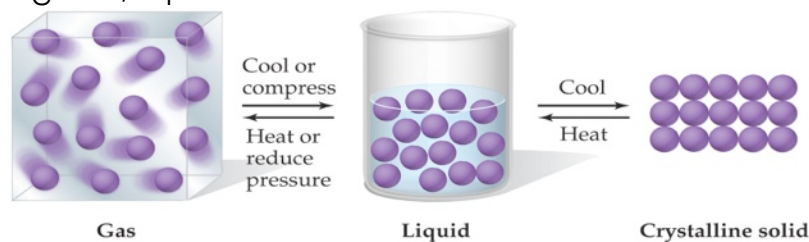


Intermolecular Forces _____

I. A note about gases, liquids and solids.

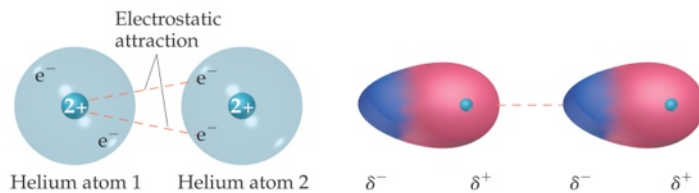


- A. Gases: _____
 - B. Liquid: _____
 - C. Solid: _____
- II. A substance's state at a certain temperature depends on _____

- A. Gases: kinetic energy of the particles _____ the _____ of the particles. _____
- B. Liquid: kinetic energy of the particles is _____ but not _____
- C. Solid: kinetic energy of the particles is _____
- D. Properties depend on the _____ and _____

III. Intermolecular forces are _____

- A. Less energy is needed to _____ than to _____
- B. These forces influence _____
- C. Introducing: _____
- D. _____ these forces become more important. (Remember _____)
- E. _____ explains the differences in strength
 - 1. _____
 - a. Occurs in _____ but is the only one present in _____
 - b. Molecules that have _____
 - i. The electrostatic forces b/w _____
 - ii. a.k.a. _____
 - c. What is actually happening:
 - i. _____ as they come into close contact with each other, _____
 - ii. a molecule's _____



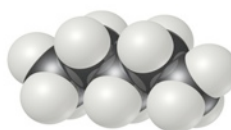
- d. Strength of dispersion force is _____
 Why?
 i. the bigger something is, _____
 ii. the more _____

TABLE 11.3 Boiling Points of the Halogens and the Noble Gases

Halogen	Molecular Weight (amu)	Boiling Point (K)	Noble Gas	Molecular Weight (amu)	Boiling Point (K)
F ₂	38.0	85.1	He	4.0	4.6
Cl ₂	71.0	238.6	Ne	20.2	27.3
Br ₂	159.8	332.0	Ar	39.9	87.5
I ₂	253.8	457.6	Kr	83.8	120.9
			Xe	131.3	166.1

e. _____

f. _____



n-Pentane
(bp = 309.4 K)



Neopentane
(bp = 282.7 K)

2. _____

- a. Occurs in _____
 b. Larger the dipole moment (_____),

 c. These are _____
 3. _____
 a. Occurs in polar molecules that have an _____
 b. Stronger than _____
 c. They are so strong because of the attraction b/w the _____

