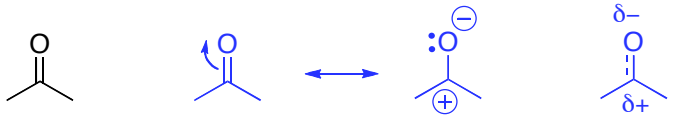
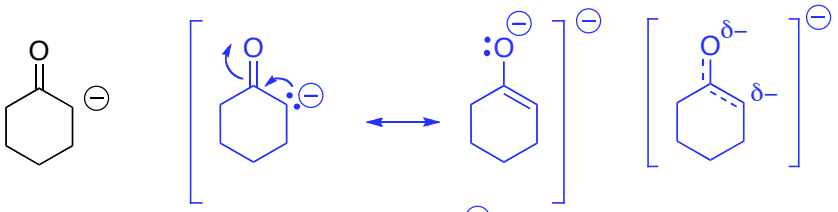
CHM 1321 A
Assignment 6 Answers

1) Draw the important resonance forms and show the resonance hybrid structures for the following:
(mechanistic arrows are provided for convenience. These structures can also be determined using the formal charge method. Insignificant structures are not shown)

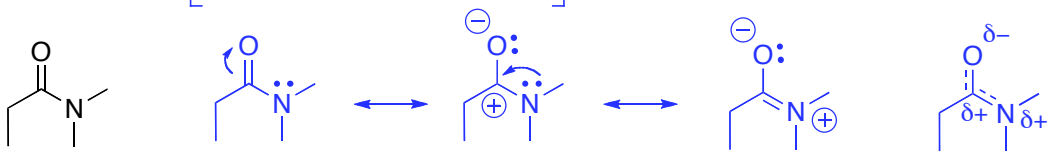
a)



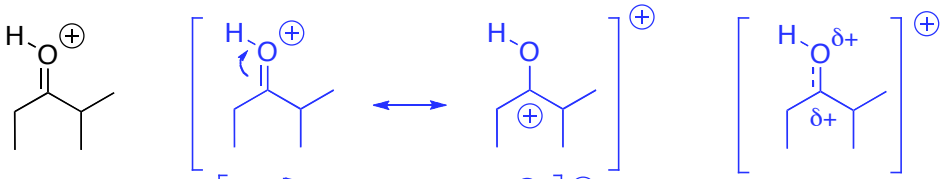
b)



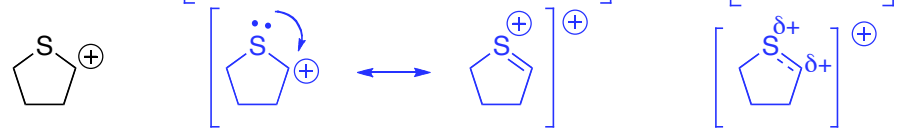
c)



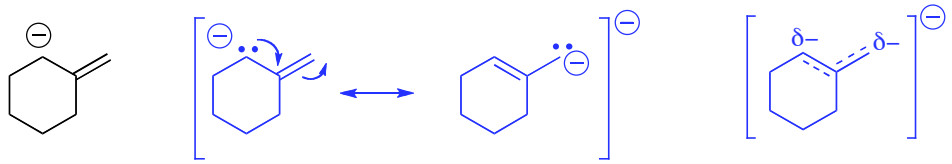
d)



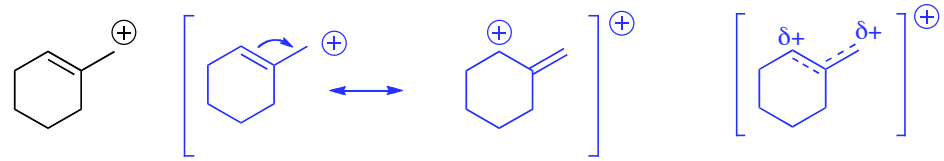
e)

