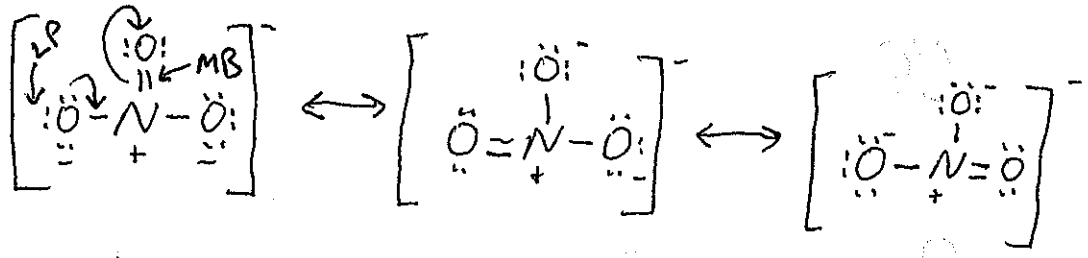
CH235 SI | Resonance | Bliss Chang

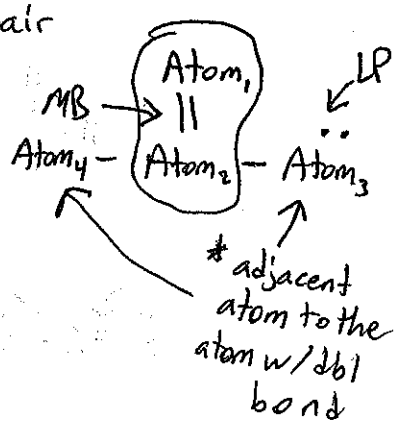
What is resonance?

- a way of describing delocalized e^- in a molecule
- increases stability of a molecule by lowering PE
- shifting of π e^-

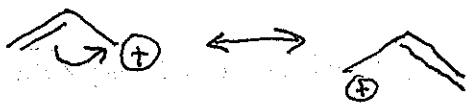
When is resonance possible?

Scenario 1) Multiple Bond + Adjacent Atom w/ atleast one lone pair

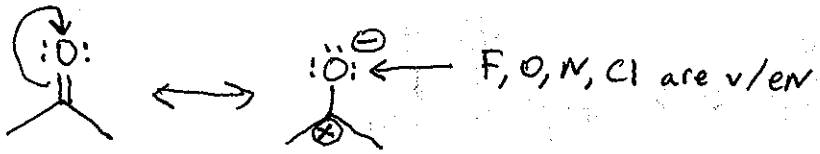




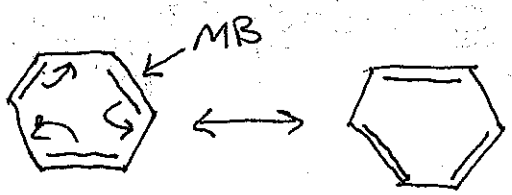
Scenario 2) π e^- near a positive charge



Scenario 3) Large electronegativity difference



Scenario 4) Multiple bonds w/ no lone pair



Benzene

Test tip*: Resonance is possible whenever there is a chance for e^- to be delocalized (moved)

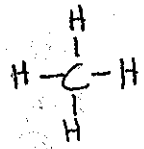
Always fill in lone pairs! They are not always drawn in!

Rules for Resonance

1) Atoms do NOT MOVE
2) Always obey octet rule
3) Always push e^-
4) Carbon can never be pentavalent

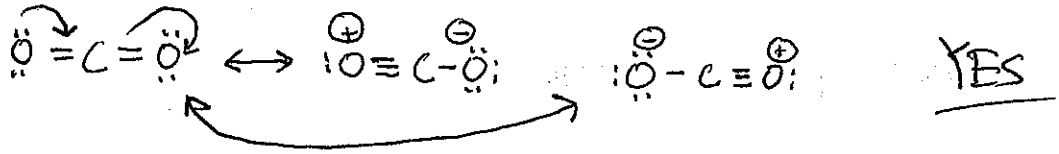
Predict whether the following would have resonance + draw all reasonable structures.

