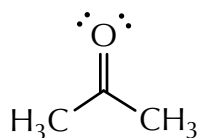
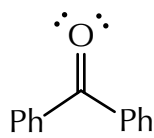


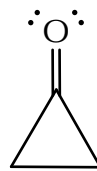
10.03 A typical ketone (acetone) has a dipole moment of 2.91 Debye, and ketones with resonance contributors have slightly higher values (benzophenone is 2.97 Debye). Cyclopropanone has a dipole moment of 2.67 Debye, while that for cyclopropenone, first isolated in 1972, is 5.08 Debye.



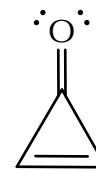
acetone  
2.91 D



benzophenone  
2.97 D



cyclopropanone  
2.67 D



cyclopropenone  
5.08 D

(a) Using words and drawings, explain the difference in dipole moment between acetone and benzophenone.

(b) Using words and drawings, explain the difference in dipole moment between cyclopropanone and cyclopropenone.

(c) Based on these two explanations, what must be true about the relative significance of the resonance contributors in acetone with respect to the resonance contributors in cyclopropanone? ~~This specific conclusion is accessible, but the explanation for it requires concepts you have not encountered.~~

(d) The conjugate acids of cyclopropanone and cyclopropenone (protonated at the oxygen atoms) have  $pK_a$  values of either -12 and -5, or -5 and -12, respectively. Which value goes with which compound, and why?