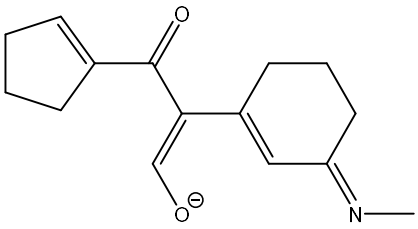
Practice Pb set N°1 – Review

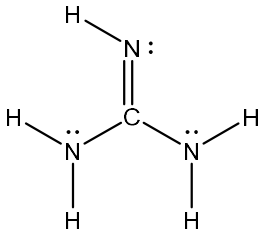
1. Which of the following species possesses a formal charge?
   BH_3; BH_4; HCO_3; H_2CO_3; CH_3S; $(CH_3)_2S$; $(CH_3)_3S$; $(CH_3)_3C$; $(CH_3)_2C$

2. Which of the following elements has the highest electronegativity?
   N; C; O; S; P; Si

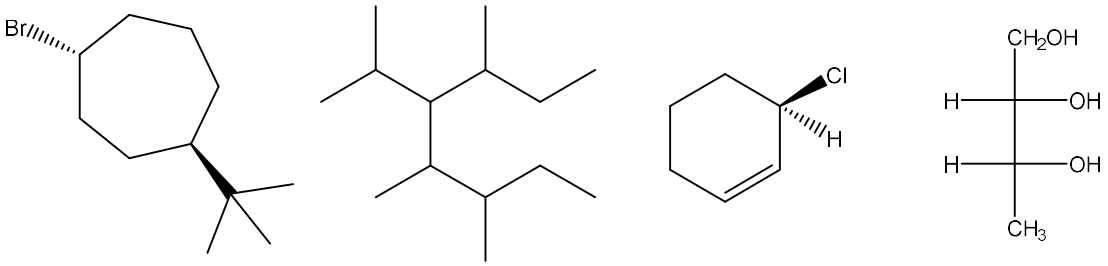
3. Draw the 4 major resonance contributors for the following molecule without generating any additional charges. Draw in all lone pairs of electrons and use arrows to show the movement of electrons within the structure.



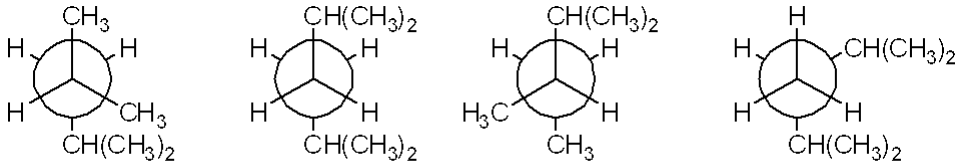
4. Draw the 3 resonance forms, contributors to this guanidine. Determine the state of hybridization of each of the 3 atoms of nitrogen and of the carbon in this molecule. In which orbitals do the three lone pairs drawn reside?



5. What is the IUPAC nomenclature of these molecules:

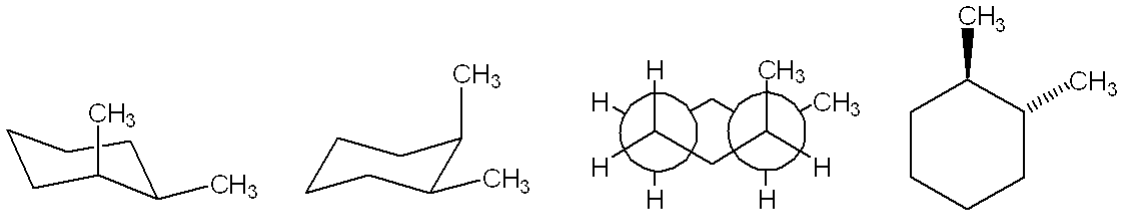


6. Which of the following Newman projections represents 2,4-dimethylpentane?



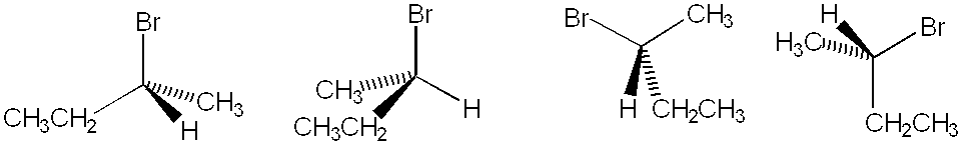
1 **2** **3** **4**

7. Which one of the following structures represents a different compound from the other three?



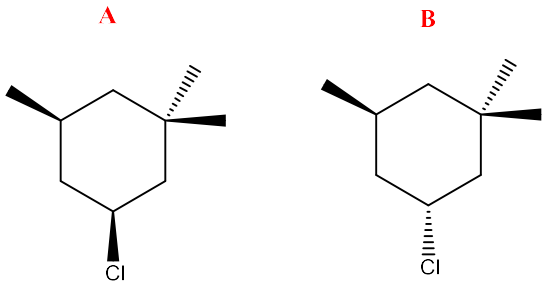
1 **2** **3** **4**

8. Which of the following structures is different from the other three?

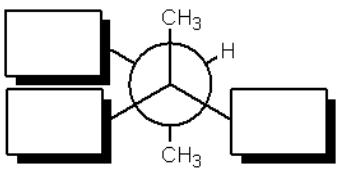


1 **2** **3** **4**

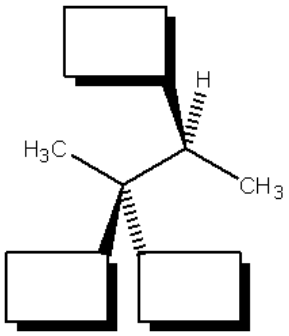
9. Draw the ring-flipped conformers of each of these molecules **A** et **B** and determine the most stable one.



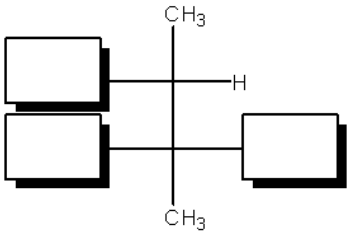
10. Complete the following diagram so that it represents each of the indicated molecule to the right:



(2*R*,3*R*)-2,3-dibromobutane



(2*S*,3*R*)-2,3-dibromobutane



(2*R*,3*S*)-butane-2,3-diol

11. Draw the chair conformation of:
    - *cis*-decalin
    - *trans*-decalin

12. How much of the *R* enantiomer is present in 10 g of a mixture which has an enantiomeric excess of 60% of the *R* isomer?

13. A solution containing 0.04 g/mL of a pure *S* enantiomer in a 1 dm polarimeter rotates plane polarized light by +2°. What is the specific rotation of the *R* isomer?