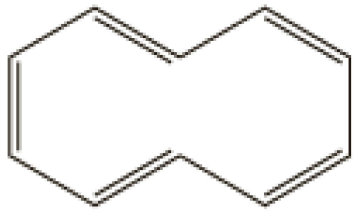
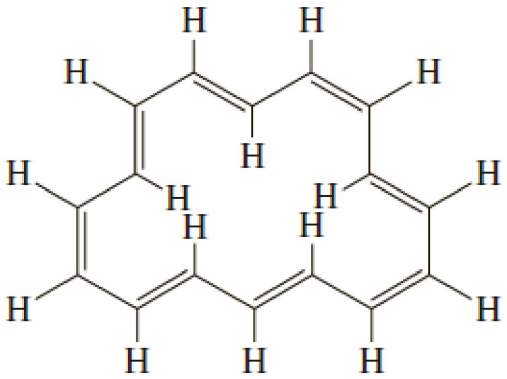
АРЕНЫ и АРОМАТИЧНОСТЬ

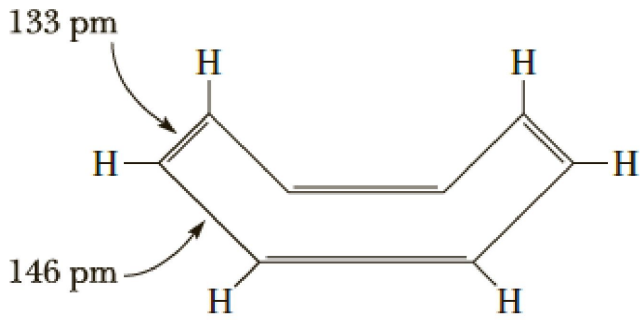
Ароматичность

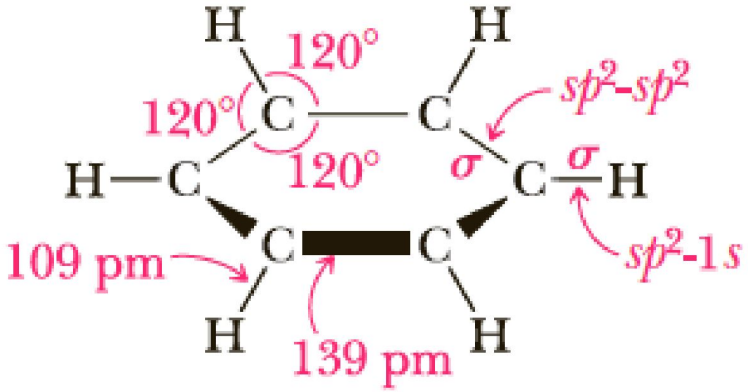
Соединения

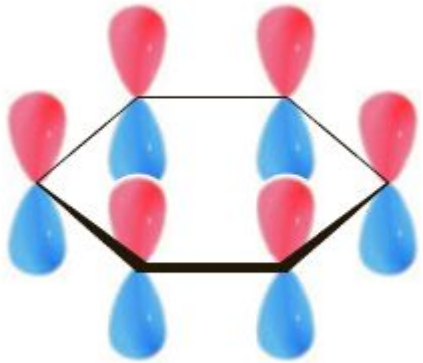
- Ароматические
  4n+2=N
  (правило Хюккеля)
- Антиароматические
  4n = N
  (правило Мебиуса)
- Не ароматические

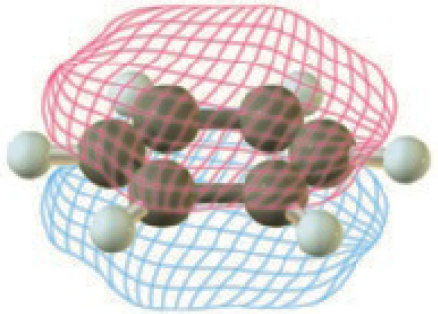


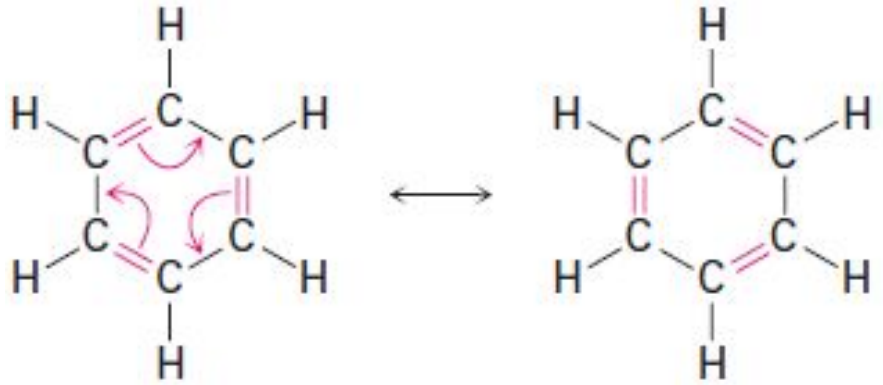




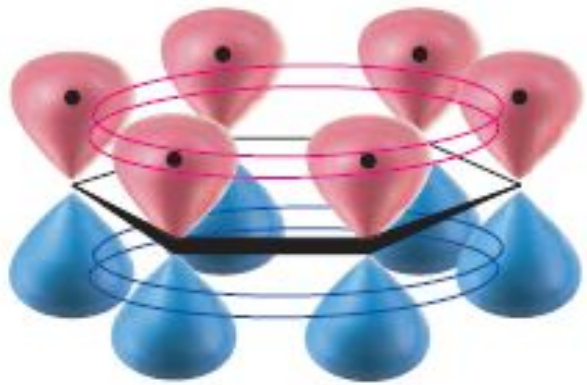


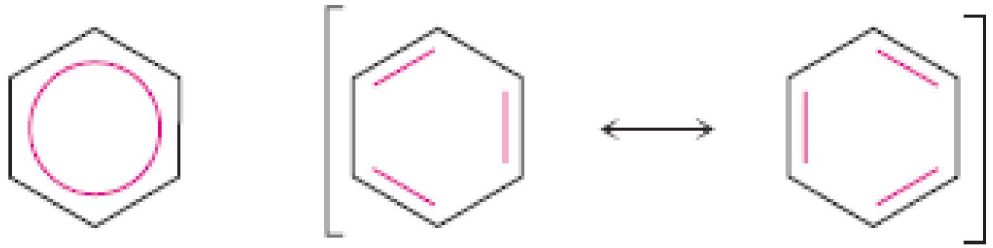


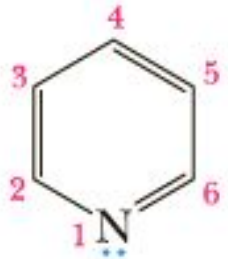




(b)

