PHYSICAL SCIENCE
982-021-06 (982-020-03) Section C2
Winter 2006

Quiz #2
March 29, 2006

Name _____

ID Number _____

MULTIPLE CHOICE: [2 MARKS EACH]
(Circle the letter of the one alternative that best completes the statement or answers the question)

1. Which would you expect to have a higher melting point: sodium chloride, NaCl, or aluminum oxide, Al_2O_3? Why?

a) The aluminum oxide has a higher melting point because of the greater charges of the ions, and hence the greater force of attractions between them.

b) NaCl has a higher boiling temperature because it is a solid at room temperature.

c) The aluminum oxide has a higher melting point because it is a larger molecule and has a greater number of molecular interactions.

d) The aluminum oxide has a higher melting point because of the covalent bonds within the molecule.

2. Is it possible for induced dipole-induced dipole attractions to occur between water molecules?

a) No, only dipole-dipole attractions occur between water molecules.

b) No, we cannot induce a dipole in a molecule that already has a dipole.

c) No, dipole-induced dipole interactions are possible but not induced dipole-induced dipole.

d) Yes, induced dipole-induced dipole attractions are always present

4. The greater the difference in electronegativity between two covalently bonded atoms,

a) the closer together the atoms are located on the perioidic table.

b) the greater the polarity.

c) the smaller the polarity.

d) Two of the above are correct.

5. Which of these covalent bonds is most polar?

a) F-F

b) F-S

c) F-O

d) F-As

6. Water, H_2O, and methane, CH_4, have about the same mass and differ by only one type of atom. Why is the boiling point of water so much higher than that of methane?

a) The oxygen of a water molecule has two lone pairs of electrons.

b) The electronegativity difference between oxygen and hydrogen is greater than the electronegativity difference between carbon and hydrogen.

c) The water molecule is less symmetrical than is the methane molecule.

d) all of the above

7. If gallium ions have a 3^+

8. Which molecule is most polar?

a) O=C=O

b) O=C=S

c) S=C=S

d) These all have the same polarity.

9. Which of the following lists the bonds in the correct order of decreasing polarity?

a) N-N < N-O < H-F < N-F

b) N-N < N-O < N-F < H-F

c) H-F < N-F < N-O < N-N

d) N-O < N-N < N-F < H-F

10. An inventor claims to have developed a new perfume that lasts a long time because it doesn't evaporate. Comment on this claim.

a) This product is sure to sweep the market making many happy customers.

b) In order to smell something, the molecules must evaporate and reach your nose. If the new perfume doesn't evaporate, it will not have an odor.

c) A perfume that does not evaporate could be toxic since the molecules never leave the skin.

d) This would be impossible to make because the perfume would have to be pressurized in order to not evaporate.

11. What type of bonding might you expect between two potassium atoms (K, atomic #19)?

a) polar covalent

b) metallic

c) nonpolar covalent

d) ionic

SHORT ANSWER [4 MARKS EACH; EXPLAIN YOUR ANSWER IN DETAIL]:

1. Which should be the larger molecule and hence exhibit greater induced dipole-induced dipole molecular interactions: dichloromethane, CH_2Cl_2, or carbon tetrachloride, CCl_4?

2. Which should be the more polar molecule and hence exhibit greater dipole-dipole molecular interactions: dichloromethane, CH_2Cl_2, or carbon tetrachloride, CCl_4?

PHYSICAL SCIENCE FORMULA SHEET

[redacted]

1 1.0079 hydrogen hydrogène																2 4.003 helium hélium	
3 6.941 lithium lithium	4 9.012 beryllium béryllium		atomic number atomic mass English name French name*									5 10.811 boron bore	6 12.011 carbon carbone	7 14.007 nitrogen azote	8 15.9994 oxygen oxygène	9 18.998 f1f127.68 735.0	0 TD0.2265 0 Tu(T)Tj0.55594 0 TD(T)Tj0.55594 0