CHM 1143 Homework Set 5

TUD Department of Chemistry
Spring 2017

1) Of the following substances, only _____ has London dispersion forces as its only intermolecular force. 1) _____

CH_3OH
NH_3
H_2S
CH_4
HCl

A) CH_3OH B) NH_3 C) H_2S D) CH_4 E) HCl

2) Which one of the following should have the lowest boiling point? 2) _____

PH_3
H_2S
HCl
SiH_4
H_2O

A) PH_3 B) H_2S C) HCl D) SiH_4 E) H_2O

3) Which one of the following exhibits dipole–dipole attraction between molecules? 3) _____

A) XeF_4 B) AsH_3 C) CO_2 D) BCl_3 E) Cl_2

4) As a solid element melts, the atoms become _____ and they have _____ attraction for one another. 4) _____

A) more separated, more
B) more separated, less
C) closer together, more
D) closer together, less
E) larger, greater

5) Hydrogen bonding is a special case of _____. 5) _____

A) London–dispersion forces
B) ion–dipole attraction
C) dipole–dipole attractions
D) none of the above
E) ion–ion interactions

6) The strongest interparticle attractions exist between particles of a _____ and the weakest interparticle attractions exist between particles of a _____. 6) _____

A) solid, liquid
B) solid, gas
C) liquid, gas
D) liquid, solid
E) gas, solid

7) Which one of the following derivatives of ethane has the highest boiling point? 7) _____

A) C_2Br_6 B) C_2F_6 C) C_2I_6 D) C_2Cl_6 E) C_2H_6

8) Solvent X has a freezing point of 2.50°C. A student prepared a solution of 2.30 g of glucose ($C_6H_{12}O_6$) in 21.15 g of X and determined that the freezing point of the solution was -8.75°C. He then dissolved 1.85 g of unknown Q in 19.95 g of X and found the freezing point of that solution to be -6.00°C.

What is the molecular weight of Q?

9) 190 proof ethanol is (assume) 95% by weight ethanol. The other 5% is water. The density of the solution is 0.816 g/mL. Calculate the molarity and molality of ethanol in the solution. (ethanol is C_2H_6O).