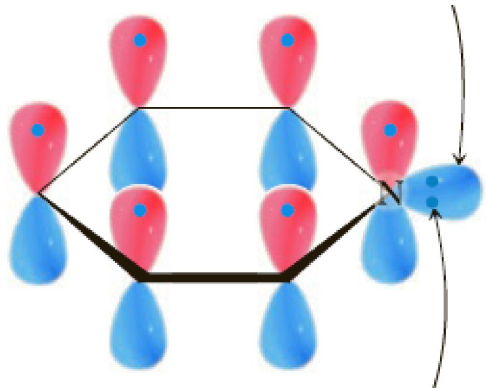


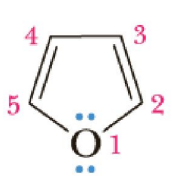




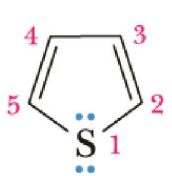
Pyridine

Pyrimidine

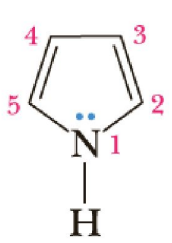




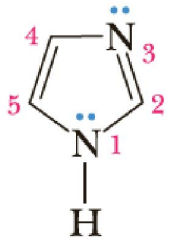
Furan



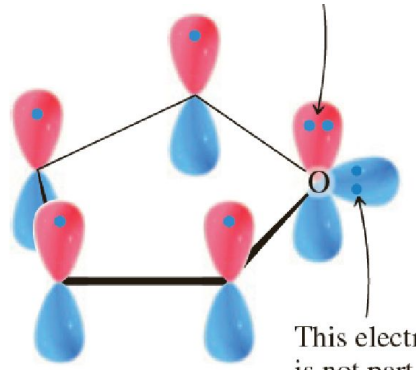
Thiophene



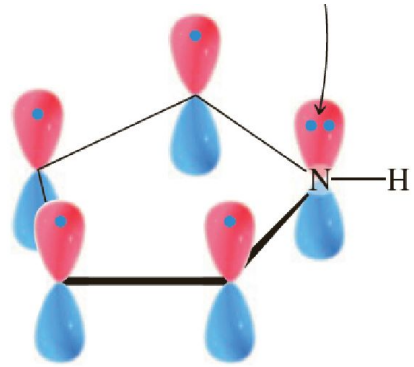
Pyrrole



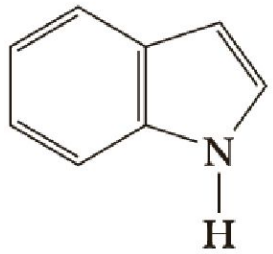
Imidazole



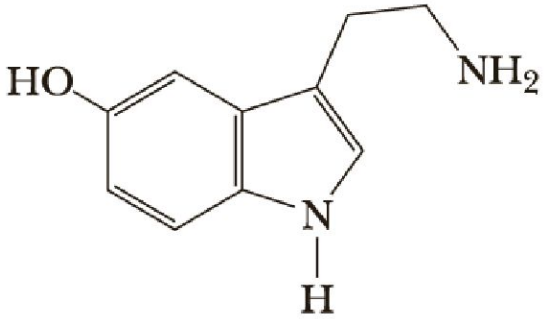
Furan



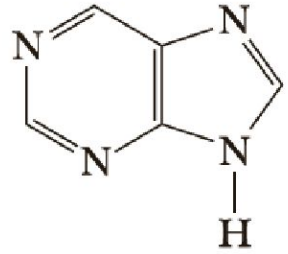
Pyrrole



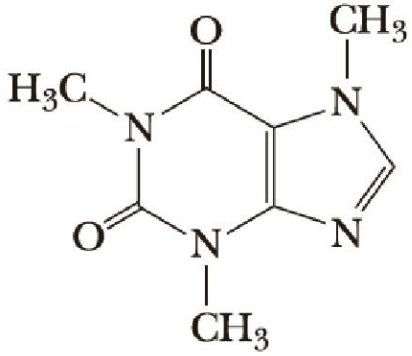
Indole



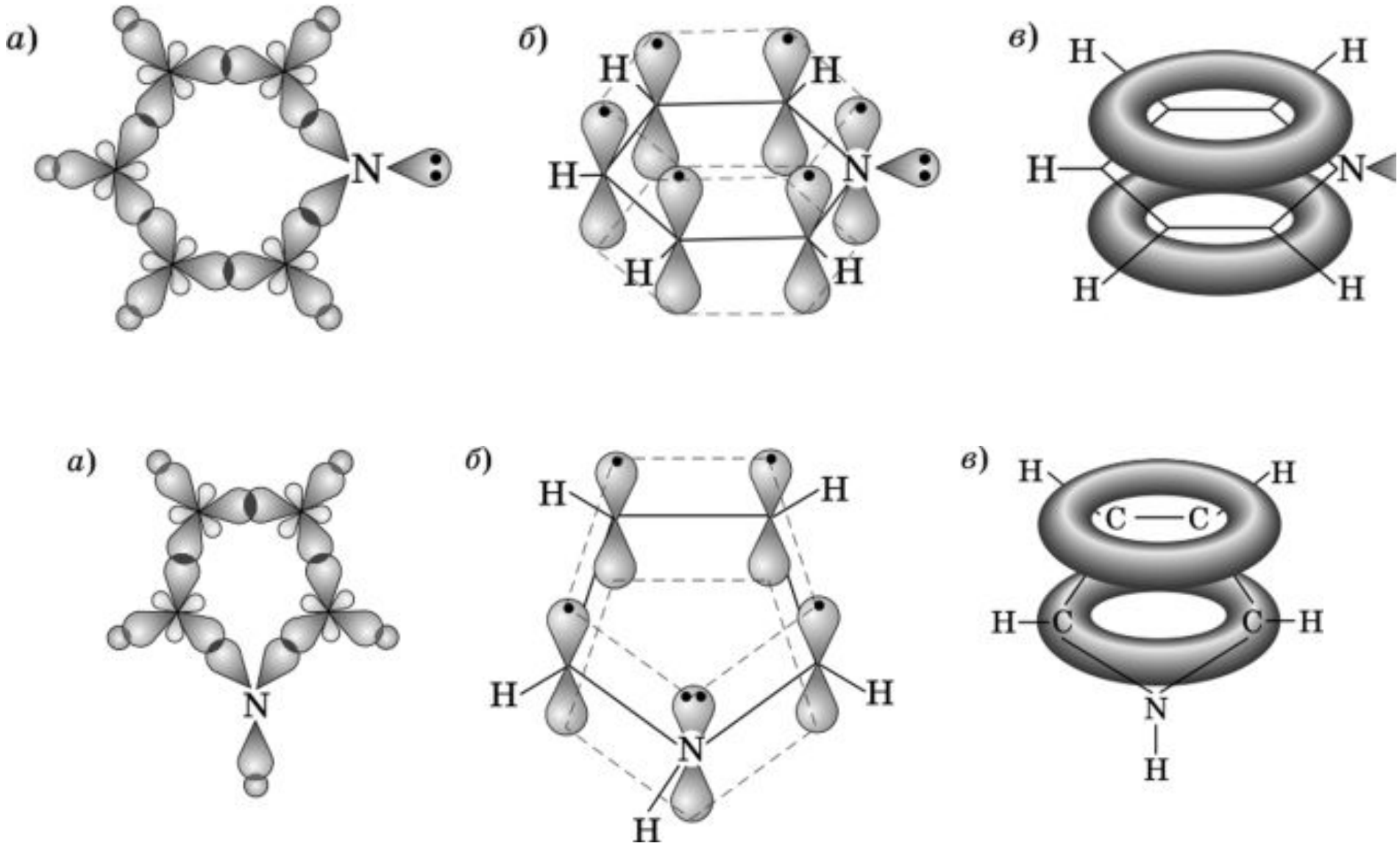
Serotonin
(a neurotransmitter)



