HW12 - Liquids & Solids

Question 1

1 pts

Which of the following statements regarding intermolecular forces (IMF) is/are true?

1. IMF result from attractive forces between regions of positive and negative charge density in neighboring molecules.

2. The stronger the bonds within a molecule are, the stronger the intermolecular forces will be.

3. Only non-polar molecules have instantaneous dipoles.

○ 1 and 2
○ 2 and 3
○ 3 only
○ 1 and 3
○ 1 only
○ 1, 2, and 3
○ 2 only

Question 2

2 pts

Put the following compounds in order of increasing melting points.

LiF, HF, F_2, NF_3

○ F_2, NF_3, LiF, HF
○ LiF, HF, NF_3, F_2
○ LiF, HF, F_2, NF_3
○ F_2, NF_3, HF, LiF

Question 3

1 pts

What type of intermolecular forces would you expect to find in a pure liquid sample of carbon tetrachloride?

○ dipole-dipole
○ hydrogen bonding
○ interionic (ionic)
○ London

Question 4

1 pts

A drop of liquid tends to have a spherical shape due to the property of...

○ surface tension.
○ close packing.
○ viscosity.
○ capillary action.
○ vapor pressure.

Question 5

1 pts

Surface tension describes...

○ capillary action.
○ the forces of attraction between the surface of a liquid and the air above it.
○ the inward forces that must be overcome in order to expand the surface area of a liquid.
○ the resistance to flow of a liquid.
○ adhesive forces between molecules.
○ the forces of attraction between surface molecules of a solvent and the solute molecules.

Question 6

1 pts

Predict which of butane (C_4H_{10}) or propanone (CH_3COCH_3) has the greater viscosity. Assume that they are both at the same temperature and in their liquid form.

○ They have equal viscosities.
○ propanone
○ butane
○ It's impossible to know.

Question 7

1 pts

Which would you expect to be the most viscous?

○ C_8H_{18} at 50°C
○ C_4H_8 at 30°C
○ C_8H_{18} at 30°C
○ C_4H_8 at 50°C

Question 8

1 pts

The vapor pressure of all liquids...

○ increases with temperature.
○ decreases if the volume of the container increases.
○ is the same at 100°C.
○ is the same at their freezing points.

Question 9

2 pts

Based on the general concepts that govern intermolecular attractions, which of the following orderings of fluorocarbons is correct when going from highest to lowest boiling point?

1. CF_4

2. $F_3C\text{-}(CF_2)_4\text{-}CF_3$

3. $F_3C\text{-}(CF_2)_2\text{-}CF_3$

○ 1, 3, 2
○ 2, 3, 1
○ 2, 1, 3
○ 1, 2, 3
○ 3, 1, 2
○ 3, 2, 1

Question 10

2 pts

Tetrabromomethane has a higher boiling point than tetrachloromethane.

○ It's impossible to know.
○ False
○ True

Question 11

2 pts

Which of KBr or CH_3Br is likely to have the higher normal boiling point?

○ It is impossible to tell.
○ CH_3Br
○ They will have the same boiling point.
○ KBr

Question 12

2 pts

Which of the following would you expect to boil at the lowest temperature?

○ C_3H_6
○ CH_4
○ PCl_3
○ KF
○ C_8H_{18}

Question 13

1 pts

A liquid with a high vapor pressure is called...

○ hot.
○ volatile.
○ cold.
○ viscous.

Question 14

2 pts

Which would you expect to have the highest vapor pressure at a given temperature?

○ C_5H_{12}
○ SBr_4
○ C_2H_6
○ NaCl

Question 15

2 pts

Rank the following in order of increasing vapor pressure at a fixed temperature: H_2O, CH_3Cl, He, NaCl

○ He < H_2O < CH_3Cl < NaCl
○ He < CH_3Cl < H_2O < NaCl
○ NaCl < H_2O < CH_3Cl < He
○ H_2O < CH_3Cl < He < NaCl
○ H_2O < NaCl < CH_3Cl < He

Question 16

1 pts

Which of the following solids is a covalent network?

○ $CaCO_3(s)$
○ Ni(s)
○ $SiO_2(s)$
○ $H_2O(s)$

Question 17

1 pts

Which of the following, in the solid state, would be an example of a covalent crystal?

○ carbon dioxide
○ water
○ iron
○ barium fluoride
○ diamond

Question 18

1 pts

Diamond and graphite are two crystalline forms of carbon. In which form are the C atoms arranged in flat sheets with one C bonded to three nearby C atoms?

○ diamond
○ graphite
○ neither of these

Question 19

2 pts

Which of the following, in the solid state, would be an example of a molecular crystal?

○ iron
○ calcium fluroide
○ diamond
○ carbon dioxide

Question 20

1 pts

Which of the following, in the solid state, would be an example of an ionic crystal?

○ copper
○ sodium nitrate
○ carbon dioxide
○ diamond

Question 21

2 pts

Metallic solids are solids composed of metal atoms that are held together by metallic bonds. They also tend to be good conductors because...

○ the electrons in metallic solids are delocalized.
○ metals are ductile and can be pulled into wires.
○ the electrons in metallic solids are tightly bound allowing other electrons to flow freely.
○ metals are malleable and can be pounded into sheets.