1) CH_4



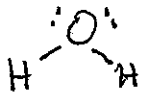
NO

2) CO_2



YES

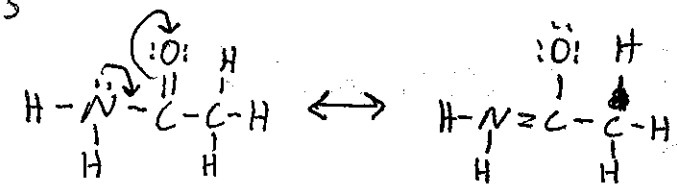
3) H_2O



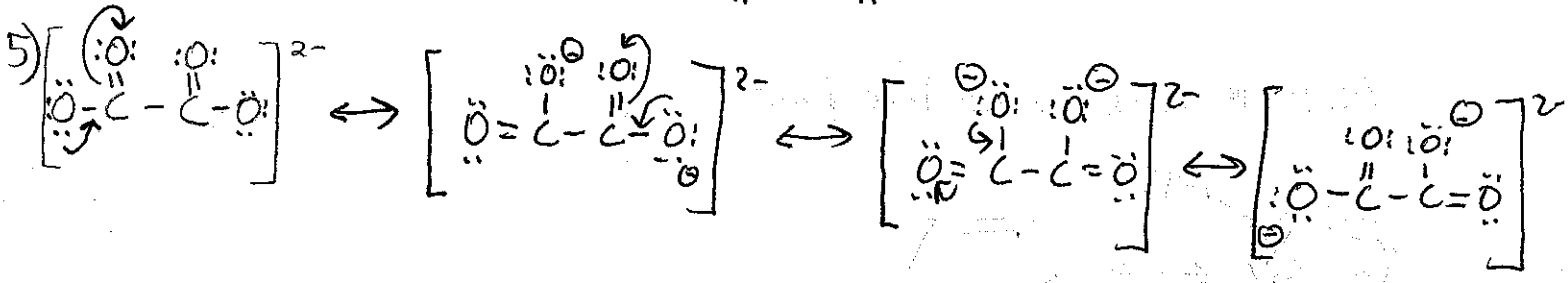
NO

has π e^- but does not fit a category / has nowhere to delocalize e^- to

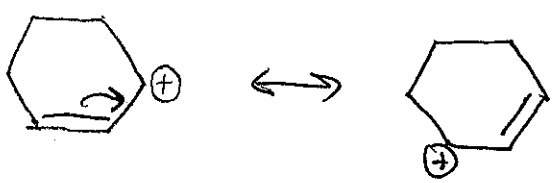
4) NH_2COCH_3

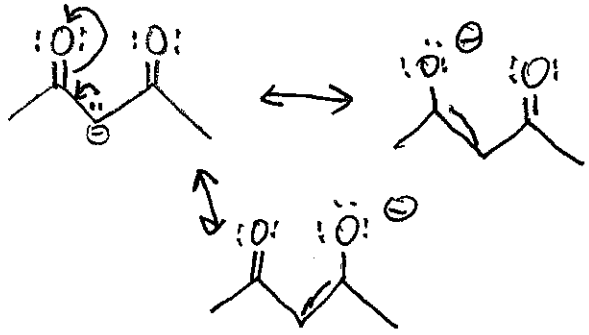


5)



6)

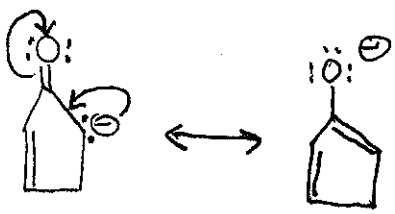


7) 

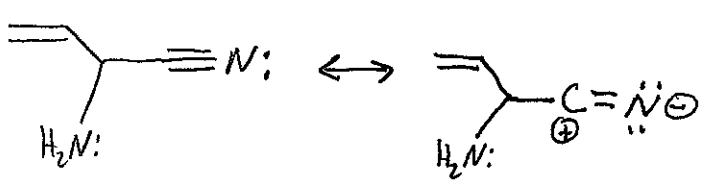
Yes

8) 

Yes

9) 

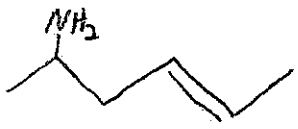
Yes

10) 

Yes

11) C_4H_4

Yes

12) 

NO

Ranking the Contribution of Resonance Structures

1) Filled valence shells
2) Maximum # of covalent bonds
3) Least separation of unlike charges
4) Negative charge on the more EN atom