

- I. Write the following definitions
  - a. Polar covalent bond
  - b. Electronegativity
  - c. Dipole moment
  - d. Polar molecule
  - e. % ionic character
  - f. Intermolecular forces
    - i. Dipole-dipole
    - ii. Ion-dipole
    - iii. Dispersion
    - iv. Hydrogen bonding
  - g. Resonance
  - h. Arrhenius acid
  - i. Arrhenius base
  - j. Bronsted-Lowry acid
  - k. Bronsted-Lowry base
  - l. Lewis acid
  - m. Lewis base
  - n.  $K_a$
  - o.  $K_b$
  - p. Electrophile
  - q. Nucleophile

II. Are the following polar?

- a.  $\text{H}_2\text{O}$
- b.  $\text{SO}_2$
- c.  $\text{CO}_2$
- d.  $\text{H}_3\text{O}^+$
- e.  $\text{CH}_4$
- f.  $\text{CCl}_4$
- g.  $\text{CH}_2\text{CH}_2$
- h.  $\text{SF}_6$
- i.  $\text{NO}_3^-$
- j.  $\text{BF}_3$

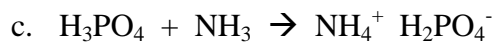
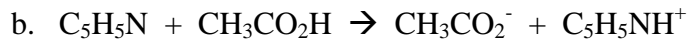
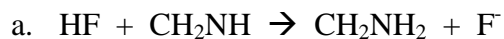
III. What type of intermolecular forces do the following have?

- a.  $\text{H}_2\text{O}$
- b. He
- c.  $\text{CH}_4$
- d.  $\text{NaCl}_{(\text{aq})}$
- e.  $\text{O}_2$
- f.  $\text{CH}_2\text{Cl}_2$
- g.  $\text{HCl}_{(\text{aq})}$
- h.  $\text{CH}_3\text{CH}_2\text{NH}_2$
- i.  $\text{NH}_4^+$
- j.  $\text{H}^+$

IV. Draw a major and minor resonance form for the following and explain why the major is preferred



V. For the following label the acid, base, conjugate acid and conjugate base



VI. Which of the following in each pair is the strongest acid?

