

Practice Exam Water **ANSWERS**

1. Water is
A. polar molecule with polar covalent bonds between H & O
2. Iodine is a solid and bromine is a liquid at STP because of
C. dispersion forces
3. It takes more energy to turn water into steam than ice into water because:
D. making steam requires breaking all of the hydrogen bonds
4. You melt a 9.000 gram hunk of ice at 273K in your hand without temperature change. You used how many joules to melt this ice this? **D. 3006 joules**
5. Surface tension in water can be broken by **C. surfactants**
6. How many grams of NaCl can dissolve into 50 mL of water at 90°C? **B. 20 g**
7. When CaCl_2 dissolves in water
B. it is an ionic compound, so it is an electrolyte
8. Which compounds show a decrease in solubility as temperature rises in an aqueous solution? **C. SO_2 & HCl**
9. Oil and vinegar do not mix. That's because **B. they are immiscible**
10. A solution that contains more solute than theoretically possible is called:
D. super-saturated
11. Why does CH_4 have a much lower boiling point (-164°C) than NH_3 (-33°C)?
B. ammonia has many hydrogen bonds
12. Like dissolves like would account for:
A. oil not dissolving in water B. HCl dissolving well in water
C. LiCl dissolving well in water **D. all three of the above**
13. Skip this one
14. When you add salt to water...
A. boiling point increases, freezing point decreases
15. CaCl_2 is used rather than NaCl to melt ice because
A. CaCl_2 ionizes into three moles of particles, NaCl into only 2 moles

16. Hydrogen bonding will:
- A. cause a lower vapor pressure in water compared to rubbing alcohol
 - B. cause a high boiling point in water compared to C_2H_6 .(ethanol)
 - C. cause surface tension to be great enough for bugs to stand on water
 - D. all of the above**
17. The amount of joules it will take to melt 60.0 grams of ice at zero centigrade to water at the same temperature is **C. 20040 joules**
18. The energy required to heat 100.0 grams of water from $3^\circ C$ to $17^\circ C$ is **D. 5852 joules**
19. Gases generally have lower solubility as solution temperature increases. This might explain why people tend to burp after gulping cold soda. Why does this happen?
- B. cold soda holds more CO_2 in solution than the soda that warms in your belly, you heat it up and the carbon dioxide comes out of solution in your stomach**
20. Water freezes at STP at **C. 273K**
21. Water has a low vapor pressure due to its many hydrogen bonds. What is low vapor pressure?
- B. water doesn't evaporate much under glass in a sealed system**
22. What is the reason that ice floats on water?
- A. hydrogen bonds force water into a six sided shape with space in the center**
23. When you dissolve ammonium nitrate into water
- B. the compound dissociates and the reaction is endothermic**
24. 522.0 grams of water has... **C. 29 moles and a freezing point of 273K**
25. If you have a saturated solution of ammonia at $10^\circ C$ of 1500.0 mL, and you heat it to a temperature of $90^\circ C$, and you are told that this solution cannot be supersaturated, how many grams of ammonia will come out of solution by the time it reaches the final temperature? **C. 900 g**

How to do this last problem... use the ratio to determine how many grams of ammonia fit into a 1500 mL solution at $10^\circ C$ (1050 g). Then figure how many grams of ammonia fit into the 1500 mL solution at the hotter $90^\circ C$ (150 g). Subtract the starting ammonia mass from the amount that could remain in solution at the hot temperature ($1050 - 150 \text{ g} = 900 \text{ grams}$ falls out of solution).