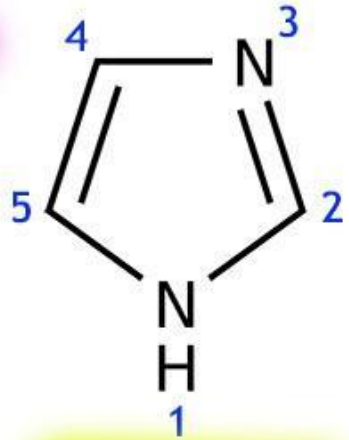
Purine



Caffeine

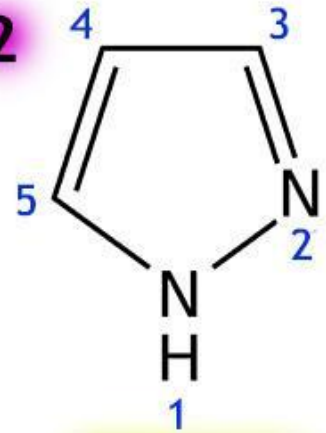

а)
N
б)
H
H
H
N
H
H
в)
H
H
H
N
H
H
а)
N
б)
H
H
H
N
H
в)
H
H
C — C
H — C
C — H
N
H

1

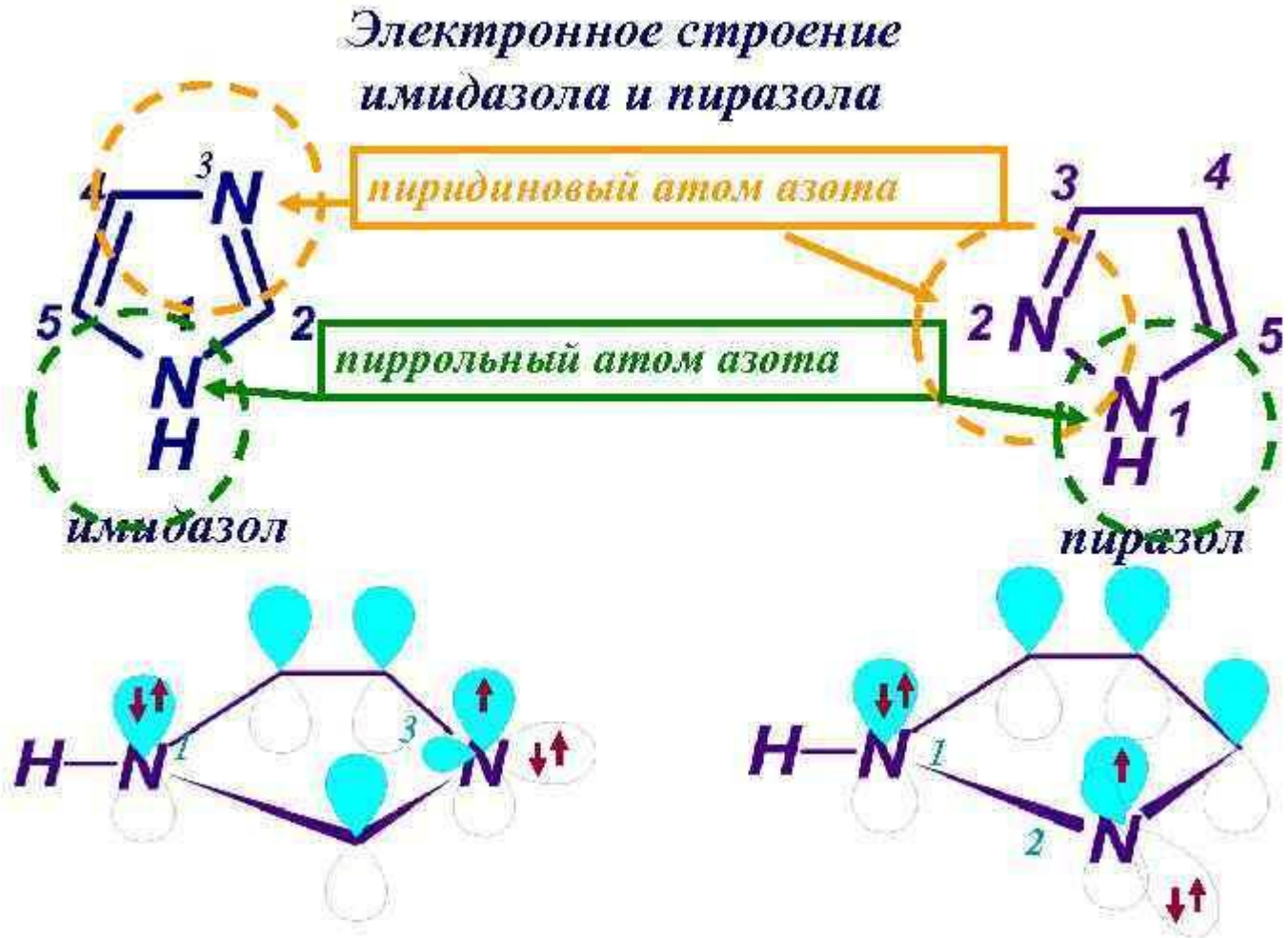


Имидазол

2

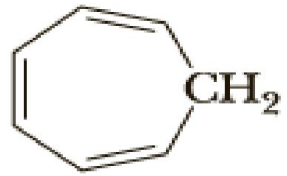


Пиразол

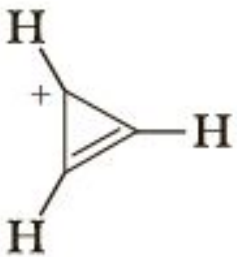


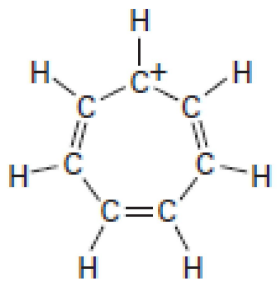
Cyclopropene

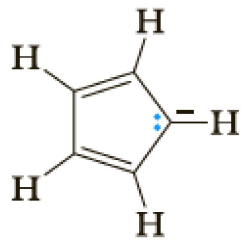
Cyclopentadiene

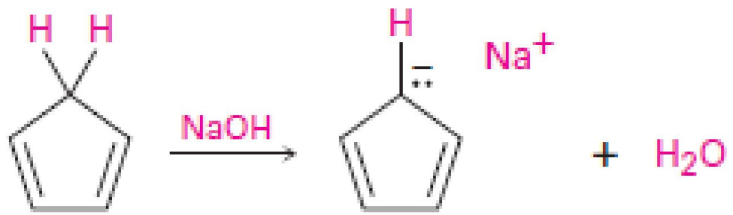


Cycloheptatriene









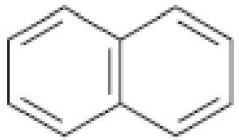
1,3-Cyclo-pentadiene

Cyclopentadienyl anion

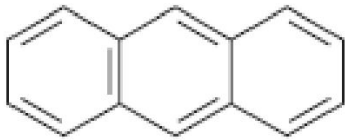
3-Chloro-cyclopropene

Antimony(V) chloride (a Lewis acid)