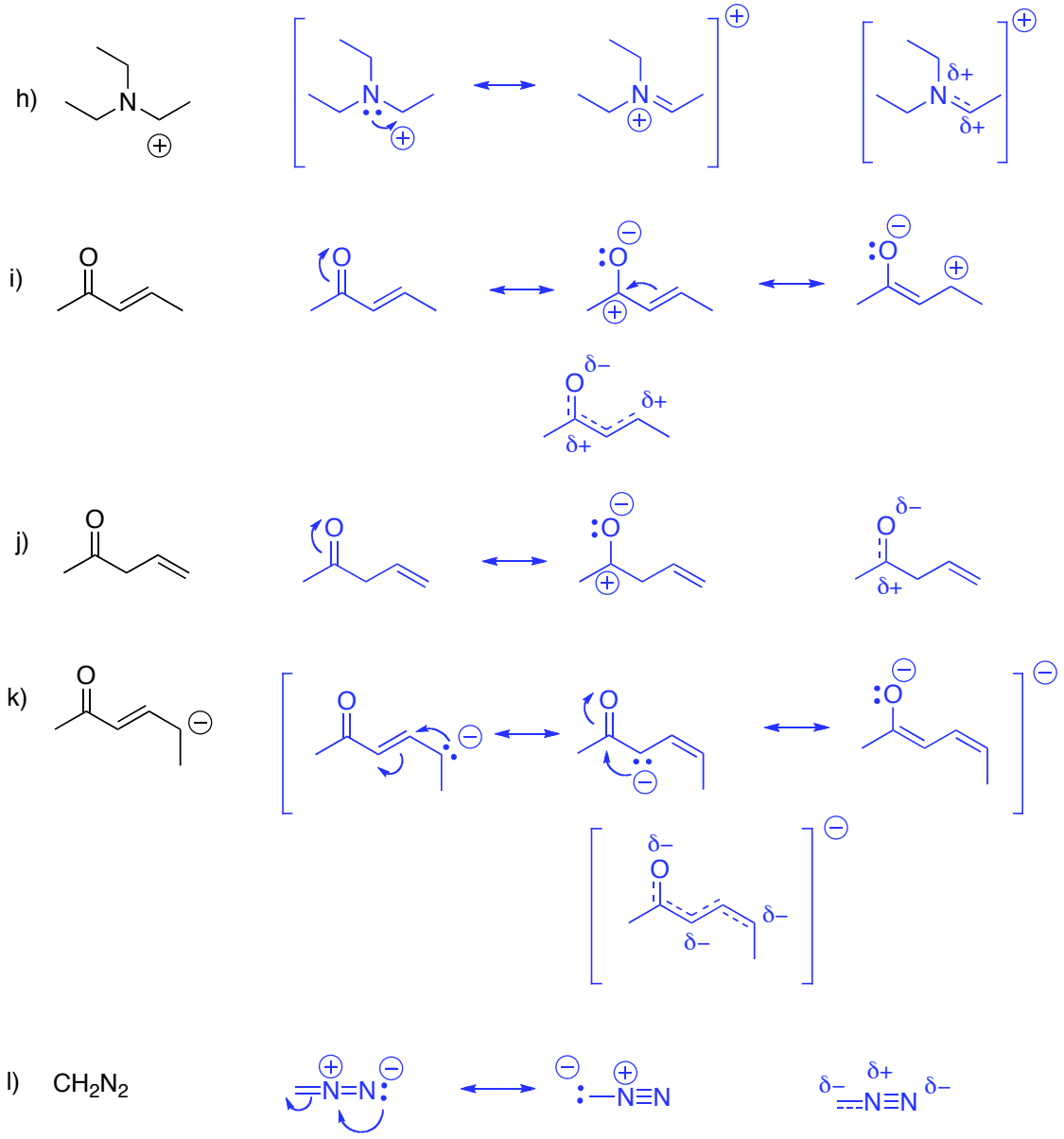


f)



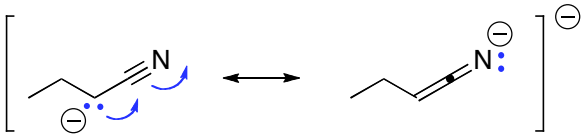
g)





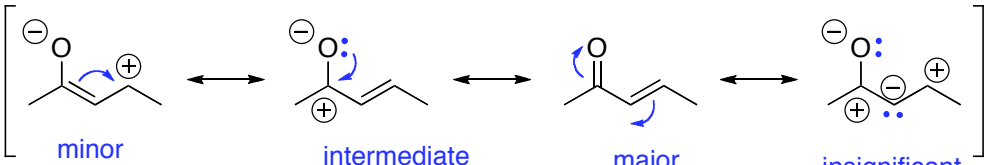
2) For the following, draw mechanistic arrows to show the electron movement when switching resonance forms. Label the major and minor resonance forms, and show which ones are of equal energy. Identify the insignificant forms. Briefly justify your choices.

a)



