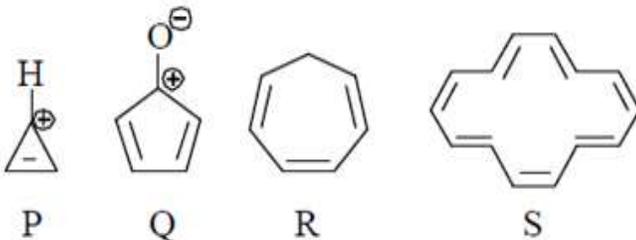


Important Questions On Aromaticity



Important Questions on Aromaticity

1. The compounds that are aromatic among the following are?



- A. R and S
B. P and Q
C. Q and S
D. P and S

2. Arrange the Benzene, Anthracene and Naphthalene in increasing order of Aromaticity.

- A. Benzene > Anthracene > Naphthalene
B. Benzene > Naphthalene > Anthracene
C. Anthracene > Naphthalene > Benzene
D. Naphthalene > Anthracene > Benzene

3. Which one is the aromatic molecule in the following?



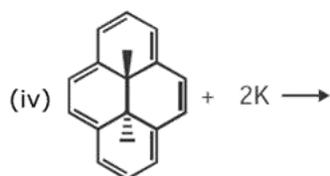
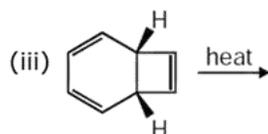
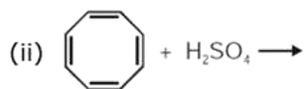
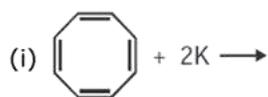
4. The given compound is non-aromatic because-



- A. It does not have delocalization of π -electrons.
B. It has maximum angle strain.
C. It does not follow $4n+2$ Huckel rule.
D. The molecule is not planar.

5. Correct match for the products of the reactions in Column A with the properties in Column B is

Column A



Column B

P. aromatic

Q. antiaromatic

R. non-aromatic

S. homoaromatic

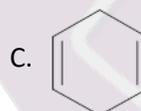
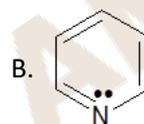
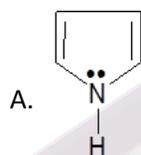
A. i-P, ii-S, iii-R, iv-Q

C. i-Q, ii-R, iii-S, iv-P

B. i-P, ii-R, iii-Q, iv-S

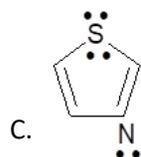
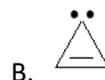
D. i-S, ii-Q, iii-R, iv-P

6. From the options given below, aromatic compound is:



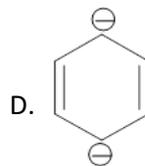
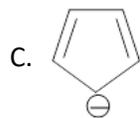
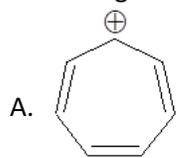
D. Both (A) and (B)

7. Which of the following compound(s) is/are aromatic?

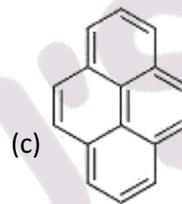
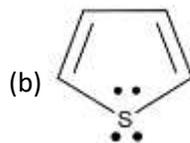
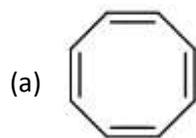


D. All of these

8. According to simple Huckel theory, select the compound which is not aromatic.



9. Identify the following as Aromatic, non-Aromatic and Anti aromatic.



- A. (a)- Anti aromatic, (b)- non-aromatic, (c)- non-aromatic
B. (a)- Anti aromatic, (b)- aromatic, (c)- aromatic
C. (a)- non-aromatic, (b)- aromatic, (c)- aromatic
D. (a)- Non-aromatic, (b)- anti aromatic, (c)- anti aromatic

10. The correct statement about following species is



- A. Both A and B are aromatic
B. A is aromatic and B is antiaromatic
C. A is non-aromatic and B is antiaromatic
D. A is aromatic and B is homoaromatic

Answers

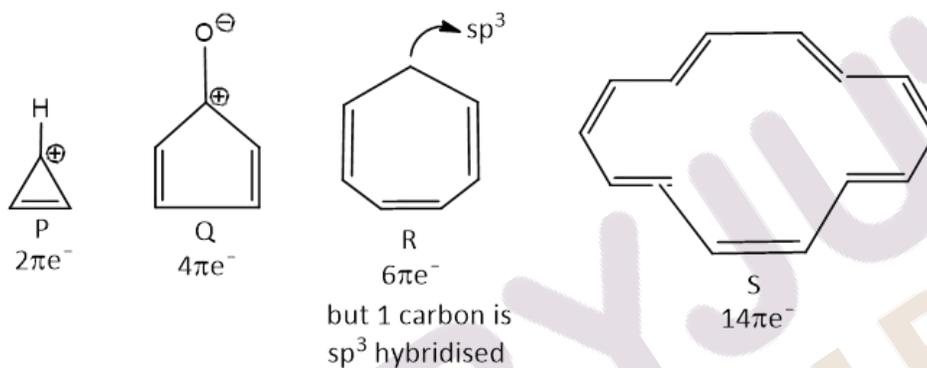
- | | | | | | | |
|------|------|-------|------|------|------|------|
| 1. D | 2. B | 3. B | 4. D | 5. A | 6. D | 7. C |
| 8. B | 9. C | 10. B | | | | |

Solutions

Solution 01:

For a compound to be aromatic, it must follow Huckel Rule, that the compound must have $(4n+2)\pi$ electrons.

