

Molar Mass Problems

1. Calculate the mass of 1.000 mole of CaCl_2
2. Calculate grams in 3.0000 moles of CO_2
3. Calculate number of moles in 32.0 g of CH_4
4. Determine mass in grams of 40.0 moles of Na_2CO_3
5. Calculate moles in 168.0 g of HgS
6. Calculate moles in 510.0 g of Al_2S_3
7. How many moles are in 27.00 g of H_2O
8. Determine mass in grams of Avogadro number of $\text{C}_{12}\text{H}_{22}\text{O}_{11}$
9. Find mass in grams of 9.03 moles of H_2S
10. Determine grams in 1.204 mole of NH_3

Consider the molecule CuNH_4Cl_3 as you answer 11 - 19.

11. Name the elements present.
 12. How many atoms form the molecule?
 13. How many of each atom in the molecule?
 14. How many hydrogen atoms in one mole of molecules?
 15. How many chlorine atoms in six moles of molecules?
 16. What is the molar mass of this molecule?
 17. Name this molecule.
 18. What is the mass in grams of one molecule?
 19. How many moles would be in 6.84 g of this substance?
20. You need 0.0100 mole of lead (II) chromate. How much should you weigh on the scale?
 21. Given 6.40 g of HBr . How many moles is this?
 22. Write the correct formula for calcium acetate and then answer 23 - 25 based on it.
 23. What is the mass of exactly one mole of calcium acetate?
 24. How many moles are contained in 1.58 g of the substance in #23?
 25. How much does 0.400 mole of #23 weigh?
 26. Write the formula for oxygen gas.
 27. How many atoms (and moles) are represented by the formula in #26?
 28. What is the mass of Avogadro number of oxygen molecules?
 29. Calculate the mass of one mole of each of these substances. (Optional: try naming each.)

a. AlCl_3	n. $\text{Ba}(\text{SCN})_2$	aa. LiH	an. $\text{Ba}(\text{BrO}_3)_2$	ba. AlBr_3	bn. HCl
b. TeF_4	o. K_2S	ab. CO	ao. Hg_2Br_2	bb. P_2O_5	bo. K_2SO_4
c. PbS	p. NH_4Cl	ac. SnI_4	ap. $\text{Cr}_2(\text{SO}_3)_3$	bc. NH_4NO_3	bp. NaCl
d. Cu_2O	q. KH_2PO_4	ad. KOH	aq. $\text{Al}(\text{MnO}_4)_3$	bd. $\text{Ba}(\text{OH})_2$	bq. LiI
e. AgI	r. $\text{C}_2\text{H}_5\text{NBr}$	ae. K_2O	ar. CoSO_4	be. PbSO_4	br. Hg_2O
f. N_2O	s. $\text{Ba}(\text{ClO}_3)_2$	af. H_2SO_4	as. $\text{Ca}(\text{NO}_3)_3$	bf. $\text{Ba}_3(\text{PO}_4)_2$	bs. HF
g. MoCl_5	t. $\text{Fe}(\text{OH})_3$	ag. Hg_3N_2	at. NaH_2PO_4	bg. $\text{NaC}_2\text{H}_3\text{O}_2$	bt. FeCl_3
h. Hg_2Cl_2	u. $(\text{NH}_4)_2\text{S}$	ah. SiF_4	au. $(\text{NH}_4)_3\text{PO}_4$	bh. $\text{Ba}(\text{OH})_2$	bu. NaHSO_4
i. Ta_2O_5	v. CoCl_2	ai. NH_4OH	av. $\text{KAl}(\text{SO}_4)_2$	bi. NaHCO_3	bv. Ag_2O
j. HgF_2	w. KMnO_4	aj. N_2O_5	aw. Hg_2SO_4	bj. $\text{Al}(\text{OH})_3$	bw. $\text{Pb}(\text{ClO}_2)_2$
k. KCl	x. CaSO_4	ak. SnCrO_4	ax. $\text{Al}_2(\text{SO}_4)_3$	bk. NH_4MnO_4	bx. CoF_3
l. KF	y. H_2CO_3	al. Al_2O_3	ay. FePO_4	bl. Fe_2O_3	by. $\text{Al}(\text{C}_2\text{H}_3\text{O}_2)_3$
m. ZnO	z. CO_2	am. CuCO_3	az. $\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2$	bm. CaCO_3	bz. $\text{Na}_2\text{Al}_2(\text{SO}_4)_4$

