

Name _____ Period _____ Date _____

1. Define Electronegativity (EN) _____

2. Describe how this picture can help to describe electronegativity



Element with the highest EN _____, lowest EN _____; in general, metals have a _____ EN than nonmetals.

3. In the periodic table the electronegativity increases in two directions, which are....

Δ EN is short for _____

4. What type of bond do you expect if the difference in electronegativity (Δ EN) is....

Close to zero _____ medium _____ large _____

Arrange the following bonds in order of increasing ionic character (nonpolar covalent first): Na-F, H-H, S-O, F-O

5 Polar molecules have a dipole. Explain and use HBr to show two ways to symbolize the dipole (\rightarrow or $\delta^+\delta^-$).

6. Why is CO_2 a nonpolar molecule even though it has two polar bonds?

7. Water is a bent molecule. If it were linear it would be a nonpolar rather than a polar molecule. Explain:

8. What are intermolecular forces? _____

9. Are hydrogen bonds covalent bonds or intermolecular forces? _____

10. Which bonds are stronger: Covalent bonds or intermolecular forces? _____

11. Do intermolecular forces influence the melting and boiling points of molecular compounds? _____

Explain _____

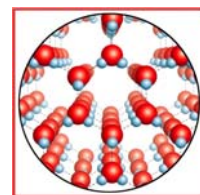
12. Give two more examples in which hydrogen bonds play an important role:

Which of the following hydrogen atoms can form hydrogen bonds? -N-H -C-H -O-H H-H

Why? _____

13. At what temperature does water have its highest density? _____

Explain why ice has a lower density than cold water (it floats) [*hint: hydrogen bonds...*]



Ice

14. Define:

Surface tension _____

Capillary action _____

Specific heat _____

endothermic _____

exothermic _____

15. Draw how the surfaces curve in a graduated cylinder for liquid water and mercury

a) water b) mercury

16. Which liquid forms better drops: Water or isopropanol? _____

17. Which needs most energy when heated from 10°C to 20°C?

- a) aluminum b) ethanol c) water d) all the same

18 Which of the following processes are considered endothermic (needs/absorbs energy or cooling surroundings)

sweat evaporating cooking condensation melting freezing

19. What type of substances dissolves well in water? **Polar or nonpolar** molecular compounds _____

20. Explain what it means that “like dissolves like”: _____

_____ 21. The states in which water occurs on Earth are _____

- a. liquid and gaseous only c. solid and gaseous only
b. liquid and solid only d. solid, liquid, and gaseous

_____ 22. The physical property of ice that allows aquatic organisms to survive over the winter is its _____

- a. high melting point c. low density
b. low boiling point d. high mass

_____ 23. The water molecule is _____

- a. polar and has polar bonds c. nonpolar and has polar bonds
b. polar and has nonpolar bonds d. nonpolar and has nonpolar bonds

_____ 24. In comparison with covalent bonds, hydrogen bonds are _____

- a. much strong c. only slightly stronger
b. of about the same strength d. much weaker

_____ 25. A compound besides water that would be expected to form hydrogen bonds is _____

- a. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$ c. $\text{CH}_2=\text{CHCH}_3$
b. $\text{CH}_3\text{CH}_2\text{-O-H}$ d. CCl_4

_____ 26. During cooling from 50°C to 0°C, the density of water _____

- a. first increases, then decreases c. increases
b. first decreases, then increases d. decreases

_____ 27. The skin-like quality of the surface of water is caused by water's

- a. density c. covalent bonding
b. boiling point d. surface tension

_____ 28. Capillary action: Compared to its height in a wide-diameter tube, the height of a column of water in a narrow-diameter tube will be _____

- a. greater c. the same
b. less d. unpredictable

_____ 29. Compared to the specific heat of most other materials, the specific heat of water is _____

- a. about the same c. much higher
b. much lower d. higher than some, lower than others