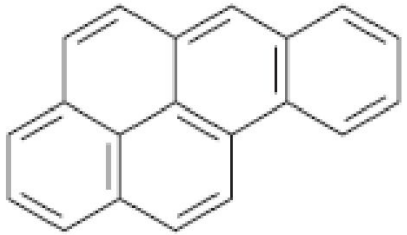
Cyclopropenyl hexachloroantimonate



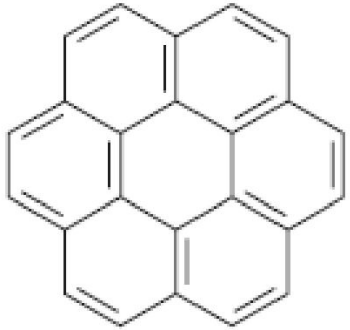
Naphthalene



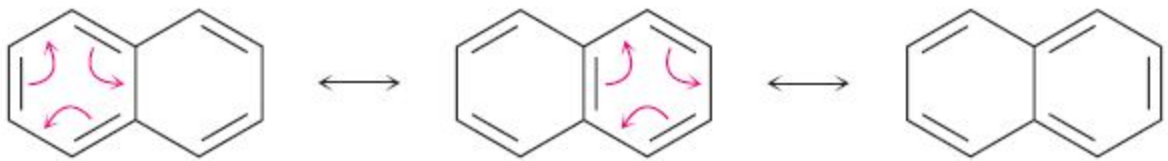
Anthracene



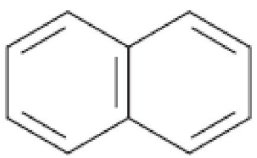
Benzo[a]pyrene



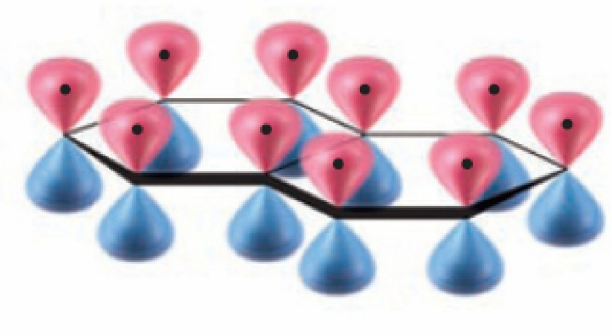
Coronene



Naphthalene

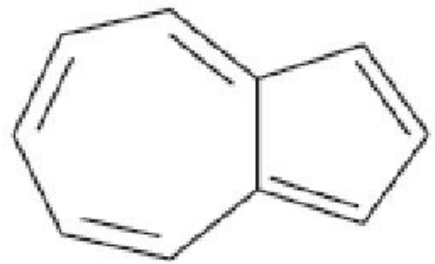


Naphthalene



Problem 15.11

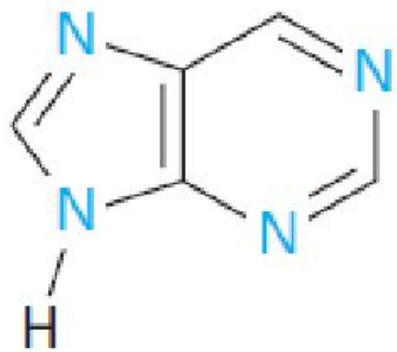
Azulene, a beautiful blue hydrocarbon, is an isomer of naphthalene. Is azulene aromatic? Draw a second resonance form of azulene in addition to that shown.



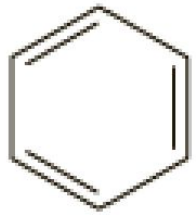
Azulene

Problem 15.12

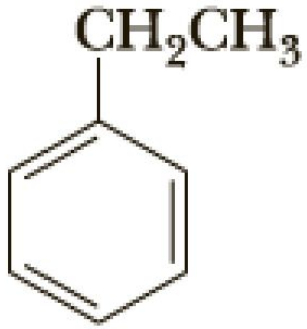
How many electrons does each of the four nitrogen atoms in purine contribute to the aromatic π system?



