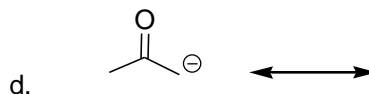
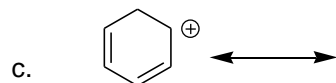
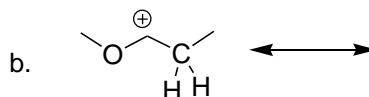
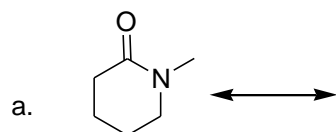
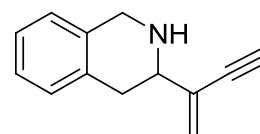


(5) 1. Draw a valid Lewis structure for any compound having the molecular formula $C_4H_8O_2$.

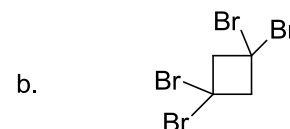
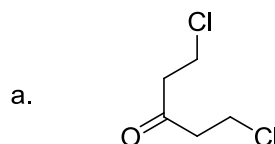
(8) 2. In each case, one resonance contributor is drawn. Draw a second resonance contributor.



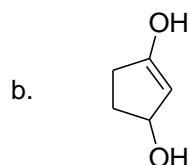
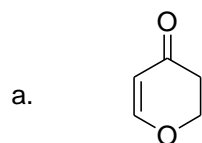
(10) 3. On the structure shown, add all implied H atoms and indicate the hybridization of each carbon.



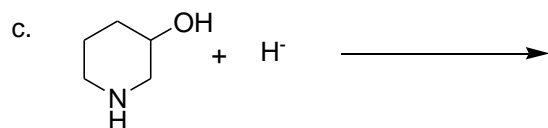
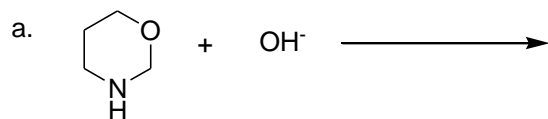
(10) 4. In each case, show the direction of the bond dipoles involving heteroatoms and indicate whether or not the compound is polar.



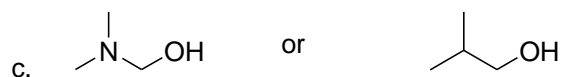
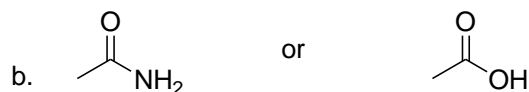
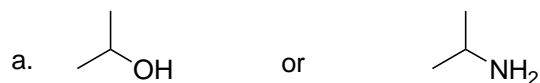
(6) 5. In each case, circle or draw in the most acidic hydrogen.



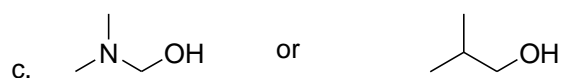
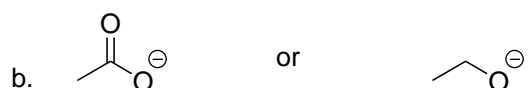
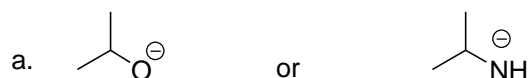
(12) 6. Predict the outcome (two products) of each of the following acid/base reactions. Assume one mole of each reactant is present. Indicate "no reaction" if you think (essentially) nothing will happen.



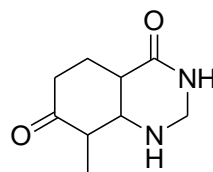
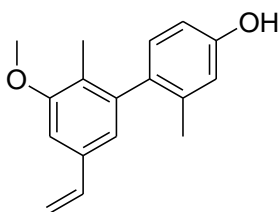
(9) 7. In each case, pick the stronger acid.



(9) 8. In each case, pick the stronger base.



(10) 9. In each case below, identify (name) all functional groups.



(6) 10. List the three types of inter-molecular forces associated with covalent compounds in order of increasing strength.

_____ weakest

_____ strongest

(15) 11. Explain....

- ...why ethyl ether, $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$, has a higher boiling point than methyl ether, CH_3OCH_3 , but a lower boiling point than ethanol, $\text{CH}_3\text{CH}_2\text{OH}$.
- ...why benzoic acid, $\text{C}_6\text{H}_5\text{CO}_2\text{H}$ is soluble in 1 M NaOH solution but not 1 M HCl solution.
- ...what the difference is between *soluble* and *miscible*.