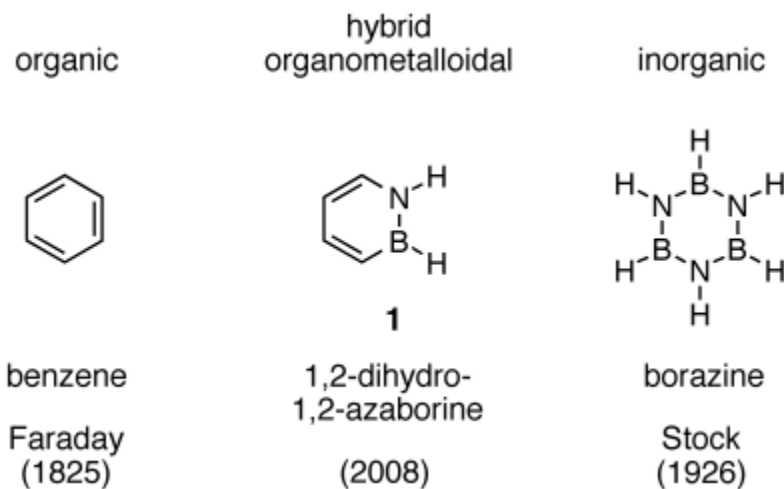
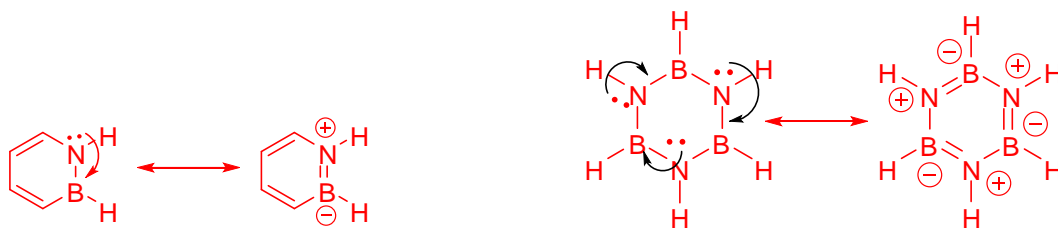


1. A recent article in the prestigious chemistry journal, *Angewandte Chemie International Edition* (2009, 48(5), 973-977), described the synthesis of compound **1**, 1,2-dihydro-1,2-azaborine. The researchers found compound **1** to have aromatic character with a stabilization energy of 21 kcal/mol, which is intermediate between the aromatic stabilization energy of benzene (34 kcal/mol) and borazine (10 kcal/mol).



a) Using resonance structures, show how compound **1** and borazine can fit the classic definition of aromatic structures that we discussed in class. (6 pts.)

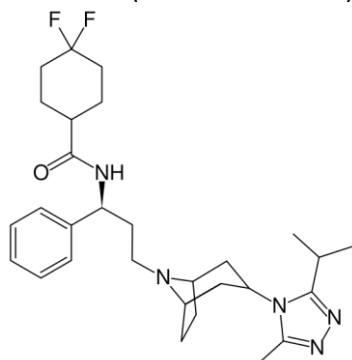


b) Propose an explanation for why the aromatic stabilization energy of compound **1** and borazine are lower. (2 pts.)

With formal charges on the boron and nitrogen in the resonance forms showing 6 pi electrons, compound **1** and borazine will be less stable.

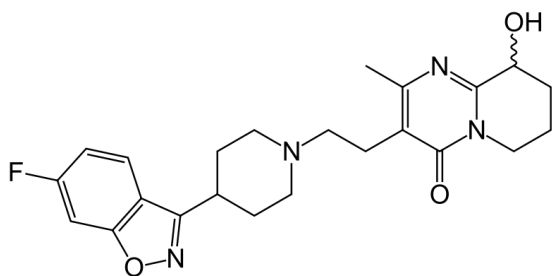
2. Shown below are four new drugs recently approved for various treatments. Circle all the aromatic structures in the compounds. Be sure to consider the effect of resonance forms! (4 pts.)

Maraviroc (anti-infective HIV)



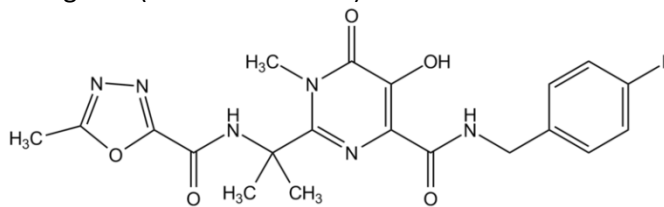
2 aromatic rings: the benzene and the five member with three nitrogens

Paliperidone (antipsychotic)



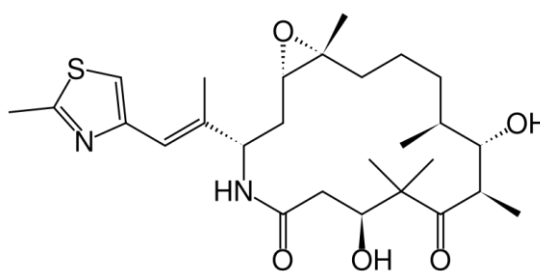
3 aromatic rings: benzene; the five member ring with N and O; and the six member ring with two N's

Raltegravir (anti-infective HIV)



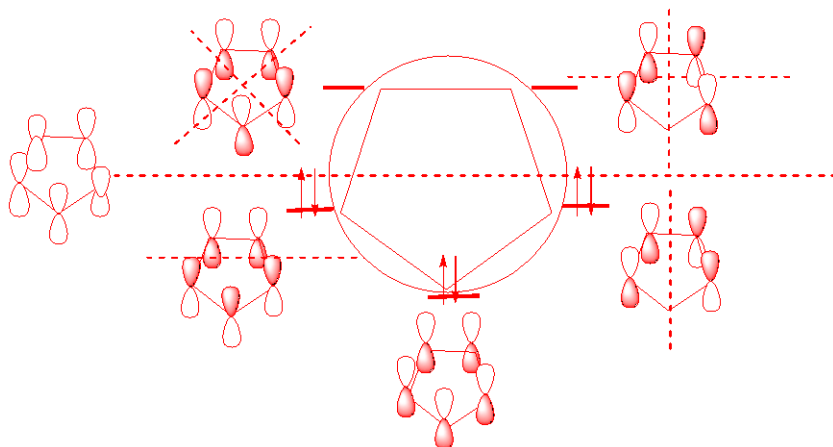
3 aromatic rings: all 3 ring structures

Ixabepilone (anticancer)



1 aromatic ring: the five member ring with the N and S.

3. Draw the molecular orbital diagram for cyclopentadienyl anion and describe why it is a stable structure. (8 pts.)



Cyclopentadienyl anion is stable because all the pi electrons are in bonding orbitals.

/20 total pts.