Physical Science 4012 Molarity Problems

Please round your answers to two decimal places, when applicable.

1. A student prepares 5 liters of salt water with 2 moles of salt (NaCl). Calculate the molarity of this solution.

2. A 300mL $NaNO_3$ solution contains 0.073 mol of $NaNO_3$. Calculate the molarity of this solution.

3. If 10.0g $NaNO_3$ are dissolved in a 0.5 L solution, then what is the molarity of this solution?

4. There are 3.4 mol of $AgNO_3$ dissolved in a 2.0 L solution. Calculate the molarity.

5. What is the concentration, in molarity, of an 800 mL solution which contains 2.6 mol of $C_6H_{12}O_6$?

6. What is the concentration, in molarity, of a 750 mL solution which contains 750 g of $C_{12}H_{22}O_{11}$?

7. What is the concentration, in molarity, of a 1200 mL solution which contains 50.0 g NaCl?

8. What is the concentration, in molarity, of a 500 mL solution which contains 100.0 g NaOH?

9. What is the concentration, in molarity, of a 6000 mL solution which contains 2000 g AgCl?

10. What is the concentration, in molarity, of a 60 mL solution which contains 23 g NaCl?

11. What is the volume of a 2.5 M sample of $AgNO_3(aq)$ if it contains 0.3 mol $AgNO_3$?

12. What is the volume of a 5 M sample of NaOH (aq) if it contains 2.2 mol NaOH?

13. What is the volume of a 2.5 M sample of $CaBr_2(aq)$ if it contains 100 g $CaBr_2$?

14. What is the volume of a 0.45 M sample of $AlPO_4$ if it contains 200 g $AlPO_4$?

15. What is the volume of a 0.80 M sample of $CaSO_4$ if it contains 50 g $CaSO_4$?

16. How many moles of $AgNO_3$ are present in 4 L of a 3 M $AgNO_3$ solution?

17. How many moles of CaI_2 are present in 200 mL of a 2 M CaI_2 solution?

18. How many grams of $AgNO_3$ are present in 2.0 L of a 3 M $AgNO_3$ solution?

19. How many grams of NaOH are present in 700 mL of a 2.5 M NaOH solution?

20. What mass of $C_{12}H_{22}O_{11}$ is present in a 300 mL sample of 4 M $C_{12}H_{22}O_{11}(aq)$?

21. For each solution below, fill in the missing blanks. You may use the remainder of the page for scrap paper.

Solution	**Concentration**	**Mass Solute Present**	**Number of Moles of Solute Present**	**Volume of Solution (mL)**	**Volume of Solution (L)**
NaOH	2.5 M			500 mL	
NaCl	4.0 M	500 g			
$NaNO_3$	3.0 M		1.8 mol		
$C_{12}H_{22}O_{11}$		500 g		450 mL	
$C_6H_{12}O_6$		600 g			2.5 L
$AgNO_3$			4.2 mol		2.1 L
CH_3COOH	2.6 M				4.0 L
$Al_2(Cr_2O_7)_3$			0.022 mol	200 mL	
HgI		72 g		50 mL	
Fe_2O_3	1.75 M	100 g			

22. Given the following three solutions:

Solution no. 1: 4 g of $CaBr_2$ in 200 mL of solution;
Solution no. 2: 4 mol of $CaBr_2$ in 20 L of solution;
Solution no. 3: 20 g of $CaBr_2$ in 2 L of solution.

Which solution has the highest concentration of $CaBr_2$?

Your answer must include the formula or formulas used and all of the calculations, including a clear indication of the units of measure.

Answer: Solution no. _____

23. Given the following three solutions:

Solution no. 1: 40 g of NaI in 0.4 L of solution;
Solution no. 2: 0.3 mol of NaI in 500 mL of solution;
Solution no. 3: 0.2 kg of NaI in 2022 mL of solution.

Which solution has the highest concentration of NaI?

Your answer must include the formula or formulas used and all of the calculations, including a clear indication of the units of measure.

Answer: Solution no. _____