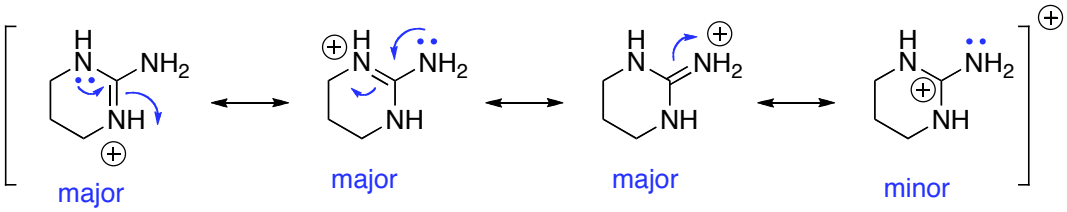
minor major

b)



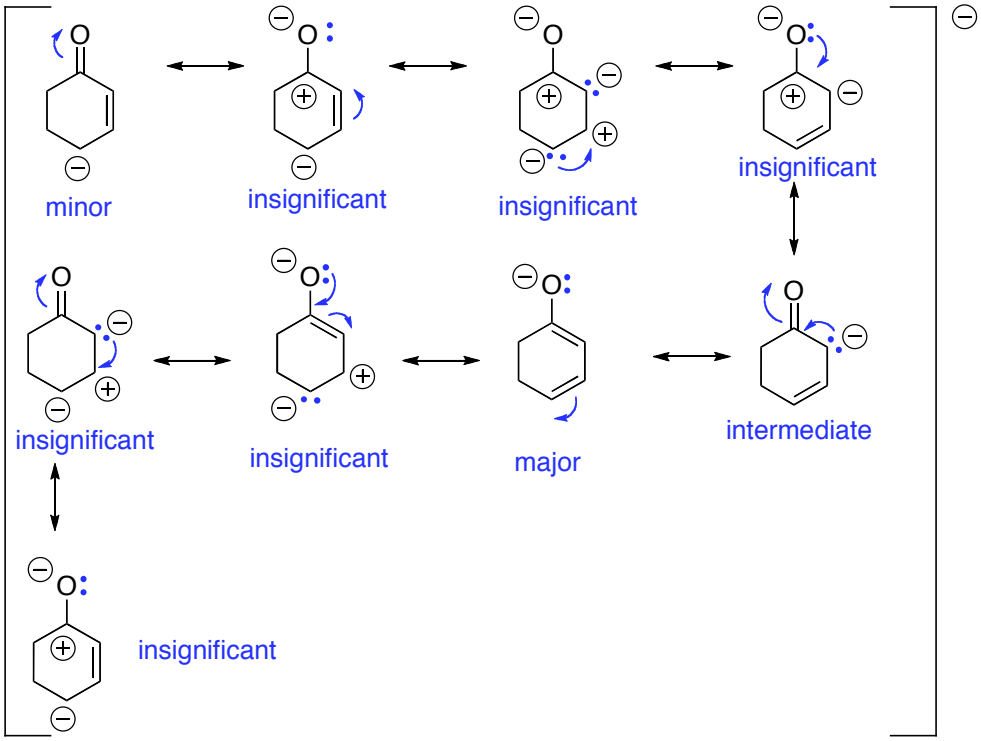
minor intermediate major insignificant

c)



major major major minor

d)



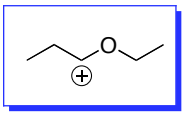
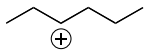
minor insignificant insignificant insignificant

insignificant insignificant major intermediate

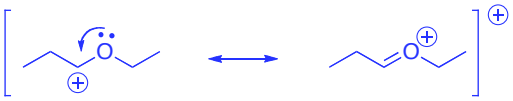
insignificant

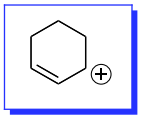
in d, the minor structure has a negative charge located very far away from the most electronegative atom. The intermediate form holds the negative charge closer to the most electronegative atom. On a test, it would be acceptable to show both of these forms as minor forms

3) For each pair of ions, determine which is more stable. Justify your answer in each case.

