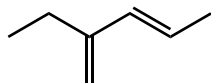


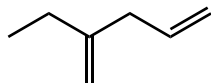
CHM 224
Test 1
Chapters 17, 18, 19

NAME:

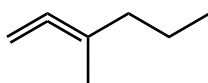
1. From the series of compounds below, label the most and least stable isomer:



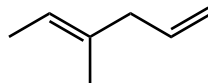
A



B



C



D

MOST STABLE:

LEAST STABLE:

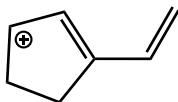
2. Which one of the following compounds is expected to undergo an S_N1 reaction *the fastest and which one the slowest?*

- A. 1-bromo-1-pentene
- B. 4-bromo-1-pentene
- C. 3-bromo-1-pentene
- D. 5-bromo-2-pentene

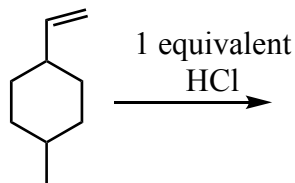
fastest:

slowest:

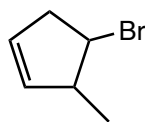
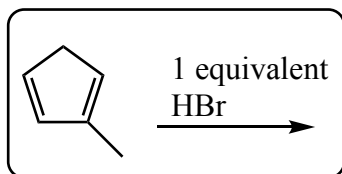
3. Draw all reasonable contributing resonance forms for the carbocation below using curved arrows and appropriate conventions:



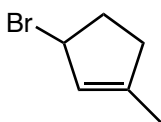
4. What is the major product expected for the following reaction? Show your work:



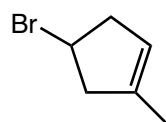
5. Which of the following are the two primary products of the following reaction?



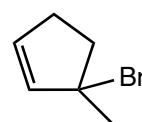
A



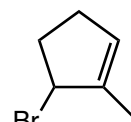
B



C



D

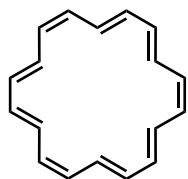


E

6. Which one of the following statements correctly describes *anti-aromatic molecules*?

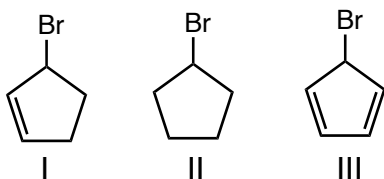
- A. they typically exhibit non-alternating bond lengths and undergo substitution reactions
- B. they typically exhibit alternating bond lengths undergo substitution reactions
- C. they typically exhibit alternating bond lengths and undergo addition reactions
- D. they typically exhibit non-alternating bond lengths and undergo addition reactions

7. Answer the questions regarding the structure of the compound provided below:



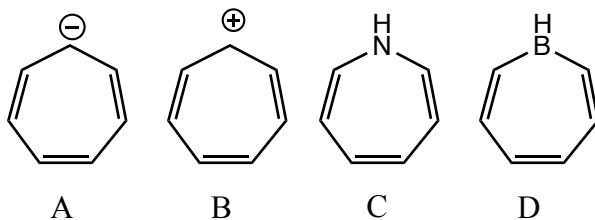
- What is the number of pi electrons?
- Is there a value for "n" that satisfies the Huckel rule? $n =$
- Is there an even or odd number of pairs of electrons?
- Is this compound predicted to be aromatic?
- The type of ring current exhibited in NMR spectroscopy would be:

8. Which of the following correctly ranks the order in which the compounds below will undergo an S_N1 reaction (from fastest to slowest):



- $I > II > III$
- $I > III > II$
- $II > I > III$
- $II > III > I$
- $III > I > II$
- $III > II > I$

9. Which of the following compounds are predicted to exhibit **aromaticity**?

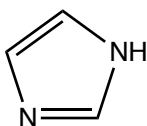


10. Cyclobutadiene is a rare example of an anti-aromatic compound because:



- It has two unpaired electrons in its pi orbitals and is planar
- It has two unpaired electrons in its pi orbitals and is nonplanar
- It has no unpaired electrons in its pi orbitals and is planar
- It has no unpaired electrons in its pi orbitals and is nonplanar

11. Answer the two questions below based on the structure provided:

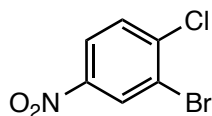


i. Do you predict the compound to be aromatic or antiaromatic? Clearly describe how you account for pi electrons, including lone pairs.

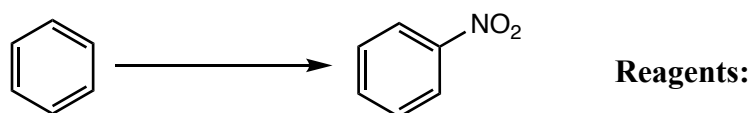
ii. The predicted heat of hydrogenation for the compound above is 240 kJ/mol. The actual (experimental) heat of hydrogenation was determined to be 130 kJ/mol. Does this information support your answer above (use specific data, not just yes or no).

13. Draw the structure of meta-chlorophenol

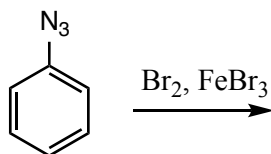
14. Provide an acceptable name for the following compound:



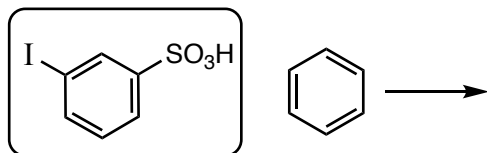
15. Provide the reagents necessary to complete the following reaction:



16. Azidobenzene (below) reacts *fifty times slower than benzene* towards Br_2 , FeBr_3 . Given this information, what would you predict to be the major product(s) of the following reaction?



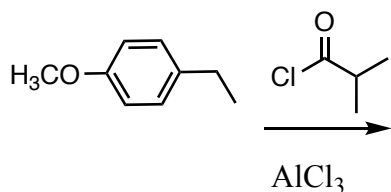
17. Provide a synthesis of the following compound starting with benzene.



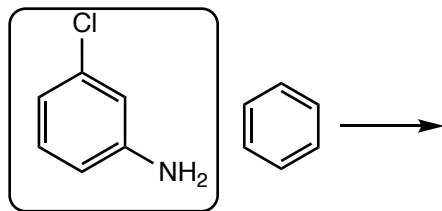
18. Which one of the following substituents *deactivates* the reaction of the benzene ring with electrophiles to the greatest extent?

- A. OH B. CN C. F D. SO_3H E. NH_2

19. What is the expected major product of the following reaction:



20. Provide a synthesis for the following compound starting with benzene.



Bonus! (1 pt). What is the name of the following compound?

