of ammonium chromate, (NH₄)₂CrO₄ ?
16. How many milligrams are there in 0.164 moles of (NH₄)₂CrO₄ ?
17. How many kilomoles are there in 19 kilograms of (NH₄)₂CrO₄ ?
18. How many nitrogen atoms are there in 37 (NH₄)₂CrO₄ formula units ?
19. How many ammonium ions are there in 2.936 moles of (NH₄)₂CrO₄ ?
20. How many (NH₄)₂CrO₄ formula units are there in 7.67×10^{-7} grams of (NH₄)₂CrO₄ ?
21. How many oxygen atoms are there in 8.3 grams of (NH₄)₂CrO₄ ?

22. What is the molar mass of perchloric acid, HClO₄ ?
23. How many pounds are there in 641 moles of HClO₄ ?
24. How many millimoles are there in 8.8×10^{-3} grams of HClO₄ ?
25. How many chlorine atoms are there in 173 HClO₄ molecules ?
26. What is the mass, in grams, of 1.00 trillion HClO₄ molecules ?
27. How many oxygen atoms are there in 914.4 milligrams of HClO₄ ?

28. What is the molar mass of calcium phosphate, Ca₃(PO₄)₂ ?
29. How many grams are there in 904.43 millimoles of Ca₃(PO₄)₂ ?

30. How many moles are there in 0.00431 micrograms of $\text{Ca}_3(\text{PO}_4)_2$?
31. How many oxygen atoms are there in 64 $\text{Ca}_3(\text{PO}_4)_2$ formula units ?
32. How many calcium atoms are there in 9.5 moles of $\text{Ca}_3(\text{PO}_4)_2$?
33. How many $\text{Ca}_3(\text{PO}_4)_2$ formula units are there in 0.000410 gram of $\text{Ca}_3(\text{PO}_4)_2$?
34. How many phosphate ions are there in 9832 grams of $\text{Ca}_3(\text{PO}_4)_2$?

Answers

If you cannot figure out how to get the correct answer, go to your instructor, Science Tutoring Center, SI, etc.

NOTE: molar mass values were taken from the CHE 111 Lab Manual and used without rounding

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|--------------------------------------|---|---|
| 1. 63.55 amu | 13. 1.50×10^{24} BrF_5 molecules | 24. 0.088 or 8.8×10^{-2} mmol HClO_4 |
| 2. 2309 g Cu | 14. 1.1×10^{20} F atoms | 25. 173 Cl atoms |
| 3. 5.8×10^3 mol Cu | 15. 152.08 g/mol | 26. 1.67×10^{-10} g HClO_4 |
| 4. 5.574×10^{25} Cu atoms | 16. 2.49×10^4 mg $(\text{NH}_4)_2\text{CrO}_4$ | 27. 2.193×10^{22} O atoms |
| 5. 9.86×10^{20} Cu atoms | 17. 0.12 kmol $(\text{NH}_4)_2\text{CrO}_4$ | 28. 310.18 g/mol |
| 6. 174.90 g/mol | 18. 74 N atoms | 29. 280.54 g $\text{Ca}_3(\text{PO}_4)_2$ |
| 7. 8.135 g BrF_5 | 19. 3.536×10^{24} NH_4^+ ions | 30. 1.39×10^{-11} mol $\text{Ca}_3(\text{PO}_4)_2$ |
| 8. 0.51140 mol BrF_5 | 20. 3.04×10^{15} formula units | 31. 512 O atoms |
| 9. 65 F atoms | 21. 1.3×10^{23} O atoms | 32. 1.7×10^{25} Ca atoms |
| 10. 78 atoms | 22. 100.46 g/mol | 33. 7.96×10^{17} $\text{Ca}_3(\text{PO}_4)_2$ f. units |
| 11. 5.519×10^{24} molecules | 23. 142 lbs. HClO_4 | 34. 3.818×10^{25} PO_4^{3-} ions |
| 12. 1.3×10^{31} F atoms | | |