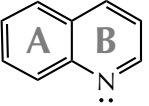
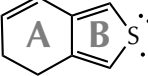
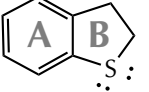
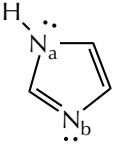


## PRACTICE QUESTIONS

10.01 The following molecules contain many different rings. One resonance contributor for each of these compounds is shown (as usual), but the entire set of significant resonance contributors is implied. Which rings are aromatic (AR), which rings are antiaromatic (AA), and which are nonaromatic (NA)? Decide whether the various nonbonding electron pairs are delocalized (DE), localized (LE), or one of each (OE; if more than one).

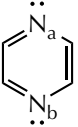

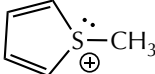
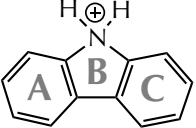
(a)  (b)  (c)  (d) 

ring A:   
ring B:   
N nbe:

ring A:   
ring B:   
S nbe:

ring A:   
ring B:   
S nbe:

ring:   
N<sub>a</sub> nbe:   
N<sub>b</sub> nbe:

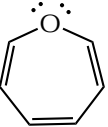
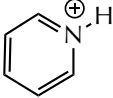
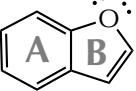

(e)  (f)  (g)  (h) 

ring:   
N<sub>a</sub> nbe:   
N<sub>b</sub> nbe:

ring:

ring:   
S nbe:

ring A:   
ring B:   
ring C:

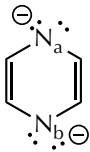
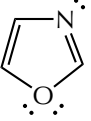
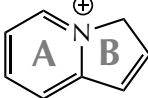
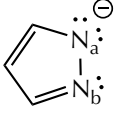
(i)  (j)  (k)  (l) 

ring:   
O nbe:

ring:

ring A:   
ring B:   
O nbe:

ring A:   
ring B:   
ring C:

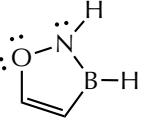

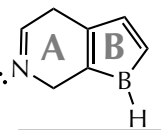
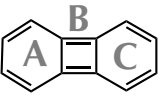
(m)  (n)  (o)  (p) 

ring:   
N<sub>a</sub> nbe:   
N<sub>b</sub> nbe:

ring:   
O nbe:   
N nbe:

ring A:   
ring B:

ring:   
N<sub>a</sub> nbe:   
N<sub>b</sub> nbe:

(q)  (r)  (s)  (t) 

ring:   
O nbe:   
N nbe:

ring A:   
ring B:   
ring C:

ring A:   
ring B:   
N nbe:

ring A:   
ring B:   
ring C: