

Mole Concept

DPP-1



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- ^{12}C is the standard for the atomic weights of atoms. What is the standard for the molecular weights of molecules? Explain.
- What is the molecular mass weight of Na_2S ?
- How many grams of H_2O are there in 2.50 mol of H_2O ?
- Calculate the number of mol of $\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2$ present in 200 g of $\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2$
- How many molecules of water are there in 36.0 g of H_2O ?
- How many moles of atoms of each element are there in 1.0 mol of each of the following compounds?
 (a) Fe_3O_4 (b) AsCl_3 (c) $\text{Mg}(\text{C}_2\text{H}_3\text{O}_2)_2$ (d) $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
- How many mol of Fe and of S are contained in
 (a) 1 mol of FeS_2 (pyrite), (b) 1.00 kg of FeS_2 ?
 (c) How many kg of S are contained in 1.00 kg of FeS_2 ?
- What is the average weight in kg of
 (a) a hydrogen atom (b) an oxygen atom (c) a uranium atom (A.M = 238)
- How much calcium is in the amount of $\text{Ca}(\text{NO}_3)_2$ that contains 20.0 g of nitrogen?
- How many moles of $\text{C}_2\text{H}_4\text{O}_2$ contains 6.02×10^{23} atoms of hydrogen?
- (a) What is the mass of 4.00×10^{-3} mol of glucose, $\text{C}_6\text{H}_{12}\text{O}_6$?
 (b) How many carbon atoms are there in 4.00×10^{-3} mol of glucose?
- If the atomic weight of carbon were set at 100 u, what would be the value of Avogadro's number? Is Avogadro's number a fundamental physical constant?
- Calculate the molecular mass of the following :
 (i) H_2O (ii) CO_2 (iii) CH_4
- In three moles of ethane (C_2H_6), calculate the following :
 (i) Number of moles of carbon atoms.
 (ii) Number of moles of hydrogen atoms.
 (iii) Number of molecules of ethane.
- What will be the mass of one ^{12}C atom in g ?
- Calculate the number of atoms in each of the following
 (i) 52 moles of Ar (ii) 52 u of He (iii) 52 g of He.
- The weight of one atom of uranium is 238 amu. Its actual weight is
 (a) 1.43×10^{26} g (b) 3.94×10^{-22} g (c) 6.99×10^{-27} g (d) None of these
- The largest number of molecules is in
 (a) 36 g of water (b) 28 g of CO_2 (c) 46 g of CH_3OH (d) 58 g of N_2O_5
- The molecular mass of CO_2 is 44 amu. Avogadro number is 6.02×10^{23} . Therefore, the mass of one molecule of CO_2 is
 (a) 3.65×10^{-23} g (b) 3.65×10^{23} g (c) 7.31×10^{-23} g (d) 7.31×10^{23} g
- 4.6×10^{22} atoms of an element weighs 13.8 g. The atomic weight of that element is
 (a) 290 (b) 180 (c) 34.4 (d) 10.4

- 21.** Which of the following pairs of gases contain the same number of molecules ?
 (a) 16 g of O_2 and 14 g of N_2 (b) 8 g of O_2 and 22 g of CO_2
 (c) 28 g of N_2 and 22 g of CO_2 (d) 32 g of O_2 and 32 g of N_2
- 22.** 90 g of water contains how many moles ?
 (a) 6.02×10^{23} (b) 90 (c) 5 (d) 1
- 23.** The number of molecules in 4.25 g of ammonia is about
 (a) 1.0×10^{23} (b) 1.5×10^{23} (c) 2.0×10^{23} (d) 2.5×10^{23}
- 24.** 19.7 kg of gold was recovered from a smuggler. How many atoms of gold were recovered ?
 (Au = 197)
 (a) 100 (b) 6.02×10^{23} (c) 6.02×10^{24} (d) 6.02×10^{25}
- 25.** How many molecules are present in one gm of hydrogen ?
 (a) 6.023×10^{23} (b) 6.023×10^{22} (c) 3.0125×10^{23} (d) 3.0125×10^{-12}

ANSWERS

- 1.** ^{12}C **2.** 78u **3.** 45.0 g **4.** 1.10 mole
- 5.** 1.20×10^{24} molecules
- 6.** (a) 3 mol Fe, 4 mol O (b) 1 mol As, 5 mol Cl
 (c) 1 mol Mg, 4 mol C, 6 mol H, 4 mol O (d) 1 mol Cu, 1 mol S, 9 mol O, 10 mol H
- 7.** (a) 1 mol Fe & 2 mol S (b) 8.33 mol Fe & 16.7 mol S
 (c) 0.533 kg S
- 8.** (a) 1.67×10^{-27} kg/atom (b) 2.672×10^{-26} kg/atom
 (c) 3.9746×10^{-25} kg/atom
- 9.** 28.57 g Ca **10.** 0.25 moles
- 11.** (a) 0.72g (b) 1.44×10^{22} atoms **12.** 5.01×10^{24} atoms ; Yes
- 13.** (i) 18u, (ii) 44u, (iii) 16u **14.** (i) 6 mol (ii) 18 mol (iii) 1.806×10^{24} molecules
- 15.** 2.004×10^{-23} g
- 16.** (i) 3.13×10^{25} atoms (ii) 13 atoms (iii) 7.826×10^{24} atoms
- 17.** (b) **18.** (a) **19.** (c) **20.** (b) **21.** (a) **22.** (c)
- 23.** (b) **24.** (d) **25.** (c)