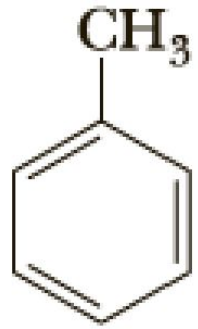
Purine



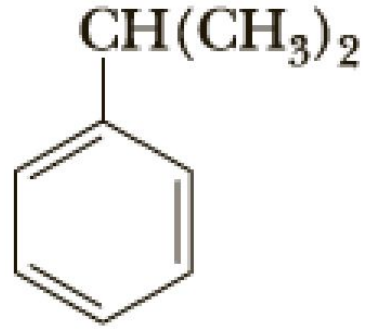
Benzene



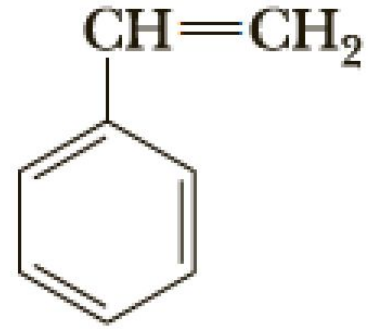
Ethylbenzene



Toluene

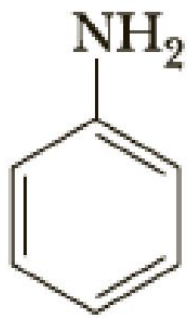


Cumene

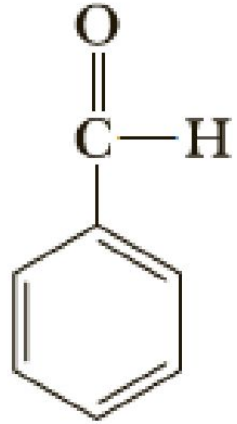


Styrene

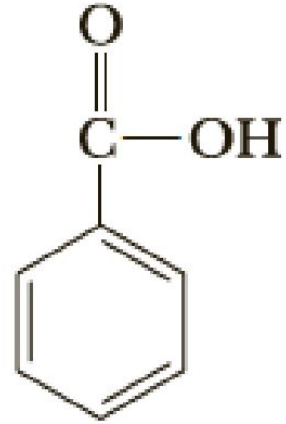
Phenol



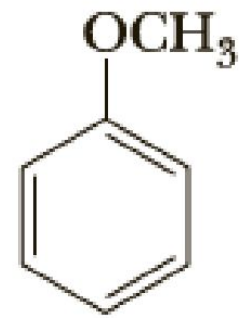
Aniline



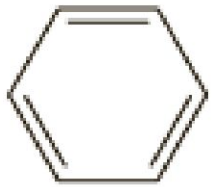
Benzaldehyde



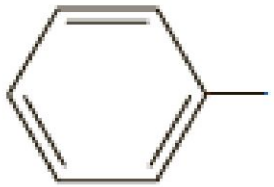
Benzoic acid



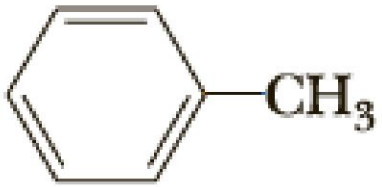
Anisole



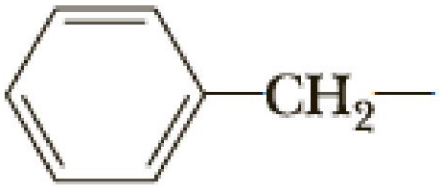
Benzene



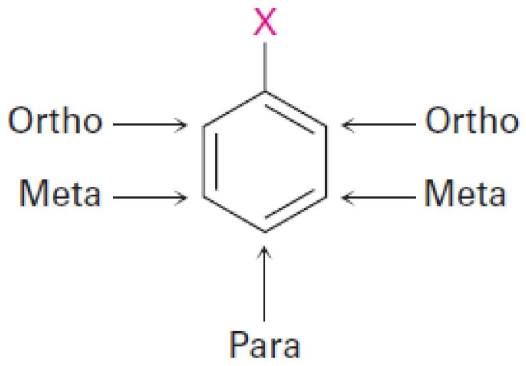
Phenyl group, Ph–

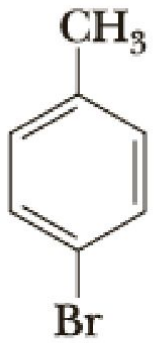


Toluene

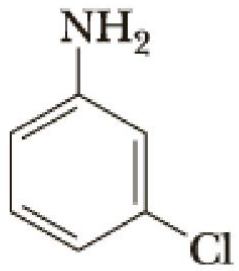


Benzyl group, Bn–

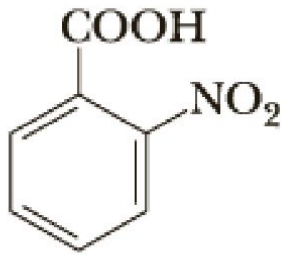




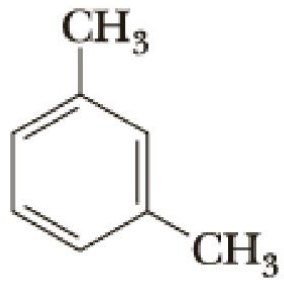
4-Bromotoluene
(*p*-Bromotoluene)



3-Chloroaniline
(*m*-Chloroaniline)



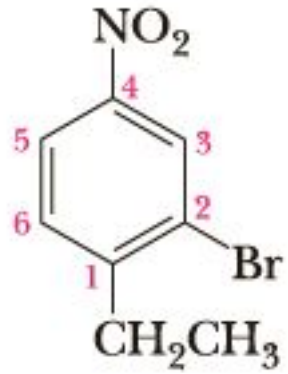
2-Nitrobenzoic acid
(*o*-Nitrobenzoic acid)



