

Unit 6 Practice Problems (with answers at end)

As lightning to the children eased
 With explanation kind,
 The truth must dazzle gradually
 Or every man be blind.
 --Emily Dickinson

VSEPR

1. Classify the following molecules or ions by VSEPR and draw the structure of each:

- a. H_3O^+ b. BF_3 c. NH_2^- d. PF_6^- e. XeOF_4 (Xe is central) f. ICl_2^-

Access to power must be
 confined to men who are not
 in love with it.--Plato

Hybridization

2. Draw the complete orbital diagram for normal and hybridized aluminum. What type of hybrid is this? What geometry would you expect for the compound AlCl_3 ?

He that knows nothing
 doubts nothing.
 --G. Herbert

Dipoles

3. For each of the molecules or ions on the facing page, determine whether a net dipole exists.

Intermolecular forces

4. What types of intermolecular forces would you expect for each of the following:

- a. CCl_4 b. OCS (carbon is central) c. NH_3 d. H_2

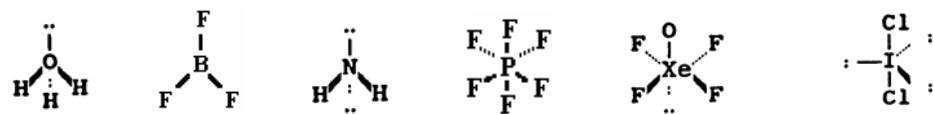
The music is the shining path
 over which the poet travels to
 bring his song to the world.
 --Lotte Lehmann

Phase Transformations and weak forces

5. What are the strongest attractive forces that must be overcome to:

- melt Benzene, C_6H_6 (symmetrical ring of 6 carbons)
- dissolve Br_2 in CCl_4
- melt NaCl
- boil SiH_4

Answers:



1. AB_3E AB_3 AB_2E_2 AB_6 AB_5E AB_2E_3

2.

Al [Ne] $\uparrow\downarrow$ \uparrow \square \square before hybridization

Al* [Ne] \uparrow \uparrow \uparrow \square after hybridization

sp^2 hybrids have trigonal planar geometry

3. a. polar b. non-polar c. polar d. non-polar e. polar f. non-polar
 4. a. dispersion b. dipole-dipole, dispersion
 c. hydrogen bonding, dipole-dipole, dispersion d. dispersion
 5. a. dispersion b. dispersion c. ionic bonding d. dispersion