CBSE TEST PAPER 10

CLASS XI CHEMISTRY

(Hydrocarbons)

General Instruction:

- All questions are compulsory.
- Marks are given alongwith their questions.

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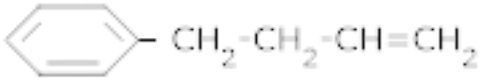
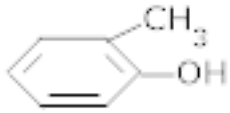
1. What are benzenoids? [1]
2. Write the IUPAC name of the following compound- [2]

(i) 

(ii) 

3. What do you mean by delocalization? [2]
4. What do you understated by Resonance energy? [2]
5. Although benzene is highly unsaturated; it does not undergo addition reactions. Give reason. [1]
6. How is aromaticity of a compound judged? [2]
7. Give some examples of aromatic compounds. [2]
8. How will you account for the structure of benzene? [1]

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[ANSWERS]

Ans 01. Aromatic hydrocarbon compound containing benzene ring are known as benzenoids.

Ans 02. (i) 4 – phenyl – but – 1 – ene.

(ii) 2 – Methyl phenol.

Ans 03. Delocalisation – it is a stabilising phenomenon which refers to the organic branch of chemistry and it implies to resonance in conjugated systems and aromatic compounds.

Ans 04. The difference between the energy of the most stable contributing structure and the energy of the resonance hybrid is known as resonance energy. In case of benzene, the resonance hybrid has (147KJ/mol^{-1}) less energy than either A to B. Thus resonance energy of benzene is 147KJ/mole.

Ans 05. Unlike olefins, π-electrons of benzene are delocalized (resonance) and hence these are unreactive towards addition reactions.

Ans 06. The following characteristics decides aromaticity of a compound-:

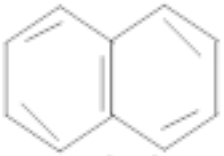
(i) Plane and polarity.

(ii) Complete delocalization of the π-electrons in the ring.

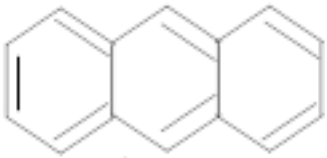
(iii) Presence of (4n+2) π electrons in the ring where n is an integer (n=0, 1, 2 ----)

This is often referred to as Huckel Rule.

Ans 07.

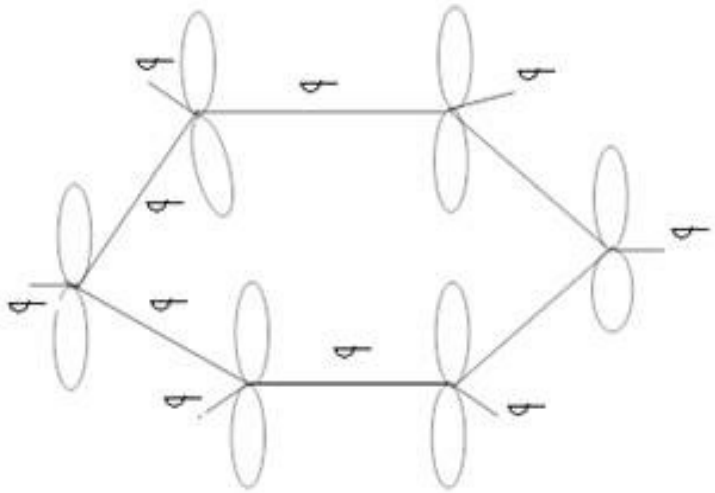


Napthalene



Anthracene

Ans 08. All the six carbon atoms in benzene are sp2 hydridised. Two sp2 hydrid orbitals of each carbon atom overlap with sp2 hydrid orbitals of adjacent carbon atoms to form six C-C sigma bonds with are in the hexagonal plane. The remaining sp2 hybrid orbital of each carbon atom overlaps with s-orbital of a hydrogen atom to form six C-H sigma bonds. Each carbon atom is now left with one hybridized p-orbital perpendicular to the plane of the ring.



The unhybridized p-orbital of C-atoms are close enough to form a π bond by lateral overlap.