

Practicing Molarity



1. A flask contains 85.5 g $C_{12}H_{22}O_{11}$ (sucrose) in 1.00 liters of solution. What is the molarity?
2. A beaker contains 212.4 g osmonium (III) fluoride in 0.0673 liters of solution. What is the molarity?
3. Calculate the molarity if a flask contains 1.54 moles of potassium sulfate in 125 ml of solution.
4. Calculate the molarity if a chalice contains 36.45 grams of ammonium chlorite in 2.36 liters of solution.
5. What is the molarity of a solution containing 14.92 grams magnesium oxalate in 3.65 ml?
6. What is the molarity of a solution prepared by dissolving 14.2 g of $NaNO_3$ in enough water to make 350 mL of solution?
7. What is the molarity of 0.289 moles of Fe dissolved in 120 mL solution?
8. 952 grams of ammonium carbonate are dissolved to make 1750 mL of solution. What is the molarity?
9. What is the molarity if 9.82 grams of lead (IV) nitrate are dissolved to make 465 mL of solution?

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Answers

1. A flask contains 85.5 g $C_{12}H_{22}O_{11}$ (sucrose) in 1.00 liters of solution. What is the molarity?

$$\text{Molarity} = 85.5 \text{ g sucrose} / 1.00 \text{ L soln} \times 1 \text{ mol sucrose} / 342.34 \text{ g sucrose} = 0.250 \text{ M sucrose}$$

2. A beaker contains 212.4 g osmonium (III) fluoride in 0.0673 liters of solution. What is the molarity?

$$\text{Molarity} = 214.2 \text{ g OsF}_3 / 0.0673 \text{ L soln} \times 1 \text{ mol OsF}_3 / 247.23 \text{ g OsF}_3 = 12.9 \text{ M OsF}_3$$

3. Calculate the molarity if a flask contains 1.54 moles of potassium sulfate in 125 ml of solution.

$$\text{Molarity} = 1.54 \text{ mol K}_2\text{SO}_4 / 0.125 \text{ L soln} = 12.3 \text{ M K}_2\text{SO}_4$$

4. Calculate the molarity if a chalice contains 36.45 grams of ammonium chlorite in 2.36 liters of solution.

$$\text{Molarity} = 36.45 \text{ g NH}_4\text{ClO}_2 / 2.36 \text{ L soln} \times 1 \text{ mol NH}_4\text{ClO}_2 / 85.50 \text{ g NH}_4\text{ClO}_2 = 0.181 \text{ M NH}_4\text{ClO}_2$$

5. What is the molarity of a solution containing 14.92 grams magnesium oxalate in 3.65 ml?

$$\text{Molarity} = 14.92 \text{ g MgC}_2\text{O}_4 / 0.00365 \text{ L soln} \times 1 \text{ mol MgC}_2\text{O}_4 / 112.32 \text{ g MgC}_2\text{O}_4 = 36.4 \text{ mol MgC}_2\text{O}_4$$

6. What is the molarity of a solution prepared by dissolving 14.2 g of NaNO_3 in enough water to make 350 mL of solution?

$$\text{Moles of NaNO}_3 = 14.2 \text{ g} / 85 \text{ g/mol} = 0.167 \text{ mol}$$

$$\text{Molarity} = 0.167 \text{ mol} / 350 \times 10^{-3} \text{ L} = 0.477 \text{ M}$$

7. What is the molarity of 0.289 moles of Fe dissolved in 120 mL solution?

$$\text{Molarity} = 0.289 \text{ mol Fe} / 120 \text{ mL soln} = 2.41 \text{ M}$$

8. 952 grams of ammonium carbonate are dissolved to make 1750 mL of solution. What is the molarity?

$$\text{Moles of (NH}_4\text{)}_2\text{CO}_3 = 952 \text{ g (NH}_4\text{)}_2\text{CO}_3 \times 1 \text{ mole (NH}_4\text{)}_2\text{CO}_3 / 96 \text{ g (NH}_4\text{)}_2\text{CO}_3 = 9.92 \text{ mole (NH}_4\text{)}_2\text{CO}_3$$

$$\text{Molarity} = 9.92 \text{ mole (NH}_4\text{)}_2\text{CO}_3 / 1.75 \text{ L soln} = 5.67 \text{ M}$$

9. What is the molarity if 9.82 grams of lead (IV) nitrate are dissolved to make 465 mL of solution?

$$\text{Moles of Pb(NO}_3\text{)}_4 = 9.82 \text{ g Pb(NO}_3\text{)}_4 \times 1 \text{ mole Pb(NO}_3\text{)}_4 / 455.2 \text{ g Pb(NO}_3\text{)}_4 = 0.0216 \text{ moles Pb(NO}_3\text{)}_4$$

$$\text{Molarity} = 0.0216 \text{ moles Pb(NO}_3\text{)}_4 / 0.465 \text{ L soln} = 0.0465 \text{ M}$$