E. Relative strength:

1. _____
 2. If the _____ is the same, _____

 3. If _____ is the same, _____

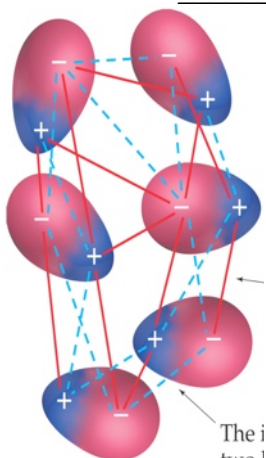
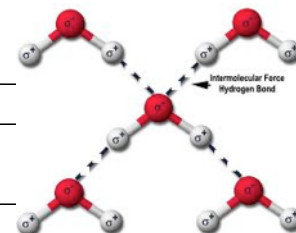
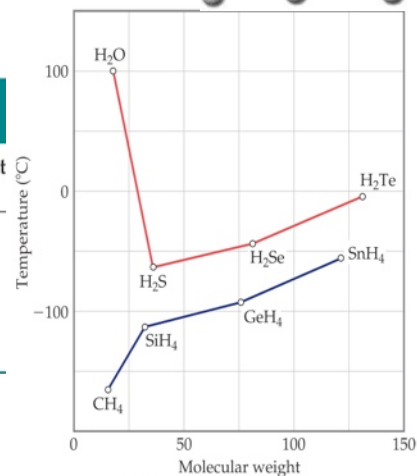
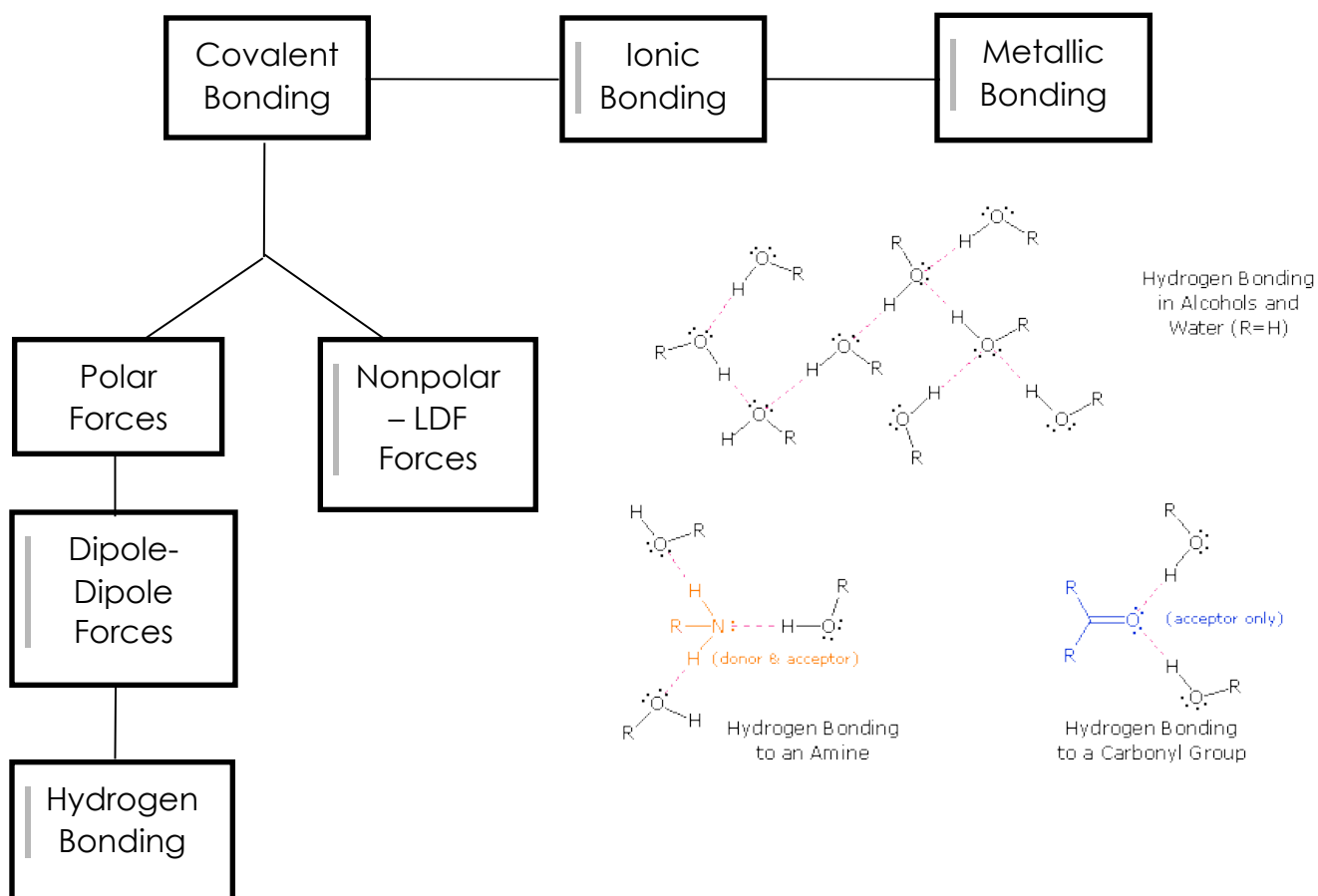


TABLE 11.2 Molecular Weights, Dipole Moments, and Boiling Points of Several Simple Organic Substances