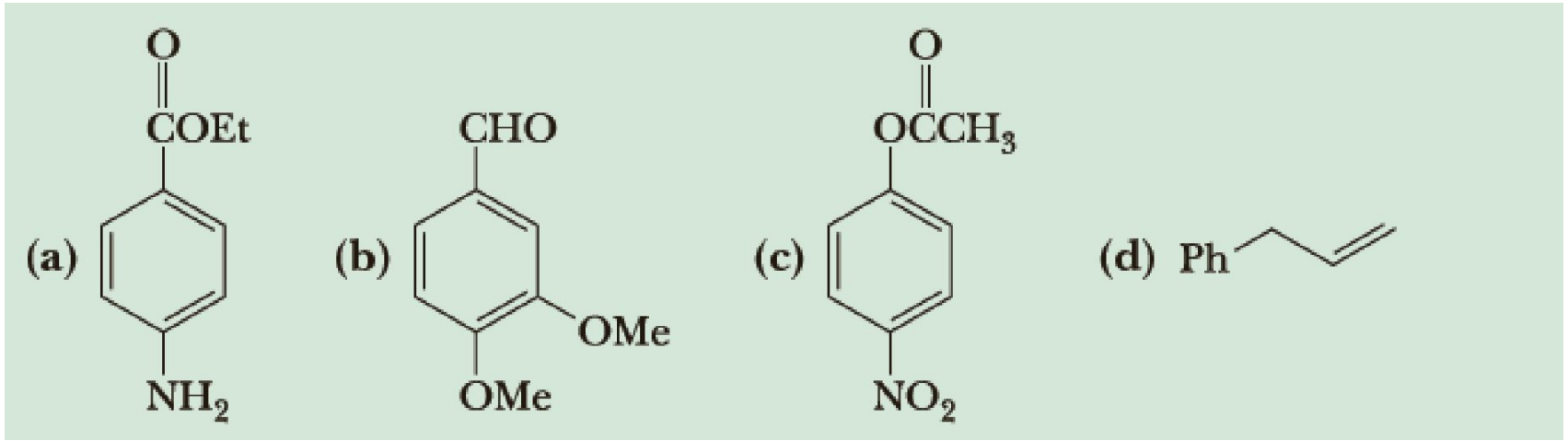
***m*-Xylene**

4-Chloro-2-nitrotoluene

2,4,6-Tribromophenol

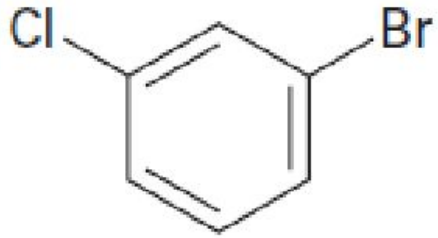


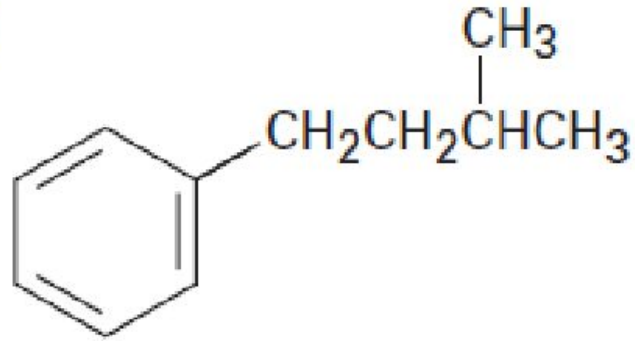
2-Bromo-1-ethyl-4-nitrobenzene

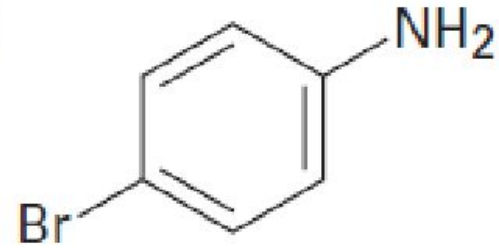


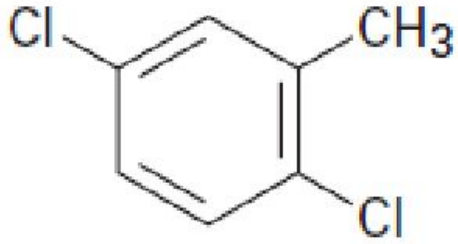
Problem 15.2

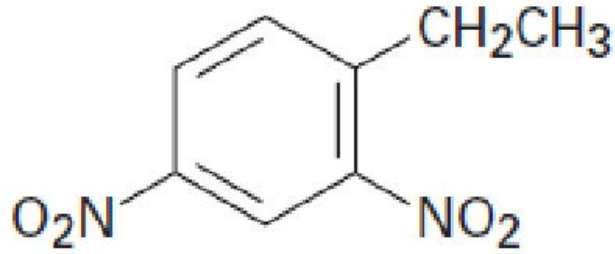
Give IUPAC names for the following compounds:

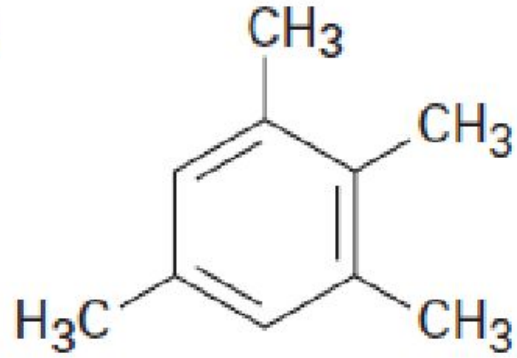
(a) 

(b) 

