

Answer Questions 1-23 using the back side of your Scantron. There is only one answer for each question (2 pt).

Chp 8.

1. According to the Bronsted-Lowry definition,

- a) a base produces H^+ ions in aqueous solutions.
- b) a base is a proton acceptor.
- c) an acid acts as the solvent.
- d) a base is a proton donor.
- e) an acid is a proton acceptor.

2. In the following reaction, $H_2O + CN^- \rightarrow HCN + OH^-$, the substance that is the base is

- A) H_2O
- B) CN^-
- C) HCN
- D) OH^-

3. The following, OH^- / H_2O is a _____ pair

- A) conjugate acid/ base
- B) base/conjugate acid
- C) acid/conjugate base
- D) conjugate acid / acid

4. Which of the following statements correctly describes the hydronium-hydroxide ion balance in aqueous solution?

- a) in neutral solutions, $[H_3O^+] = [H_2O]$.
- b) in bases, $[OH^-]$ is less than $[H_3O^+]$.
- c) in bases, $[OH^-] = [H_3O^+]$.
- d) in acids, $[OH^-]$ is greater than $[H_3O^+]$.
- e) in bases, $[OH^-]$ is greater than $[H_3O^+]$

5. What is the $[OH^-]$ concentration in a solution that has a $[H_3O^+] = 1 \times 10^{-6} M$?

- a) $1 \times 10^{-10} M$
- b) $1 \times 10^{-12} M$
- c) $1 \times 10^{-2} M$
- d) $1 \times 10^{-8} M$
- e) $1 \times 10^{-6} M$

$$[H^+][OH^-] = 1 \times 10^{-14}$$

$$[OH^-] = \frac{1 \times 10^{-14}}{1 \times 10^{-6}} = 1 \times 10^{-8}$$

6. Which of the following are correctly matched?

- a) pH 4/neutral.
- b) pH 11/basic.
- c) pH 7/basic.
- d) pH 8/acidic.
- e) pH 1/basic

7. What is the pH of a solution with $H_3O^+ = 1 \times 10^{-9} M$?

- a) $1.0 \times 10^{-5} M$
- b) 9.0
- c) -5.0
- d) -9.0
- e) 5.0

$$pH = -\log(H^+)$$

$$pH = -\log(1 \times 10^{-9}) = 9$$

8. In a neutralization reaction

- a) an acid and a base react to form a salt and water.
- b) water and a salt react to form an acid and a base.
- c) a base and a salt react to form water and an acid.
- d) two acids react to form water.
- e) an acid and a salt react to form water and a base.

9. Which of the following acids is a weak acid?

- A) $HC_2H_3O_2$
- B) HCl
- C) HI
- D) H_2SO_4
- E) HNO_3

10. Which of the following acids is a diprotic acid?

- A) $HC_2H_3O_2$
- B) HCl
- C) HI
- D) H_2SO_4
- E) HNO_3

11. Which of the following acids is a strong acid?

- A) $HC_2H_3O_2$
- B) H_2CO_3
- C) HI
- D) H_2SO_3
- E) HNO_2

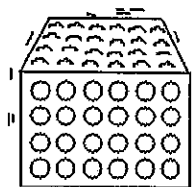
12. A solution that has a pH of 5.4 has a $[H^+]$ equal to

- A) 4.0×10^{-6}
- B) 2.5×10^5
- C) 8.6
- D) 2.5×10^{-9}
- E) 4.0×10^8

Chp 12

13. (12.1) Which state of matter is illustrated below?

- a. Gas
- b. Liquid
- c. Solid
- d. Both gas and solid
- e. Both liquid and solid



14. (12.1) Which of the following statements applies to the gaseous state of a substance?

- A) The particles are less free to move about than in the liquid and solid states.
- B) This state is characterized by an indefinite shape and high density.
- C) Pressure changes influence the volume of this state more than the other two states of matter.
- D) This state is characterized by an indefinite shape and a definite volume.

15. (12.3) Which one of the following statements is the correct statement about intermolecular attractions?

- a). Intermolecular forces are weaker in liquids than in gases because the particles are closer to each other
- b). Smaller intermolecular distances in liquids result in stronger intermolecular forces, when compared to intermolecular distances and forces in gases
- c). Compared to liquids, large distances between gaseous molecules yield strong intermolecular attractions
- d). The smaller the distance between molecules the smaller the intermolecular attractions, therefore attractions are weaker in liquids than gases

(12.3) Select the name of the most important Intermolecular Force (A-D) for each of the following substances:

16. $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-CH}_3$ C

A) Hydrogen bonding

17. HCl B

B) Dipole-dipole

18. CH_3OH A

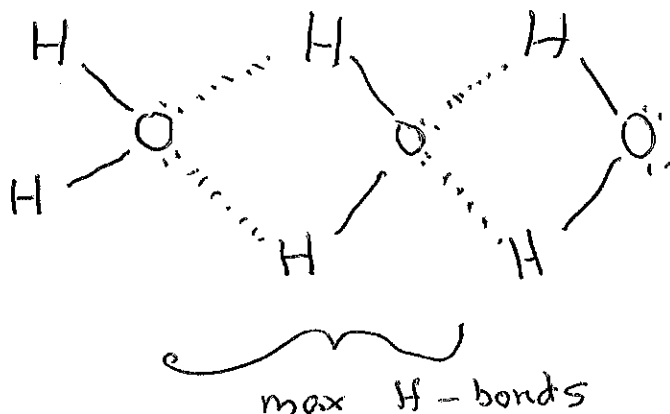
C) London

D) ionic

19. In which of the following pairs do both changes have the same thermicity? (**both** are endothermic or exothermic)

- A) sublimation and freezing
- B) deposition and sublimation
- C) condensation and melting
- D) condensation and freezing

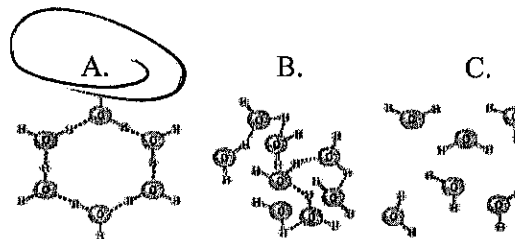
(4 pt) Using Lewis structures, draw a diagram showing the attractive force (the Intermolecular Force) between water molecules. Use as many molecules as needed.



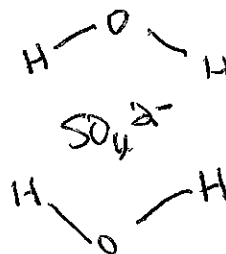
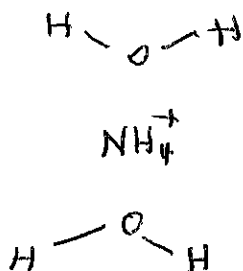
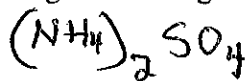
18 pt

Chp 7.2

20. (7.2) Which of the following depicts water molecules in the solid state?



(5 pt) Draw a diagram showing how water molecules



is dissolved in water.

21. What are the ions formed in glucose, $\text{C}_6\text{H}_{12}\text{O}_6$?

- a) $\text{CO}_2 + \text{H}_2\text{O}$ b) $\text{C}_6\text{H}_{11}\text{O}_5 + \text{OH}^-$ c) $\text{C}_6\text{H}_{11}\text{O}_6^- + \text{H}^+$ d) no ions are formed

Chp 13

22. What is another name for a homogeneous mixture?

- a) compound b) element c) pure substance d) solution

23. Which of the following compounds will be soluble in mineral oil ($\text{C}_{14}\text{H}_{30}$, a non-polar liquid)?

- a) MgCl_2 b) AgCl c) PbCO_3 d) $\text{Ca}(\text{OH})_2$ e) none are soluble in mineral oil

all polar