Substance	Molecular Weight (amu)	Dipole Moment μ (D)	Boiling Point (K)
Propane, CH ₃ CH ₂ CH ₃	44	0.1	231
Dimethyl ether, CH ₃ OCH ₃	46	1.3	248
Methyl chloride, CH ₃ Cl	50	1.9	249
Acetaldehyde, CH ₃ CHO	44	2.7	294
Acetonitrile, CH ₃ CN	41	3.9	355



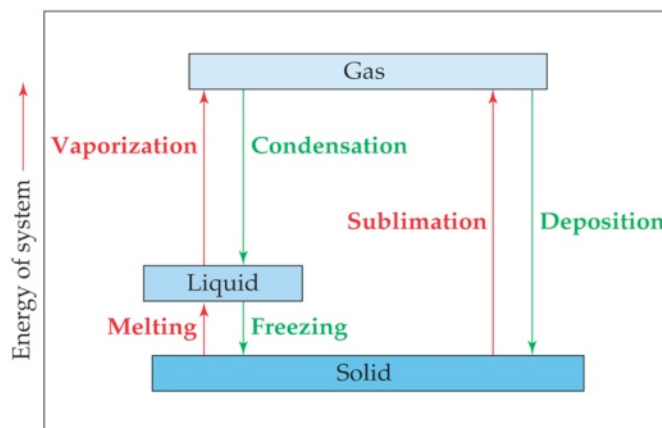


F. Strength of intermolecular forces give rise to certain properties of liquids and solids.

1. _____
2. As the strength of the intermolecular forces of a gas increases, _____

Phase Changes

I. Phase change review:



II. _____ during phase changes.

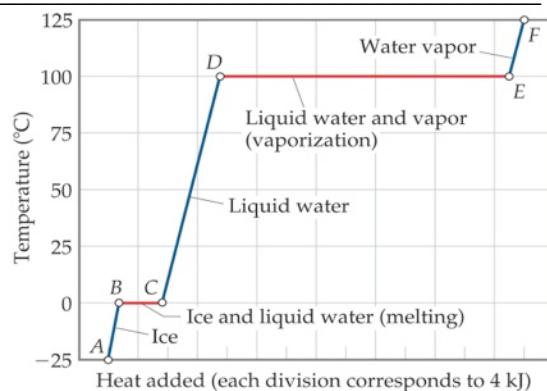
III. Energy changes:

A. Heat of vaporization (_____): _____

B. Heat of fusion (_____): _____

IV. Heating (Cooling) Curves (q or E v. T):

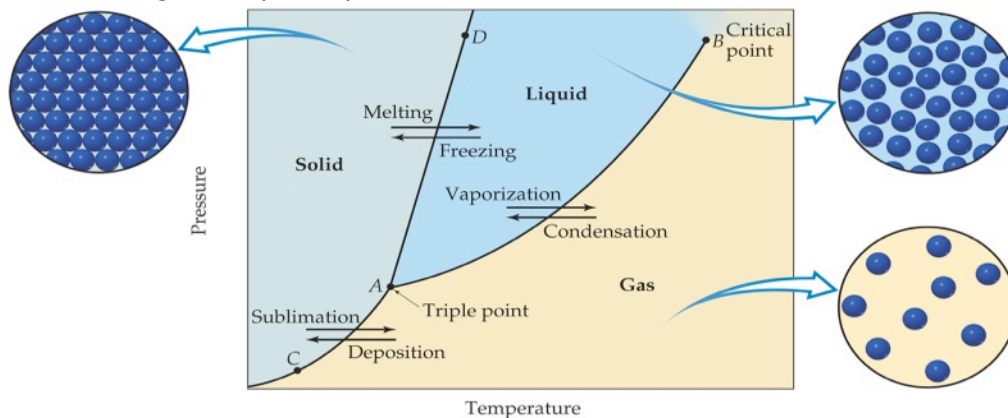
A. _____



Calculate the enthalpy change upon converting 1.00 mol of ice at -25°C to water vapor (steam) at 125°C under a constant pressure of 1 atm. The specific heats of ice, water, and steam are $2.09\text{ J/g}\cdot\text{K}$, $4.18\text{ J/g}\cdot\text{K}$ and $1.84\text{ J/g}\cdot\text{K}$, respectively. For H_2O , $\Delta H_{\text{fus}} = 6.01\text{ kJ/mol}$ and $\Delta H_{\text{vap}} = 40.67\text{ kJ/mol}$.