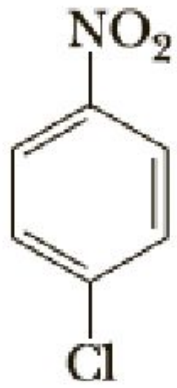
(c) 

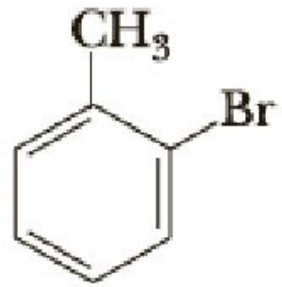
(d) 

(e) 

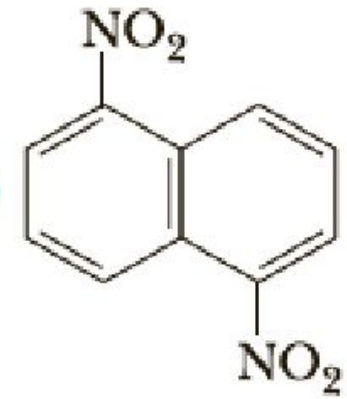
(f) 

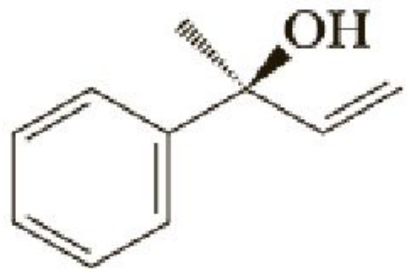
21.8 Name the following compounds and ions.

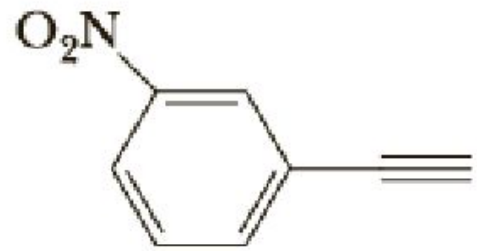
(a) 

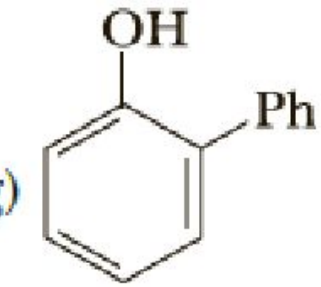
(b) 

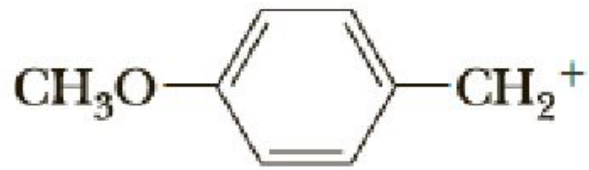
(c) 

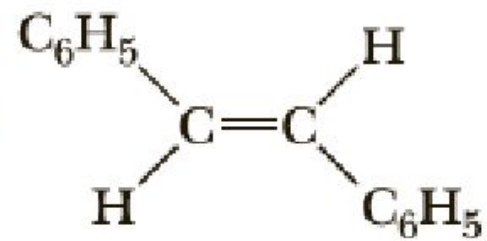
(d) 

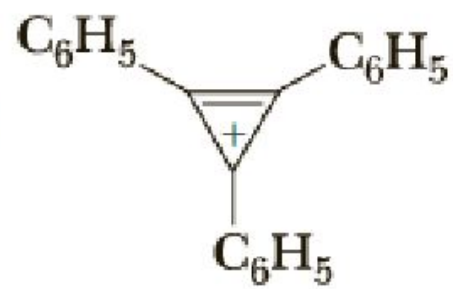
(e) 

(f) 

