

Name: _____

date: _____ period: _____

ch. 13, 10, 20 IMF; reactions; redox

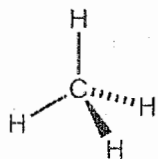
test

65 points (2ec)

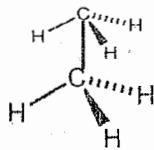
honors chemistry

In problems involving any calculation, show your work in an organized manner, include (i) any relevant equation (or formula), (ii) conversion factor(s), (iii) put the proper units in your calculations and answer, and (iv) proper number of significant figures in your answer.

1. What is the relative boiling point of CH_4 versus C_2H_6 ? basis / rationale? [10 points]



Methane

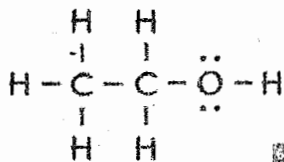
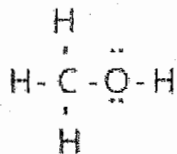


Ethane

BP: ethane > methane

- b/c both eqd = nonpolar b/c \exists only nonpolar bonds
- so \exists only London IMF
- polarizability: ethane > methane
- so IMF: ethane > methane
- \uparrow IMF \rightarrow harder to separate liquid molecules \rightarrow harder to boil $\rightarrow \uparrow$ BP

2. What is the relative vapor pressure of CH_3OH versus $\text{CH}_3\text{CH}_2\text{OH}$? basis / rationale? [10 points]



VP: EtOH > MeOH

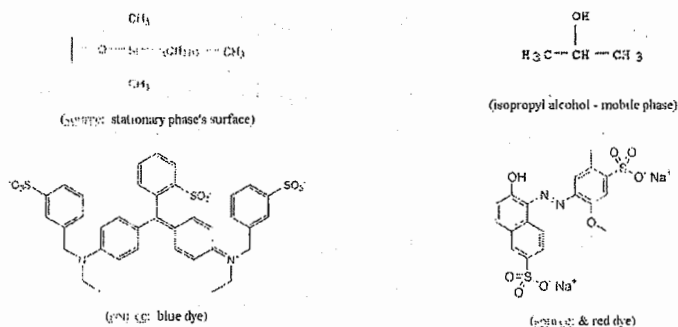
- b/c both eqd have H-bond IMF
- b/c H-O \neq polar eqd
- b/c Σ bond dipoles $\neq 0$

• polarizability: EtOH > MeOH

• so IMF total: EtOH > MeOH

• EtOH: \uparrow IMF \rightarrow harder to separate liquid molecules \rightarrow harder to evaporate \rightarrow \downarrow gas \rightarrow \downarrow VP

3. In the chromatography lab, which food dye, red or blue, came out of the chromatography column first? Basis / rationale using concepts of IMF. [10 points]



3 P1
3
4

polarity: red < blue
 so dye-stationary phase IMF: red < blue
 so red dye is dye to come out of column
 chromatography

4. Write the net ionic equation; if there is no net ionic equation, then write: "none" [15 points]

a. Mix aqueous solutions of lead (II) acetate and lithium chloride



b. Add solid copper to an aqueous solution of zinc nitrate



c. Mix aqueous solutions of potassium carbonate and hydrogen bromide



d. Combustion of ethane; hint: see # 1



e. Mix aqueous solutions of hydrogen bromide and potassium hydroxide



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5. What is the oxidation number of all atoms in ____ [14 points]

a. Calcium sulfate $CaSO_4$

2 Ca + 2
2 S + 6
2 O : -2

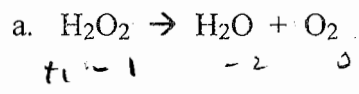
b. methane; hint: see # 1 CH_4

2 C : -4 + 4
2 H : +1 or -1

c. $KMnO_4$

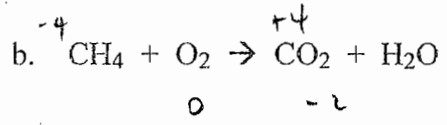
2 K : +1
2 Mn : +7
2 O : -2

6. Identify the atom that is oxidized or reduced in the below reaction. [6 points]

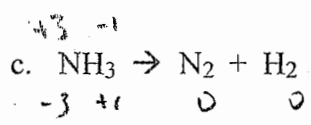


2pts

oxid : O
reduce : O



oxidized : C
reduced : O



oxid : N or H
red : H or N