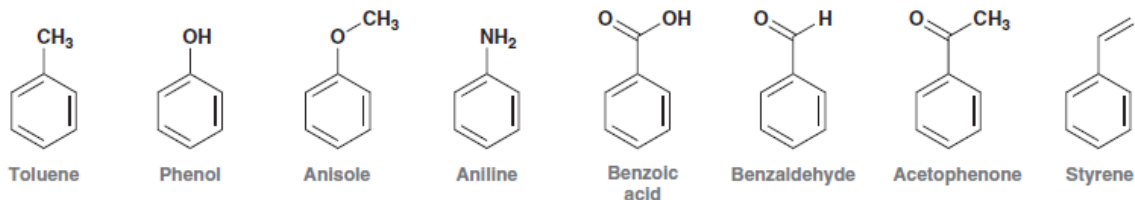


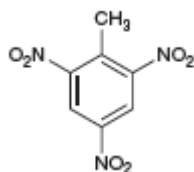
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Aromatic compounds

The following aromatic compounds have common names which are accepted by IUPAC (International Union of Pure and Applied Chemistry). Please try to commit these names to memory, as they will be used throughout the exercises.



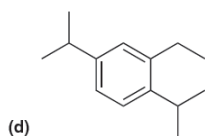
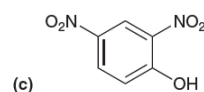
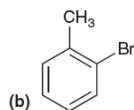
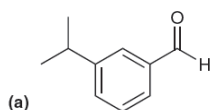
1. Provide a systematic name for TNT, a well-known explosive with the following molecular structure:



2. Draw the structures for the following compounds.

- p*-Dichlorobenzene
- 1,3,5-Trimethylbenzene
- 1,3,4,5-Tetramethylbenzene
- 2,4-Dichlorotoluene
- Diphenyl

3. Provide a systematic name for each of the following compounds:



4. Draw the structure for each of the following compounds:

- 2,6-Dibromo-4-chloroanisole
- meta*-Nitrophenol

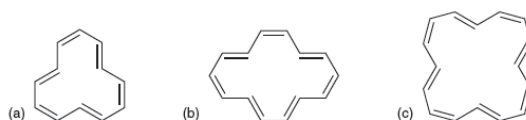
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Aromatic compounds

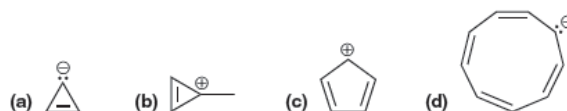
5. The carbon-carbon bonds in benzene are _____.
- of equal length and are shorter than the double bond
 - of equal length and are midway between a single bond and a double bond
 - of equal length and are longer than the single bond
 - of unequal length and alternate as single and double bonds
 - none of these

6. Identify the number of π electrons present in an aromatic compound.
- $4n + 2$
 - $2n + 2$
 - $4n$
 - $2n$
 - $3n$

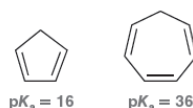
7. Try to predict whether each of the following compounds should be aromatic.



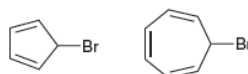
8. Determine whether each of the following ions is aromatic or anti-aromatic.



9. Explain the vast difference in pK_a values for the following compounds



10. Try to predict which of the following compound will react more readily in an S_N1 reaction and explain why:

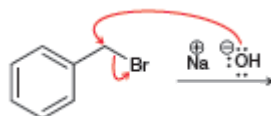


11. The chemical formula for the cyclopropenyl cation is $C_3H_3^+$. The structure of the three-membered ring is flat and contains a continuous system of overlapping p orbitals. The system contains a total of two π electrons. Draw an energy diagram (Frost circle) showing the relative energy levels of all MOs and predict whether this cation might exhibit aromatic stabilization.

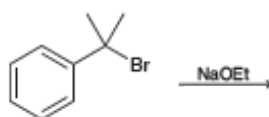
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Aromatic compounds

12. Benzylic halides undergo nucleophilic substitution reactions very rapidly. Draw the products of the following reaction. Is this a concerted reaction?



13. Draw the products of the following reaction. Try to identify the reaction mechanism.



14. The lone pair on nitrogen in the following compound is _____.



- Localized
- Delocalized

15. The lone pairs on oxygen in the following compound are _____.

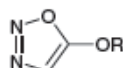


- Both localized
- Both delocalized
- One localized and one delocalized

16. Try to identify which of the following compounds is expected to be a stronger base. Explain.



17. Would you expect the following compound to be aromatic? Explain.



18. Draw the major products of the following reaction. Try to identify the reaction mechanism.