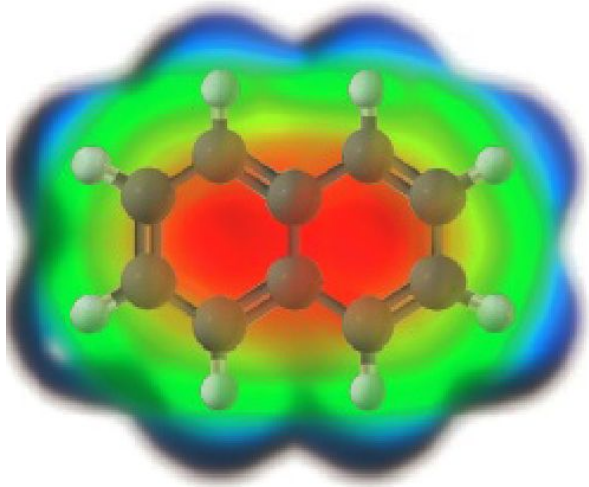
(g) 

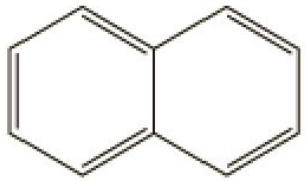
(h) 

(i) 

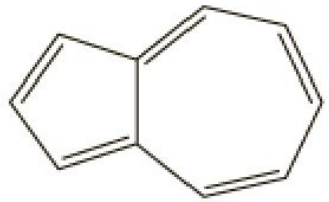
(j) 

Naphthalene and azulene are constitutional isomers of molecular formula $C_{10}H_8$.

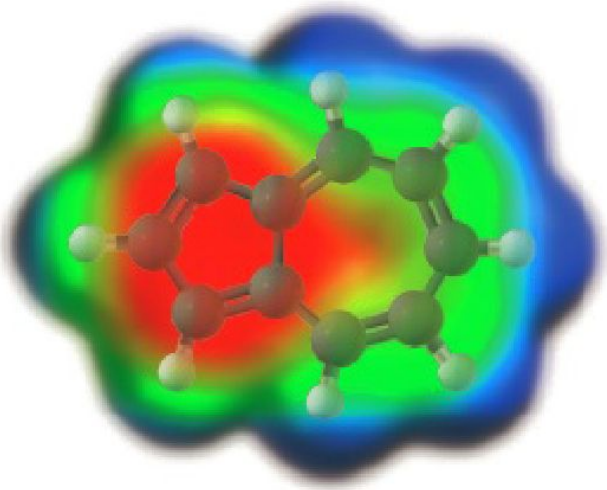




Napthalene

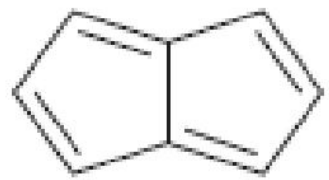


Azulene

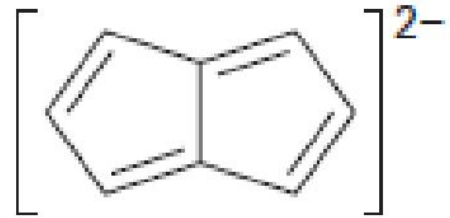


Naphthalene is a colorless solid with a dipole moment of zero. Azulene is a solid with an intense blue color and a dipole moment of 1.0 D. Account for the difference in dipole moments of these constitutional isomers.

15.36 Pentalene is a most elusive molecule that has been isolated only at liquid-nitrogen temperature. The pentalene dianion, however, is well known and quite stable. Explain.

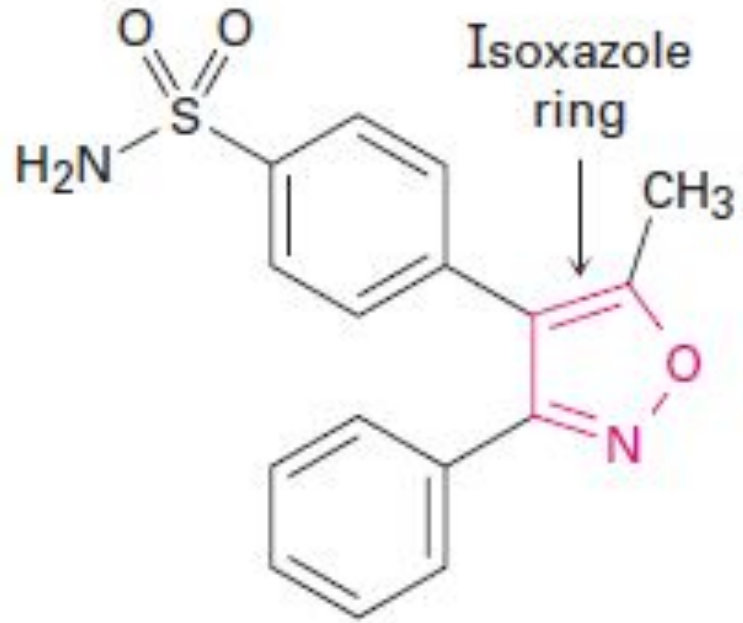


Pentalene



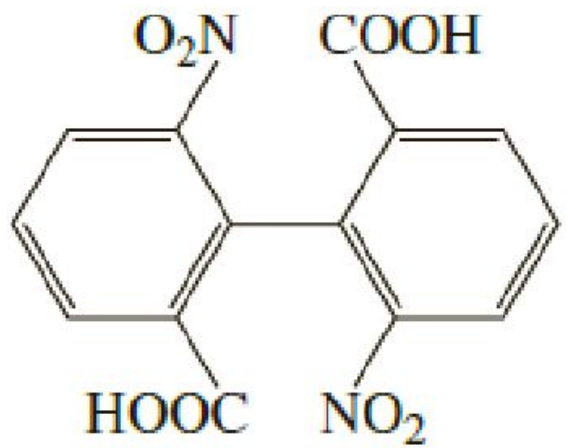
Pentalene dianion

Bextra, a COX-2 inhibitor used in the treatment of arthritis, contains an isoxazole ring. Why is the ring aromatic?



Bextra

Molecules of 6,6′-dinitrobiphenyl-2,2′-dicarboxylic acid have no tetrahedral chiral center, and yet they can be resolved to a pair of enantiomers. Account for this chirality.



6,6′-Dinitrobiphenyl-2,2′-dicarboxylic acid