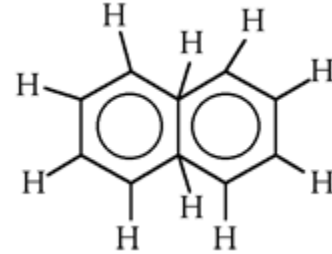
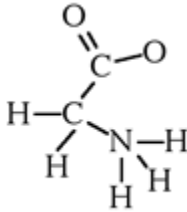
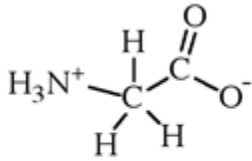


Chemistry Self-Evaluation

The following problems are designed to indicate the level of chemistry required for Introductory Biology classes 7.012, 7.013, and 7.014. Answers are below.

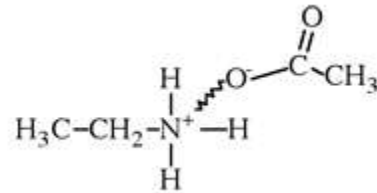
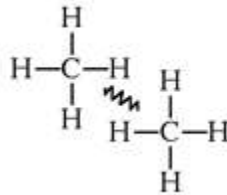
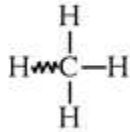
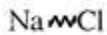
1) Covalent bonds – number of bonds per atom/charge on atoms

What is wrong with the following structures? (Correct the mistakes)



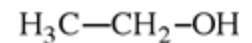
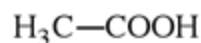
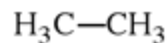
2) Bond types:

What type of bond (ionic, covalent, hydrogen, VanDer Waals) is indicated by the wavy line?



3) Hydrophobicity/Hydrophilicity:

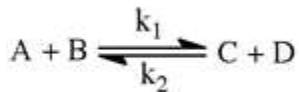
Which of the following would you expect to be water-soluble?



4) Thermodynamics

Given the reversible chemical reaction where:

$$\Delta G^{\circ} = -5.0 \frac{\text{kcal}}{\text{mol}}$$



k_1 = forward rate constant
 k_2 = reverse rate constant

$$K_{\text{eq}} = \frac{k_1}{k_2}$$

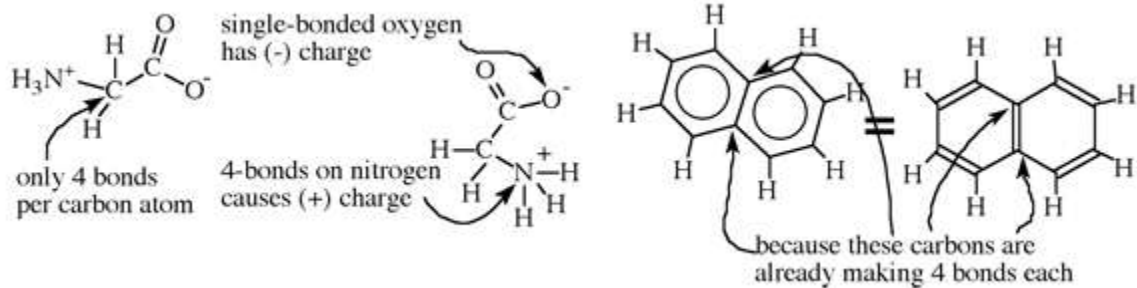
$$\Delta G^{\circ} = -RT \ln(K_{\text{eq}})$$

Which of the following statements are true and which are false?

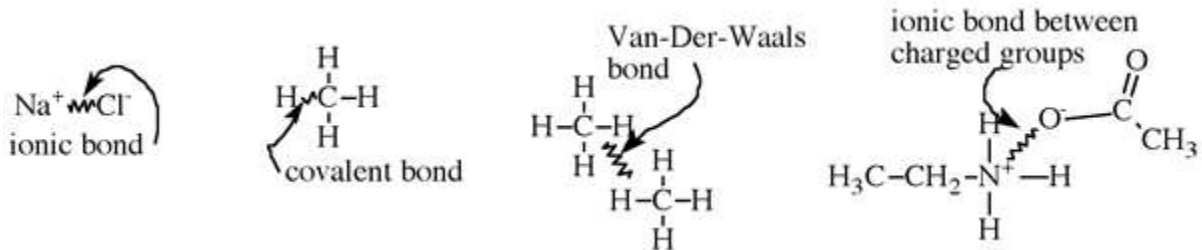
- a) At equilibrium, $[A]=[B]=[C]=[D]$.
- b) Starting with $[A]=[B]=[C]=[D]=1\text{M}$, there will be a net reaction to the right.
- c) Starting with $[A]=1\text{M}$, $[B]=1\text{M}$, $[C]=0$, and $[D]=0$, there will be a net reaction to the right.
- d) Starting with $[A]=0$, $[B]=0$, $[C]=1\text{M}$, and $[D]=1\text{M}$, there will be a net reaction to the right.

Solutions

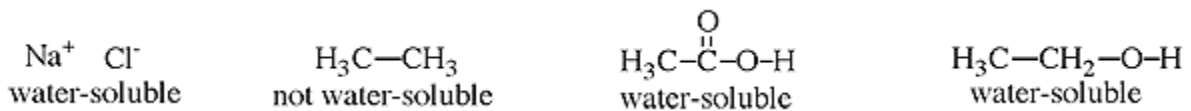
1) Covalent Bonds



2) Bond Types



3) Hydrophobicity/Hydrophilicity



4) Thermodynamics

- a) False
- b) True
- c) True
- d) False

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