

Chemistry 12: Review of Solubility of Ionic Substances

1. Identify each of the following as **ionic** or **molecular** substances:

a) $\text{NaCl}_{(\text{aq})}$

b) $\text{CH}_3\text{COOH}_{(\text{aq})}$

c) $\text{CCl}_4(\text{l})$

d) $\text{HNO}_3(\text{aq})$

e) $\text{C}_2\text{H}_6(\text{l})$

2. A good way to test a liquid to see if it contains **ions** is to _____

3. Define a **saturated solution** _____

4. Define an **unsaturated solution** _____

5. What is meant by **solubility** ? _____

6. What is meant by a **polar molecule** ? _____

7. Draw a diagram of a **water** molecule showing the **polarity**.

8. The process of an ionic solid breaking down into individual ions is called _____

9. Given a saturated solution of sodium acetate, outline the procedure you could use to determine the **solubility** of sodium acetate at that particular temperature in grams per 100 mL.

10. Does an *increase in temperature* always increase the **rate** of dissolving? _____

11. Does an *increase in temperature* always increase the solubility of a substance in water? ____
Explain.

12. A chemistry stockroom contains a bottle of 12.0 M HCl. A teacher needs to make up 800.0 mL of a 3.0 M solution of HCl. What volume of the stock solution (12.0 M) does the teacher need to use?

Answer_____

13. A chemistry student dilutes a 0.20 M solution by adding 200.0 mL of water to 50.0 mL of the original solution. Calculate the **molar concentration** of the final solution.

Answer_____

14. A student has 600.0 mL of a 0.30 M solution of HNO_3 . How much water must she add in order to make it a 0.15 M solution? (Be careful that you answer the question!)

Answer _____

15. If 25.0 mL of 0.90 M HCl is added to 125.0 mL of water, what is the final [HCl]?

Answer _____

16. Calculate the $[\text{Fe}^{3+}]$ in a 0.25 M solution of $\text{Fe}_2(\text{SO}_4)_3$?

Answer _____

17. Calculate the $[\text{Na}^+]$ in a 0.55 M solution of sodium acetate. (Write the proper formula for sodium acetate first.)

Answer _____

18. Calculate the $[\text{Na}^+]$ in a 0.55 M solution of sodium carbonate. (Write the proper formula for sodium carbonate first.)

Answer _____

19. Calculate the $[\text{Na}^+]$ in a 0.55 M solution of sodium phosphate. (Write the proper formula for sodium phosphate first)

Answer _____

20. 300 mL of 0.500 M NaCl is mixed with 400 mL of 0.200 M HCl. Calculate the final total [Cl⁻].

Answer _____

21. 200 mL of 0.500 M NaCl is mixed with 300 mL of 0.200 M CaCl₂. Calculate the final total [Cl⁻].

Answer _____

22. An aqueous solution of Pb(NO₃)₂ is mixed with an aqueous solution of KBr and a precipitate forms.

a) Write a **balanced formula equation** for this reaction. (*Include all subscripts.*)

b) Write a **balanced total ionic equation** for this reaction. (*Include all subscripts.*)

c) Write a balanced **net ionic equation** for this reaction. (*Include all subscripts.*)
