Intermolecular Attractions

Example One
Which of the following noble gases is the most polarizable?

a. He
b. Ne
c. Ar
d. Kr
e. Xe

Example Two
Which of the following compounds would experience the strongest London dispersion forces?

a. C_2H_6
b. CH_4
c. C_4H_{10}
d. C_3H_8

Example Three
Which statement best describes a dipole?

a. The combination of two positive but unequal charges located at the center of the particle
b. The combination of two negative charges and equal charges located at the center of the particle
c. The combination of two equal and opposite charges separated by a small distance

Example Four
Label all the intermolecular forces each of the substances below would experience

a. H_2
b. HCl
c. NO
d. CO_2

Example Five

The boiling points of three haloalkanes are shown below. Explain the trend in the boiling point data for these three molecules.

Liquid	Dipole Moment (D)	Boiling Point (°C)
CH_2F_2	1.93	-52
CH_2Cl_2	1.60	40
CH_2Br_2	1.43	97

Example Six

Samples of which of the molecules below will experience hydrogen bonding interactions?

a. H_2S
b. NH_3
c. HCl
d. HF
e. CH_3CH_2OH

Example Seven

When a sample of ammonia, NH_3 is boiled, which of the following processes occur during the boiling process?

a. The N-H bonds within the ammonia molecule are broken apart.
b. Hydrogen bonds within the NH_3 molecule are broken apart.
c. Hydrogen bonds between NH_3 molecules are broken allowing the NH_3 molecules to separate from one another.

Example Eight

Which of the following interactions shows a "hydrogen bond"?

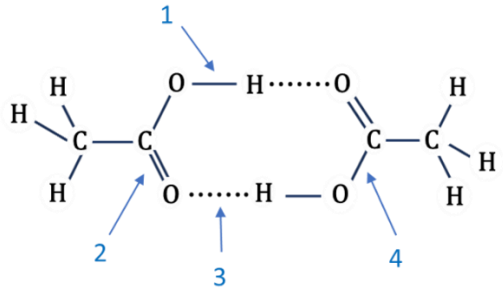
a) – C ····· H-O –
b) – O ····· H-N –
c) – N ····· H-C –
d) – O ····· H-S –
e) – O ····· H-O –
f) – O ····· H-C –
g) – C ····· H-O –
h) – N ····· H-C –

Example Nine
Samples of which of the particles below will experience hydrogen bonding interactions with H_2O?
Select all that apply.

a. H_2CO
b. NCl_3
c. HCl
d. HF
e. NH_4^+

Example Ten
In general, which of the following intermolecular forces is the weakest?
a. London Dispersion Forces
b. Dipole - Dipole Forces
c. Hydrogen - Bonding Interactions

Example Eleven
Which arrow is pointing toward a covalent bond and which arrow is pointing toward a hydrogen bond?



Example Twelve
Hydrogen bonding occurs between molecules where hydrogen is bonded to which of the following elements: (Select all that apply)

a. Hydrogen
b. Fluorine
c. Chlorine
d. Oxygen
e. Nitrogen

Example Thirteen
Which one of the following compounds is likely to experience London dispersion and dipole-dipole forces as well as hydrogen bonding interactions.

a. H_2
b. NF_3
c. CH_3OH
d. F_2

Example Fourteen
Which intermolecular bond is caused by the temporary uneven distribution of electrons?
(a) London dispersion forces
(b) Hydrogen bonding
(c) Dipole to dipole attractions