Chemistry 11 – Mole Conversions

Part 1: Mole ↔ Mass Conversions

Convert the following number of moles of chemical into its corresponding mass in grams. (Sig. figs. count in your final answer.)

1. 0.436 moles of ammonium chloride
2. 2.360 moles of lead (II) oxide
3. 0.031 moles of aluminum iodide
4. 1.077 moles of magnesium phosphate
5. 0.50 moles of calcium nitrate
6. 23.5 g of sodium chloride
7. 0.778 g of sodium cyanide
8. 0.250 g of water
9. 169.45 g of calcium acetate
10. 79.9 g of potassium permanganate

Part 2: Moles ↔ Number of Particles Conversions

Convert the following number of moles into their corresponding number of particles. (Sig. figs. count in your final answer.)

11. 0.0455 moles of hydrochloric acid
12. 1.2 moles of glucose ($C_6H_{12}O_6$)
13. 0.32 moles of sodium bicarbonate
14. 6.99×10^{24} molecules of sodium nitrite
15. 1.255×10^{25} molecules of magnesium chloride
16. 7.2×10^{23} atoms of helium
17. How many **atoms** of **oxygen** are there in 2.35 moles of sodium phosphate?
18. How many **atoms** of **carbon** are there in 0.0022 moles of lead (IV) acetate?
19. How many **moles** of **oxygen atoms** are there in 2.55×10^{24} molecules of sodium nitrate?
20. How many **moles** of **hydrogen atoms** are there in 1.046×10^{23} molecules of ammonium hydroxide?

Part 3: Moles ↔ Molarity Conversions

Convert the following number of moles into their corresponding molarities.

21. 0.694 moles of sodium hydroxide in 400. mL
22. 1.25 moles of magnesium borate in 2.5 L
23. 0.0039 moles of lead (II) chloride in 25 mL
24. 500. mL of 1.25 M sodium oxide
25. 250. mL of 0.75 M magnesium fluoride
26. 100. mL of 1.10 M calcium nitrate

Part 4: Moles ↔ Litres of gas (at standard conditions STP) Conversions

Convert the following number of moles into their corresponding volumes of gas.

27. 2.2 moles of hydrogen gas
28. 0.0665 moles of oxygen gas
29. 30.7 moles of sulfur dioxide gas
30. 50.0 L of oxygen gas
31. 2.75 L of chlorine gas
32. 1000. mL of carbon dioxide gas

Part 5: Mixed Problems involving multiple conversions

Convert the following masses into their corresponding molarities.

33. Find the molarity of a 50.0 g of sodium hydroxide in 1.2 L
34. Find the molarity of a 100. g of magnesium nitrate in 500. mL
35. Find the molarity of a 75.45 g of calcium sulfate in 300. mL
36. Find the molarity of a 10.1 g of sodium chlorite in 100. mL
37. Find the molarity of a 1.2 L of 0.400 M sodium carbonate
38. Find the molarity of a 450. mL of 1.35 M iron (III) nitrate
39. Find the molarity of a 250. mL of 0.095 M copper (II) sulfate
40. Find the molarity of a 5.00 L of 1.15 M zinc nitrate

41. What is the mass of 45.25 L of carbon dioxide (at STP)?
42. What is the mass of 2.8 L of carbon disulfide (at STP)?
43. What is the mass of 50.0 L of nitrogen (at STP)?
44. What is the mass of 2000. L of carbon monoxide (at STP)?

45. What is the volume of 50.0 g of oxygen gas?
46. What is the volume of 3.50 kg of argon?
47. What is the volume of 700. g of nitrogen monoxide?
48. What is the volume of 500. g of sulfur trioxide?

49. 50.0 L of carbon dioxide gas will contain how many molecules of the gas?
50. How many atoms of oxygen are contained in question #49?