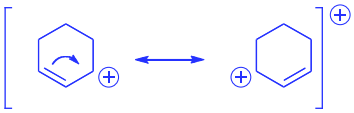
a)  or 

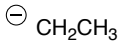
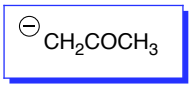
Resonance is possible with this product. The positive charge is next to a heteroatom with unpaired electrons. Delocalization of the charge will increase stability



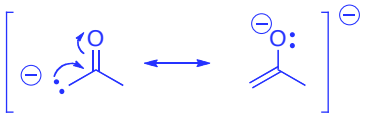
b)  or 

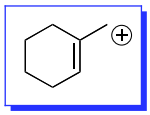
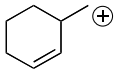
Resonance is possible with this product. The positive charge is next to a π bond. Delocalization of the charge will increase stability



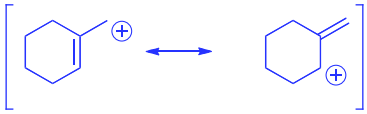
c)  or 

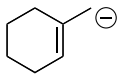
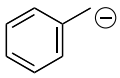
Resonance is possible with this product. The negative charge is next to a π bond. Delocalization of the charge will increase stability



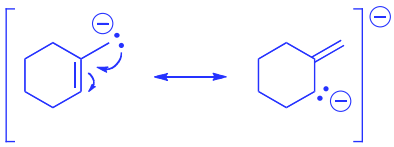
d)  or 

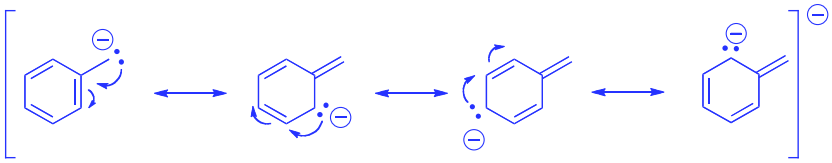
Resonance is possible with this product. The positive charge is next to a π bond. Delocalization of the charge will increase stability



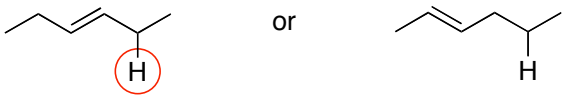
e)  or 

Resonance is possible with both anions. The molecule on the right has three double bonds in proximity to the charge that can all participate in resonance. Delocalization of the charge is much more extensive with this product

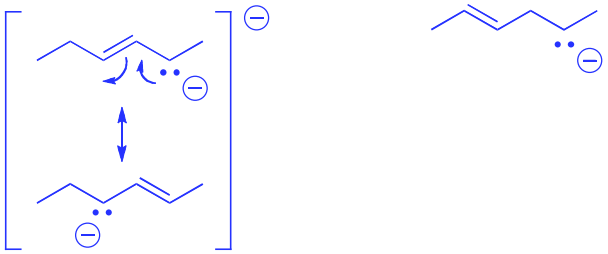


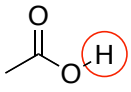
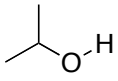


4) Which of the following hydrogens is the most acidic? Draw structures to justify your answer in each case.

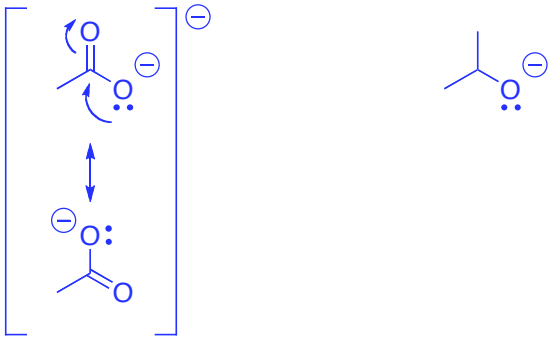
a)  or

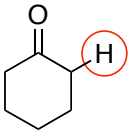
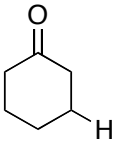
most acidic. conjugate base resonance stabilized



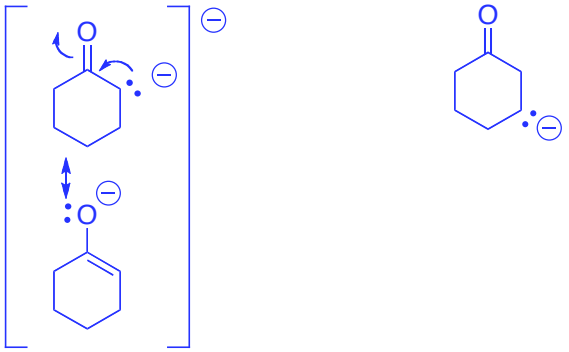
b)  or 

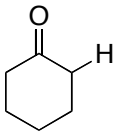
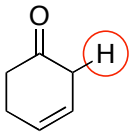
most acidic. conjugate base resonance stabilized



c)  or 

most acidic. conjugate base resonance stabilized



d)  or 

most acidic. resonance in conjugate base resonance more extensive