It should be sp^2 hybridized, planar, cyclic.

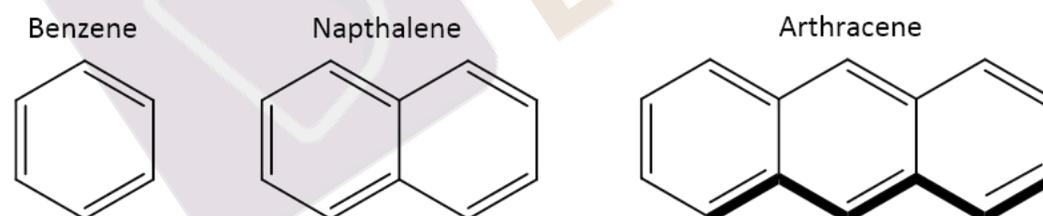


Compound P, S follow Huckel rule completely. Therefore, they are aromatic in nature.
Correct answer is D.

Solution 02:

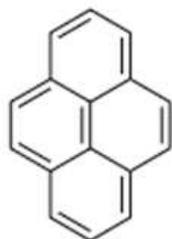
Aromaticity order is arranged based on the resonance energy per ring.

On increasing the ring size, electron density per ring decreases Therefore, aromaticity decreases.



Solution 03:

In compound B,



There are 16 pi-electrons out of which only 14 pi-electrons are the part of conjugation. Thus, following the Huckel-rule of $(4n+2)$ pi-electrons; the electrons of the pi-bond in the middle of the ring do not participate in the resonance.

Solution 04:

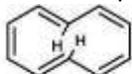
The structure given is of cyclodecapentaene.

It is cyclic.

It is conjugated.

It has $4n+2=10 \pi$ electrons

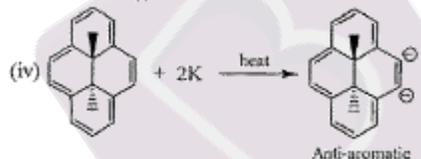
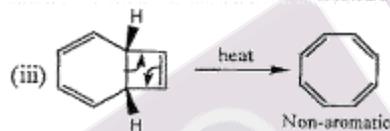
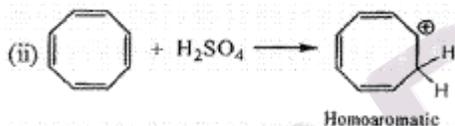
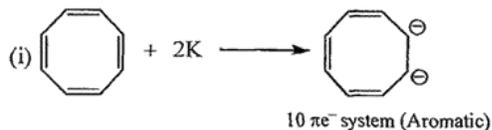
But it is not planar and so, non-aromatic. Because the H's crowd distorts out of plane.



Cyclodecapentaene

Not planar
(non-aromatic)

Solution 05:



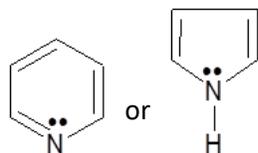
In the first option, we get an aromatic molecule with 10 pi electrons

The second option forms a homoaromatic system.

The third option gives a non -aromatic system as there is no conjugation.

The fourth option is forming an anti-aromatic compound.

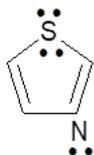
Solution 06:



Both above compounds are aromatic because in pyridine, lone pair of nitrogen is not used in delocalization while in pyrrole lone pair on nitrogen is used in delocalization.

Solution 07:

Molecule given in option C has aromatic sextet and involves a lone pair of S atom in aromaticity.



Solution 08:

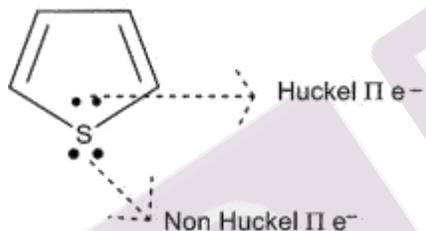
A compound given in option D has eight delocalized π -electrons. Hence, it is anti-aromatic in nature.

Solution 09:

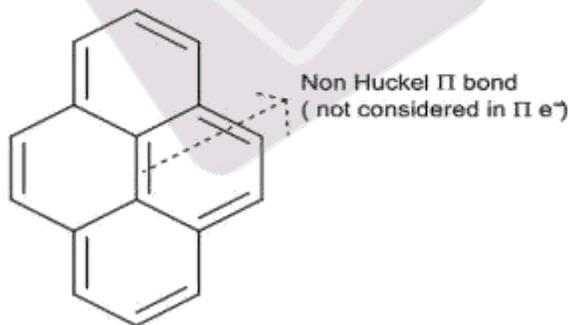
(a) It has non-planar structure. All cyclic, completely conjugated but non-planar compounds having $(4n+2)\pi$ electrons and $4n\pi$ electrons are Non-Aromatic.



(b) It has cyclic planar structure having complete conjugation. Also 6π electrons are participating in conjugation. Hence it shows presence of delocalized $(4n + 2)\pi$ electrons. So, it is Aromatic.



C. Due to the presence of Non Huckel π bond, total number of π electrons = 14π electrons. Also, it is cyclic, planar having complete conjugation and delocalized $(4n + 2)\pi$ e⁻. So, it is AROMATIC.



Solution 10:



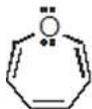
A

It is a cyclic, planar, conjugated system. Now apply Huckel rule:

$$4n+2=6$$

$$n=1$$

So, it is aromatic.



B

It is a cyclic, planar, conjugated system.

$$4n+2=8$$

$$n=3/2$$

It does not follow Huckel rule, so it is anti-aromatic.

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