

Mark answers on your scantron for Questions 1-29. Mark only one answer unless directed otherwise. Each question is worth 2 pt.

Chp 7.1 - Types of Attractive Forces

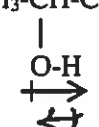
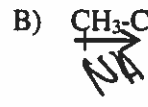
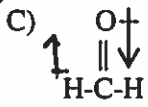
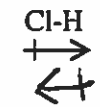
1. All of the following bonds are found in organic compounds. Which of these is the LEAST polar?

- A) C=C B) C-H C) C-Cl D) C=O E) O-H

2. When it comes to hydrogen bonding which chemical bond in Question 1 has a hydrogen bond DONOR? **E**

3. In the following molecules, which of the following has the dipole correctly indicated?

Use the electronegativities shown above to help you answer this question.

- A) $\text{CH}_3\text{-CH-CH}_3$  B) $\text{CH}_3\text{-CH}_3$  C) H-C-H  D) Cl-H  E) All are correct **None**

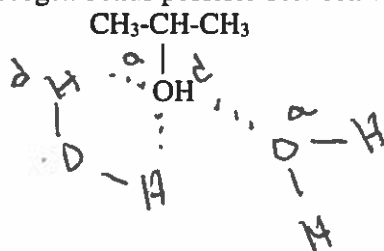
4. Which compound in Question 3 has only London forces? **B**

5. What is the name of the interaction (the attractive force) that occurs between water and sodium chloride?

- A) London B) Dipole-dipole C) Hydrogen bonding D) Ion-dipole E) Ion-ion

6. Remember the lab where you made Jiggle Jelly. Which of the attractive forces in Question 5 was mostly responsible for the formation of the Jiggle Jelly? **C**

(7 pt) Draw all the hydrogen bonds possible between water and isopropyl alcohol. Mark the donar and the acceptor atoms in your diagram.

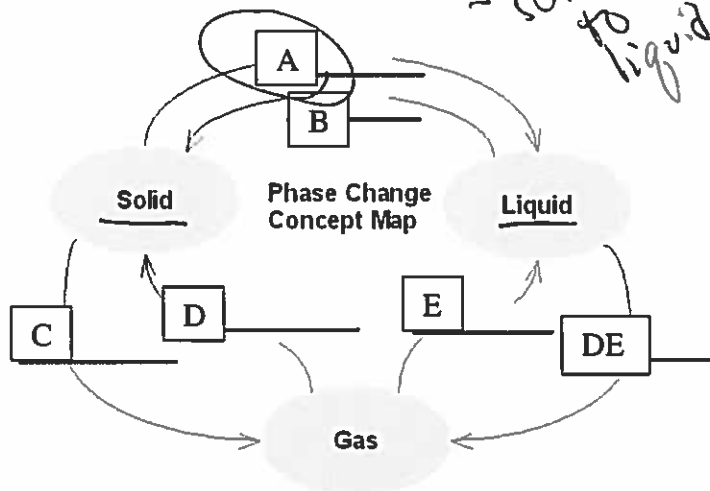


Chp 7.2 - Liquids and Solids: Attractive Forces Everywhere

7. The transition from the gas phase to the liquid phase is called:

- A) condensation B) freezing C) sublimation D) deposition ~~E) melting~~

8. The appearance of water dripping off a snow covered roof on a warm Spring day is represented by A in this diagram.



For each of the following pairs of compound indicate which has the higher boiling point.

9. A) $\text{CH}_3\text{CH}_2\text{CH}_3$ B) $\text{CH}_3(\text{CH}_2)_3\text{CH}_3$ bigger

10. A) B) $\text{CH}_3(\text{CH}_2)_2\text{CH}_3$



Chp 7.3 Attractive Forces and Solubility

11. Soaps can be described as:

- A) esters of fatty acids B) salts of fatty acids C) long chain acids D) all of these

12. The long hydrocarbon tails of soap molecules are:

- A) hydrophobic and attracted to water
 B) hydrophobic and attracted to oils
 C) hydrophilic and attracted to water
 D) hydrophilic and attracted to oils

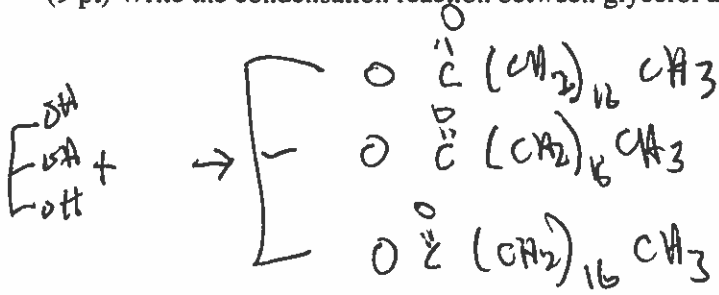
13. Remember the golden rule "like dissolves like"? Which of the following compounds will dissolve in water? *Mark all that apply on your scantron.*

- A) $\text{CH}_3-\text{CH}(\text{O}-\text{H})-\text{CH}_3$ B) CH_3-CH_3 C) $\text{O}=\text{C}-\text{H}$ D) $\text{Cl}-\text{H}$ E) All are correct

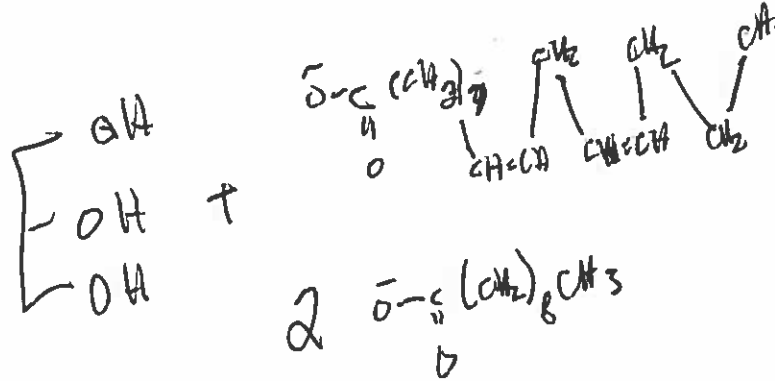
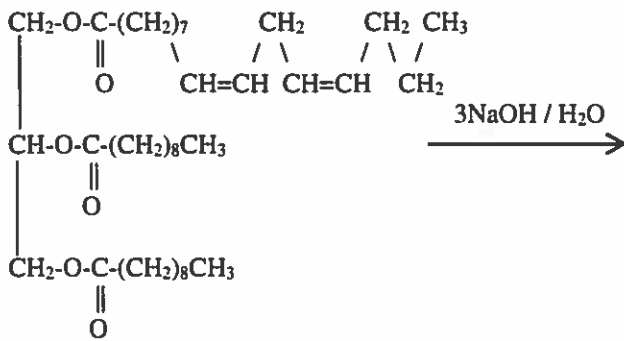
14. The compound formed from the condensation reaction between a glycerol molecule and 3 fatty acid molecules contains the following functional group.

- A) Alcohol B) aldehyde C) carboxylic acid D) Ester E) Ether

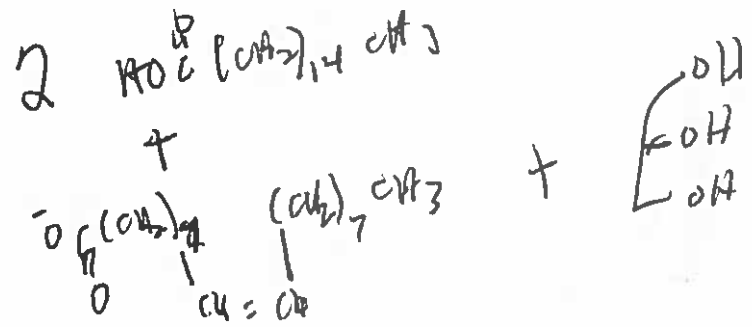
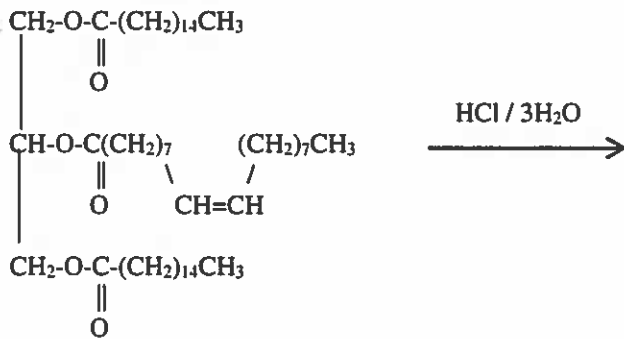
(9 pt) Write the condensation reaction between glycerol and 3 stearic acid molecules.



