

## Aromatic Compounds Chemistry Questions with Solutions

**Q1. Choose the correct statement related to aromatic hydrocarbon?**

- a.) It has only sigma bonds
- b.) It has only pi bonds
- c.) It has a sigma and two pi bonds
- d.) It has a sigma and delocalized pi bond

**Correct Answer–** (d.) It has a sigma and delocalized pi bond

**Q2. Aromatic compounds should have a  $\pi$ - electron cloud containing electrons. What cannot be the value of n?**

- a.) 2
- b.) 3
- c.)  $\frac{1}{2}$
- d.) 4

**Correct Answer–** (c.)  $\frac{1}{2}$ .

**Explanation–** Huckel's rule states that only planar, fully conjugated monocyclic polyenes having  $4n + 2$   $\pi$  electrons, where n is an integer, that is,  $n = 0, 1, 2, 3, 4$ , etc., should possess aromatic stability.

**Q3. Out of the given options which one is aromatic?**

- a.) Cyclopentadienyl cation
- b.) Cyclooctatetraene
- c.) Cycloheptatriene
- d.) Cycloheptatrienyl cation

**Correct Answer–** (d.) Cycloheptatrienyl cation

**Explanation–** Since it has 6 electrons in its pi system, the cycloheptatrienyl (tropylium) cation is aromatic. It has a conjugated system, is planar, and is cyclic.

**Q4. Out of the given options, which of the following is not aromatic?**

- a.) Benzene
- b.) Cyclopentadienyl cation
- c.) Cyclo-octatetraenyl dianion
- d.) Tropyllium cation

**Correct Answer–** (b.) Cyclopentadienyl cation.



**Explanation–** Cyclopentadienyl cation does not follow Huckel's Rule.

**Q5. Aromatic hydrocarbons are–**

- a.) saturated
- b.) unsaturated
- c.) Both (a.) and (b.)
- d.) None of the above

**Correct Answer–** (b.) unsaturated

**Q6. State True or False.**

**Arenes are polar in nature.**

**Answer.** False.

Arenes are insoluble in water, which concludes that they are non-polar compounds.

**Q7. Fill in the blank.**

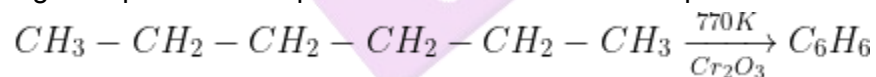
**Aromatic hydrocarbon compounds containing benzene ring are known as \_\_\_\_.**

**Answer.** Aromatic hydrocarbon compounds containing benzene ring are known as benzenoids.

**Q8. What is aromatization? How will you convert n-hexane into benzene?**

**Answer.** Aromatization is the process of converting alkanes with six or more carbon atoms into aromatic hydrocarbons that involves cyclization, isomerization, and dehydrogenation with the use of heat and a catalyst.

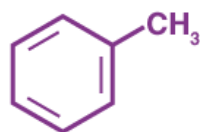
When n-hexane undergoes pyrolysis in presence of vanadium or chromium oxide as a catalyst and at high temperature and pressure forms benzene as a product.



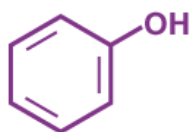
**Q9. Give some examples of aromatic compounds**

**Answer.** Some examples of aromatic compounds are as follows-

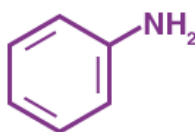




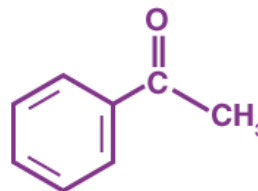
Toluene



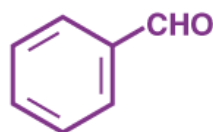
Phenol



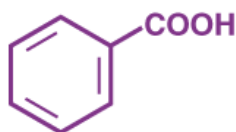
Aniline



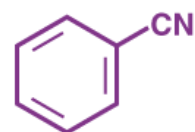
Acetophenone



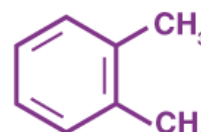
Benzaldehyde



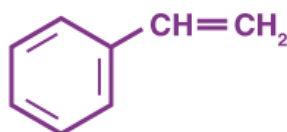
Benzoic acid



Benzonitrile



Ortho-xylene



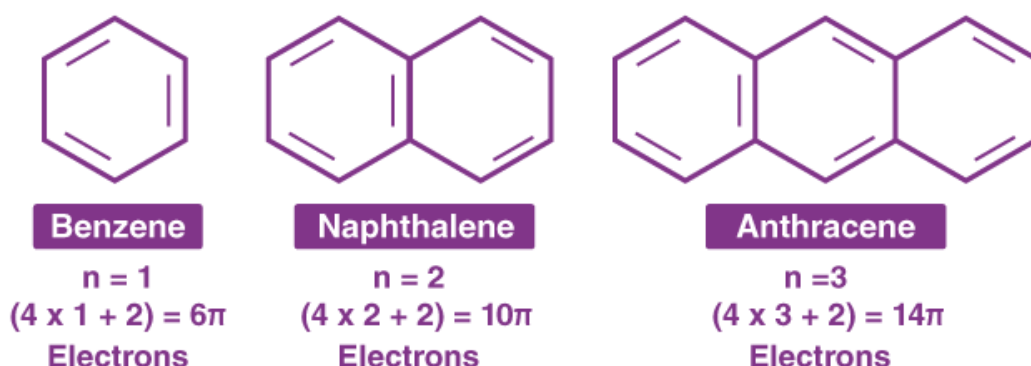
Styrene

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#### Q10. Explain the Huckel's Rule of Aromaticity.

