Cha. 4 Aromatic Compounds

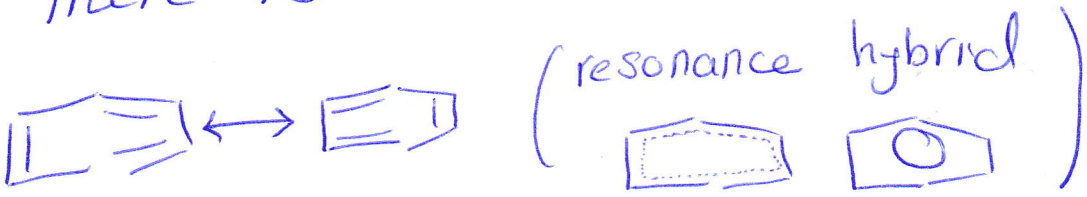
* Introduction

① They are stable molecules. Benzene is an example of aromatic compounds.

② Benzene (C_6H_6) 

There is no equilibrium. (kekulé structures)

rather there is a resonance relationship.



Bond length of C–C is an intermediate between single bond and double bond.

③ Three π bonds (6 π electrons) are moved <u>above</u> and <u>below</u> the ring plane (benzene ring is planar since each carbon is sp^2 hybridized).

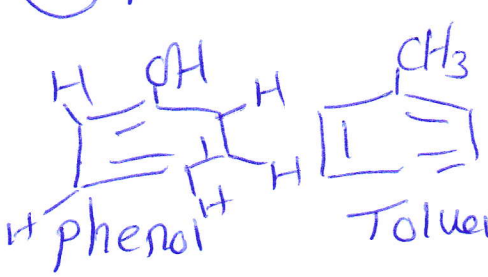
<u>Remember:</u> π-bond is produced from side by side overlap among P-orbitals (⊥ on the plane).

④ Benzene (aromatic Compounds) has an extra stabilization energy due to the resonance structures.

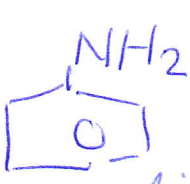
⑤ Benzene is Not an alkenes.

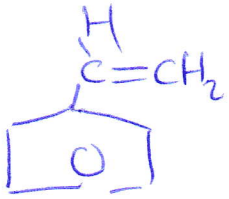
* Nomenclature of aromatic compounds:

Ⓐ Monosubstituted:-


phenol

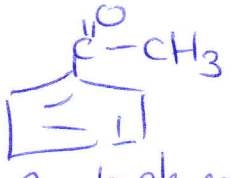
Toluene

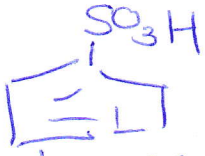

aniline

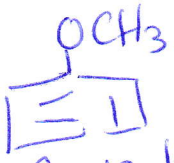

styrene

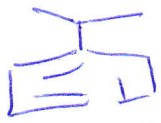

benzoic acid


benzaldehyde


Acetophenone

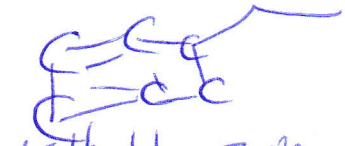

benzenesulfonic acid


Anisole


Cumene

These names are Common names.

others have no Common names:


Ethylbenzene

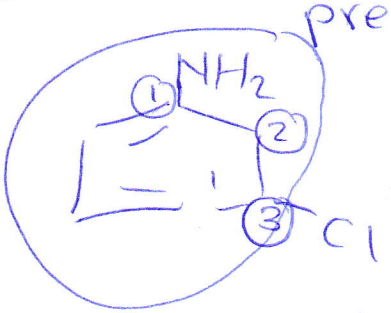

nitrobenzene


chlorobenzene

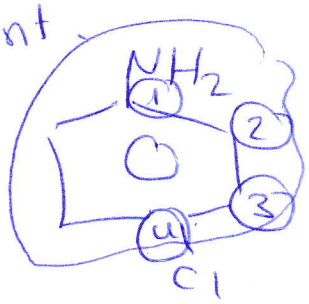

propyl benzene

(B) Disubstituted: (1) select common name if present

2-Chloroaniline

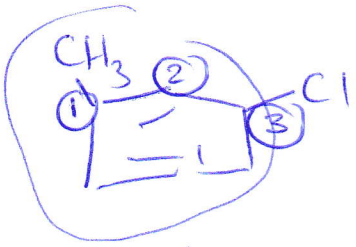


3-Chloroaniline

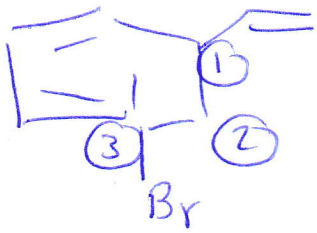


4-Chloroaniline

(2) Give a second substituent a lower number:



3-Chlorotoluene



3-Bromostyrene

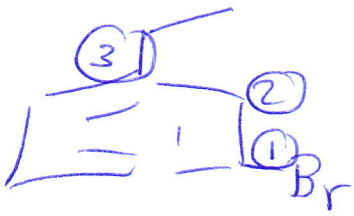
* Notes: * Don't give numbers for Carbons outside and carbon inside the ring.

* You Can use: ortho (o-), meta (m-), Para (p-) for ONLY 2 substituents on the same molecule (benzene).