(4 pt) Base hydrolysis



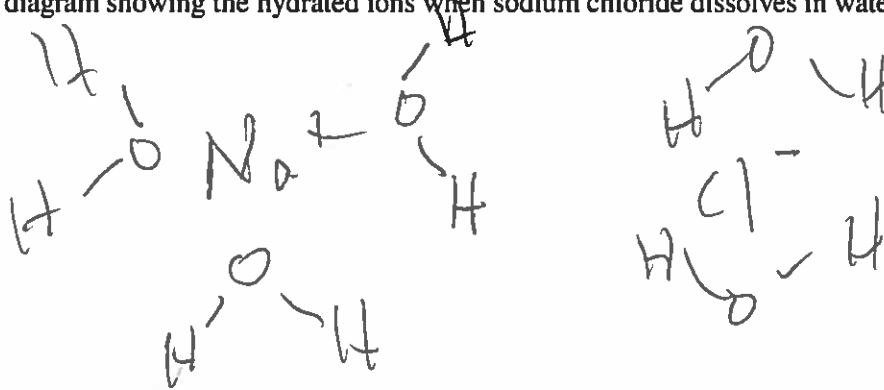
(6 pt) Acid hydrolysis



(6 pt) Explain why soap molecules form micelles in water. Include the kind of intermolecular force that occurs between water and soap.

1. Soaps are amphiphatic and have a polar head and non-polar tail.
2. In water the polar heads are attracted to the water but the non-polar tails stick together.
3. This forms the micelles.
4. Polar heads are hydrophilic and non-polar tails are hydrophobic.

(8 pt) Draw a diagram showing the hydrated ions when sodium chloride dissolves in water.



7.4 Gases: Attractive Forces are Limited

(6 pt) Describe how Boyle's Law explains how inhalation and exhalation occurs.

Gases move from high to low pressure, so inhalation occurs when the volume of chest increases thereby lowering pressure and air rushes in. In exhalation - volume decreases increasing pressure in the chest and air rushes out. $P_1 V_1 = P_2 V_2$ Pressure of volume are inversely related

15. A 65 mL sample of argon gas has a temperature of 325 °C. What will the temperature be in °C when the volume of the gas is decreased to 25 mL at constant pressure?

- A) 65 °C B) 125 °C **C) 43 °C** D) 1280 °C E) 641 °C AA) 325 °C

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$V_1 = 65 \text{ mL}$$

$$T_1 = 325 + 273 = 598 \text{ K}$$

$$V_2 = 25 \text{ mL}$$

$$\frac{T_1}{V_1} = \frac{T_2}{V_2}$$

$$\frac{598}{65} \times 25 = T_2 = 230 \text{ K}$$

$$230 - 273 = -43$$

(6 pt) A gas has a volume of 460 mL at 500 mm Hg. What will be the volume at 1.2 atm? Show all work and round answer to the correct number of significant figures.

$$P_1 V_1 = P_2 V_2$$

$$500 (460) = 1.2 \text{ atm} \left(\frac{760}{1} \right) V_2 = 912 V_2$$

$$V_2 = 252 \text{ mL} \xrightarrow{\text{sig. fig.}} \boxed{300 \text{ mL}}$$

freezing water

(6 pt) A gas has a volume of 10L at 32 °F. What is the final temperature of the gas (in °C) if its volume increased to 25 L? Show all work and round answer to the correct number of significant figures.

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$\frac{10 \text{ L}}{273} = \frac{25 \text{ L}}{T_2}$$

$$32 \text{ F} - 32 = 0 \text{ C}$$

$$0 \text{ C} + 273 = 273 \text{ K}$$

$$\frac{25 \times 273}{10} = 683 \text{ K} - 273 = \boxed{410 \text{ °C}}$$

22. In a lipid bilayer membrane:

- A) The hydrophilic heads of the molecules are on the outer and inner surface.
- B) All the molecules are triglycerides
- C) The hydrophobic heads point to the hydrophilic tails
- D) The hydrophobic tails are on the inner and outer surface.

Use the following to answer Questions 23-25

23. Which of the following when embedded in a membrane, makes it less flexible? **A**

24. This lipid is used to store fatty acids in humans. **C**

25. Sex hormones belong to this class of lipid. **E**

- | |
|-----------------|
| A) cholesterol |
| B) carbohydrate |
| C) triglyceride |
| D) phospholipid |
| E) steroid |
| AB) protein |

Use the following to answer questions 26-28:

A. chylomicrons; B. VLDL; C. LDL; D. HDL

26. Which is the smallest lipoprotein? **D**

27. Which lipoprotein is least dense? **A**

28. Which lipoprotein has the highest cholesterol content? **C**

29. Which lipoprotein is known as the "good cholesterol"? **D**