30. Determine the mass of one mole for the following two substances.

a. $(\text{HOOCCH}_2)_2\text{NCH}_2\text{CH}_2\text{N}(\text{CH}_2\text{COOH})_2$

b. $(\text{NH}_4)_2\text{CH}(\text{CH}_2)_5\text{COOH}$

31. Determine the mass of one molecule of:

a. H_2

b. NO

c. NH_3

d. U^{235}F_6

e. U^{238}F_6

32. Determine the mass of the stated number of moles.

a. 2.55 mole Cu_2CrO_4 h. 1.95 mole HNO_3 o. 2.00 mole $\text{HC}_2\text{H}_3\text{O}_2$

b. 10.0 mole NaCl i. 2.20 mole SnCl_2 p. 5.00 mole Ag_2O

c. 3.00 mole H_2 j. 3.27 mole O_2 q. 0.000300 mole AuCl_3

d. 1.55 mole KrF_2 k. 0.100 mole NH_3 r. 0.00550 mole CH_4

e. 0.100 mole H_2O l. 0.500 mole CaCO_3 s. 0.300 mole H_3PO_4

f. 1.500 mole K_2SO_4 m. 0.0010 mole H_2SO_4 t. 5.0 mole NH_4OH

g. 4.50 mole Na_2O n. 0.30 mole HCl u. 0.00200 mole Na_2SO_4

33. Determine the number of moles in the stated mass.

a. 26.0 gram $\text{Ca}(\text{ClO}_4)_2$ m. 5.08 gram XeF_4 y. 10.0 gram $\text{KAl}(\text{SO}_4)_2$

b. 32.0 gram O_2 n. 10.0 gram V_2O_5 z. 2.50 gram $\text{CoSO}_4 \cdot 6\text{H}_2\text{O}$

c. 34.2 gram NH_3 o. 2.50 gram $\text{K}_2\text{Cr}_2\text{O}_7$ aa. 24.0 gram CO

d. 9.00 gram H_2SO_4 p. 10.00 gram Na_2CO_3 ab. 3.45 gram ZnCl_2

e. 59.3 gram SnF_2 q. 3.091 gram K_2SO_4 ac. 36.0 gram $\text{Na}_2\text{CrO}_4 \cdot 4\text{H}_2\text{O}$

f. 0.00500 gram XeO_3 r. 20.00 gram KOH ad. 15.0 gram PbO

g. 10.0 gram SO_3 s. 0.0089 gram IF_7 ae. 50.00 gram KBr

h. 1.00 gram CO_2 t. 32.58 gram CuS af. 1.00×10^2 gram KCl

i. 5.00 gram CaCO_3 u. 1.00 gram $\text{Ba}(\text{OH})_2$ ag. 12.25 gram $\text{Sr}(\text{HCO}_3)_2$

j. 1.00 gram NaCl v. 2.001 gram Al_2O_3 ah. 0.00860 gram $\text{Ca}_3(\text{PO}_4)_2$

k. 98.9 gram NaI w. 2.00×10^{-3} gram NH_4NO_3

l. 14.0 gram N_2 x. 0.0010 gram $\text{Al}(\text{MnO}_4)_3$

These problems are samples only. Focus your attention on the above problems, not these.

34. Which of the following pure iron samples contains the largest number of atoms?

a. 6.70 g

b. 0.110 mole

c. 7.83×10^{22} atoms

35. Arrange the following in order of increasing weight.

a. 10.4 g of sulfur

b. 0.179 moles of iron

c. 6.33×10^{25} atoms of hydrogen

d. 0.77 moles of N_2

36. How many atoms of copper are there in a piece of copper that weighs the same as a piece of aluminum that contains 4.86×10^{21} atoms of aluminum?

37. Can you swim in a billion billion (1×10^{18}) molecules of water? What mass does this represent?

38. How many molecules of oxygen (O_2) would be required to produce one drop (0.010 g) of water?