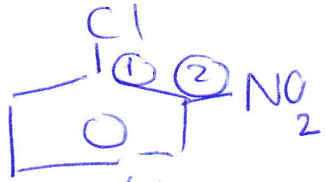
O - (1,2- Di substituents), meta (1,3), Para (1,4).

If Common name is not present:

* Use Alphabetical orders of substituents Then give a second substituent a lower number:



1-Bromo-3-ethyl benzene
(m-Bromoethylbenzene).

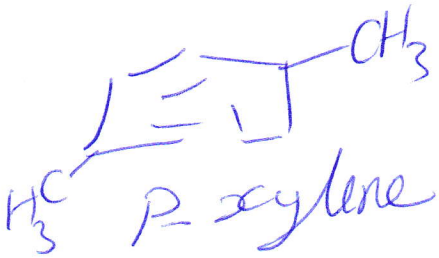


1-Chloro-2-nitro benzene.

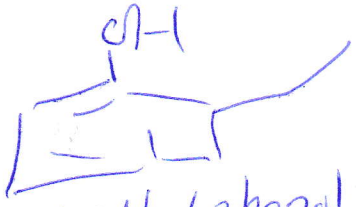
General Examples:

1,3-Dimethyl benzene
m-xylene (Common name)

m-Bromochloro benzene
(1-Bromo-3-Chloro benzene).



p-xylene

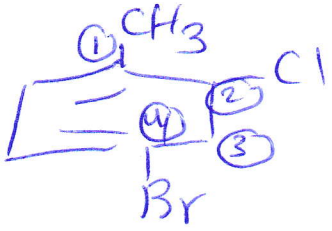


o-Ethylphenol

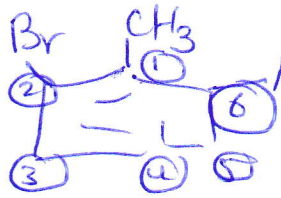
o-, m-, p- are used ONLY for 2 substituents and should be attached to benzene ring (not cyclohexane).

© 3 or more substituents:

Select common name, if present then give substituents lower numbers.

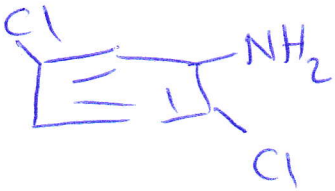


4-Bromo-2-Chlorotoluene

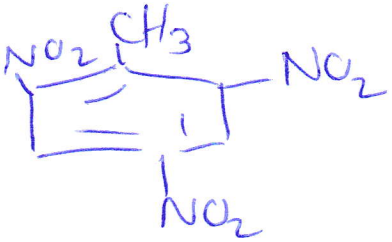


numbering is based on alphabetical.

2-Bromo-6-Nitrotoluene

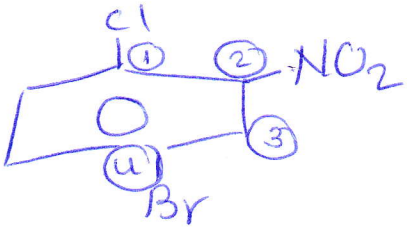


2,5-Dichloroaniline

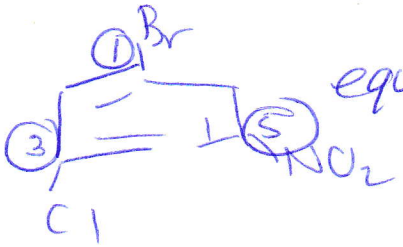


2,4,6-Trinitrotoluene

If common name is not present, give substituents the lowest numbers.

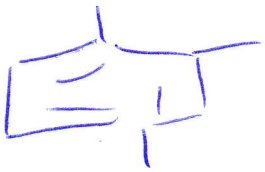


4-Bromo-1-Chloro-2-nitrobenzene (based on alphabetical)



equidistant (1,3,5) ⟹ numbering is based on alphabetical order.

1-Bromo-3-Chloro-5-nitrobenzene



1,2,4-Trimethylbenzene

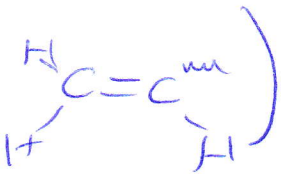
Notes:

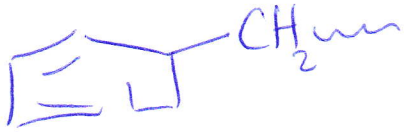
① 
C_6H_5 as substituent is called: phenyl

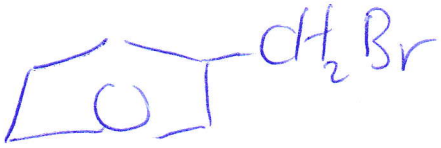
3-phenylhexane

phenyl chloride as common name

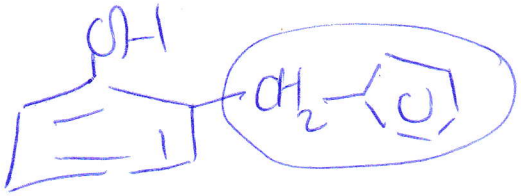
2-Bromo-4-phenylpentane

(Remember: Vinyl )

②  is called: benzyl



benzyl bromide (common name)



o-benzylphenol

benzyl alcohol