**Answer.** Huckel's rule states that only planar, fully conjugated monocyclic polyenes having  $4n + 2 \pi$  electrons, where  $n$  is an integer, that is,  $n = 0, 1, 2, 3, 4$ , etc., should possess the aromatic stability. An aromatic compound must be planar and contain a cyclic cloud of  $\pi$  electrons below and above the plane of the molecule. It contains  $sp^2$  hybridized carbon atoms and must obey the Huckel rule. According to this rule, the ring system must have  $(4n+2) \pi$  electrons, where  $n$  is any whole number (0, 1, 2, 3, etc). On this basis the ring systems which have  $2(n=0)$ ,  $6(n=1)$ ,  $10(n=2)$ ,  $14(n=3)$  etc  $\pi$  electrons are aromatic. Typical examples of aromatic compounds are benzene, naphthalene, and anthracene.





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**Q11. What is the significance of aromatic hydrocarbons?**

**Answer.** Aromatic hydrocarbons are commonly used as a non-polar solvent for other molecules. As a result, aromatic hydrocarbons can be used as additives in gasoline, paints, lacquers, and other products. Their low reactivity also helps them to be used as a solvent.

**Q12. State the properties of Aromatic compounds.**

**Answer.** The properties of Aromatic compounds are as follows-

- Arenes are mostly nonpolar and non-miscible in water.
- These compounds are usually unreactive and are used as solvents for various other nonpolar compounds.
- Their carbon to hydrogen ratio is high.
- They are characterized by sooty yellow flame.

**Q13. What is the aromatic effect?**

**Answer.** An aromatic ring current is a phenomenon seen in aromatic molecules like benzene and naphthalene. A ring current is induced in the aromatic ring's delocalized electrons when a magnetic field is directed perpendicular to the plane of the aromatic system.

**Q14. Give the difference between Aromatic and Aliphatic Compounds.**

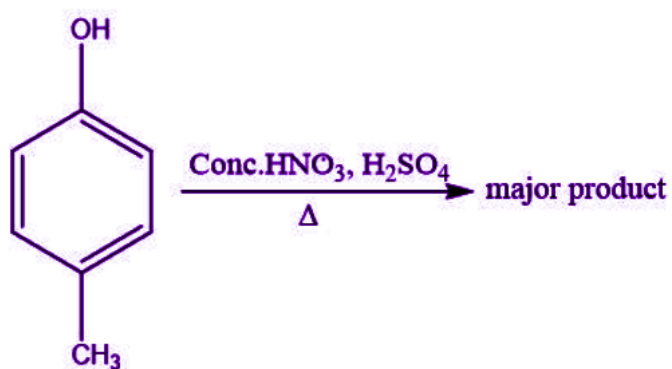
**Answer.** Following is the table explaining the difference between aromatic and aliphatic compounds:

Parameter	Aromatic compounds	Aliphatic compounds
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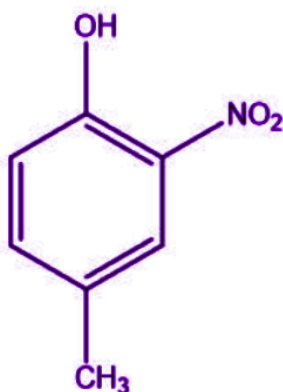
<b>Structure</b>	The linking of carbon compounds takes place in the ring structure with the help of conjugated pi electrons.	The linking of carbon compounds takes place in a straight line manner.
<b>Flame test</b>	A sooty flame is produced when burnt.	A sooty flame is not produced when burnt.
<b>Odour</b>	Pleasant odour.	Unpleasant odour.
<b>Example</b>	Benzene and naphthalene.	Butane and propane.

**Q15. Predict the major product for the following aromatic substitution reaction.**



**Answer.** The major product for the substitution reaction is-





## Practise Questions on Aromatic Compounds

**Q1. Choose the incorrect statement–**

- a.) The aromatic hydrocarbon has a pleasant smell.
- b.) Some of the aromatic compounds are ring-shaped.
- c.) Aromatic hydrocarbon can be either mono or polycyclic.
- d.) Benzene is the simplest hydrocarbon.

**Correct Answer–** (b.) Some of the aromatic compounds are ring-shaped.

**Explanation–** All aromatic hydrocarbons are ring-shaped.

**Q2. An aromatic compound must consist of-**

- a.) Cyclic molecule
- b.) A planar structure
- c.) A delocalized  $\pi$  electron cloud
- d.) All of the above

**Correct Answer–** (d.) All of the above

**Q3. State True or False.**

**Benzene has a stronger Vander-Waal's force than methylbenzene.**

**Answer.** False.

Since the benzene molecule is smaller than that of methylbenzene, its Vander-Waal forces are not equal to those of methylbenzene.



**Q4. How is the aromaticity of a compound judged?**

**Answer.** The aromaticity of a compound is determined by the following characteristics:

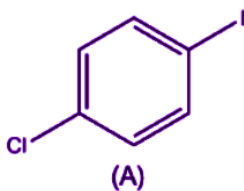
Planarity

- The  $\pi$ -electrons in the ring have been completely delocalized.
- The presence of  $(4n+2)$  electrons in a ring, where  $n$  is an integer ( $n=0, 1, 2, \dots$ ).
- This is known as the Huckel Rule.

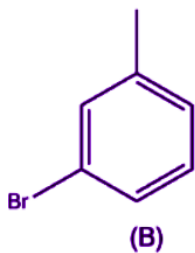
**Q5. Draw the following structures-**

- (A) p-chloriodobenzene  
(B) m-bromotoluene  
(C) p-chloroaniline  
(D) 1,3,5-trimethyl benzene

**Answer.** (A) p-chloriodobenzene



(B) m-bromotoluene



(C) p-chloroaniline





(D) 1,3,5-trimethyl benzene