What is the enthalpy change during the process in which 100.0 g of water at 50.0°C is cooled to ice at -30.0°C ? (Use the specific heats and enthalpies for phase changes given in Sample Exercise 11.4.)

V. Phase Diagrams (P v. T):



Ch. 9 Liquids and Solids

A. Some important points:

1. Lines (AD, AB, AC) represent points where _____
2. _____ (A): P and T where _____
3. _____ (B): _____

Above this point, _____.

4. _____: Line AD.
5. _____: Line AB.
6. _____: Line AC.

Vapor Pressure

I. At any temperature, _____

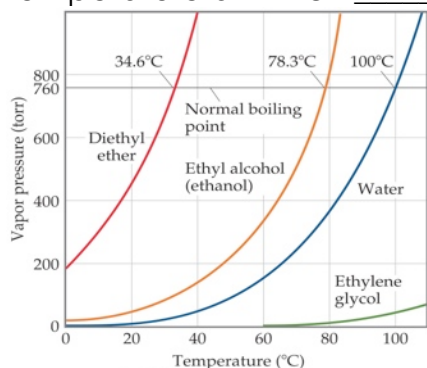
- A. The pressure caused by these "escaped" molecules is known as _____
- B. As temperature increases, _____

II. In a sealed container, the liquid and vapor are in _____

- A. The substance _____

III. Boiling Point: _____

A. Normal boiling point: temperature at which _____



Ex: Estimate the boiling point of diethyl ether under an external pressure of 0.80 atm.

Ex: At what external pressure will ethanol have a boiling point of 60°C?

Solids!

I. Look at the chart...

II. Answering AP questions:

- A. Relate your response to _____
- B. Many times, it's all about the electrons (_____)!

C. Memorize the _____

1. _____

III. Alloys

A. Mixtures of _____

B. Two types

1. _____ alloy: (One type of atom in the metallic matrix). Ex.: _____

2. _____ alloy: (One type of atom in the metallic matrix). Ex.: _____

a. special case: _____

b. silicon is _____ with other elements to _____

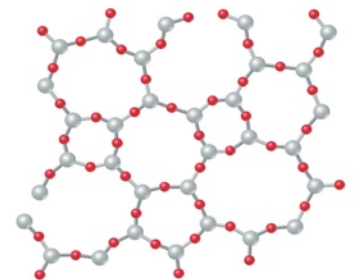
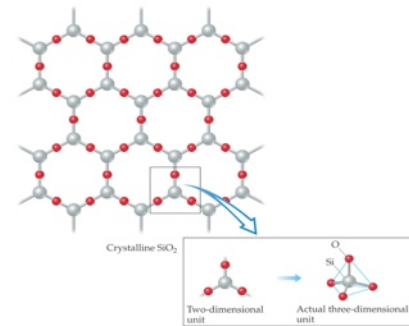
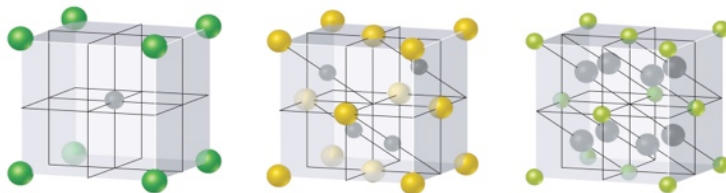
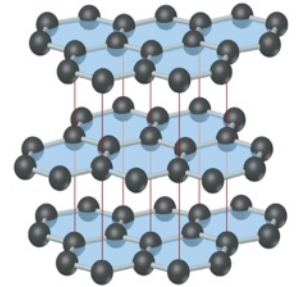
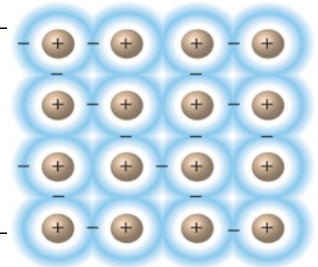
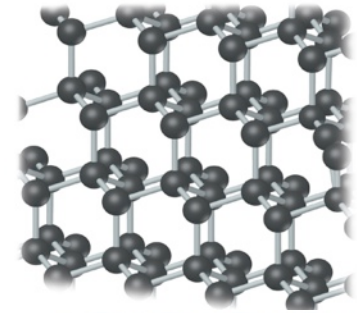
Polarity and Solubility

I. _____

A. _____ dissolves _____ and _____ dissolves _____

B. Therefore, _____

C. Substances with _____ tend to be _____



Amorphous SiO₂