* Woodward-Fieser Rules for calculating $\lambda_{max}$ in conjugated dienes, trienes and polyenes-

CONJUGATED DIENES- alternative double bonds

Types: i) Acyclic conjugated diene-

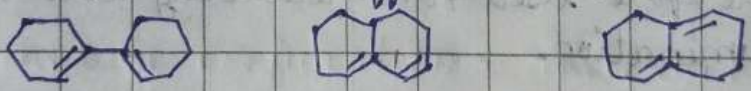
(Parent value- 215 nm)

ii) Homoannular diene- cyclic diene having conjugated double bond in the same ring.

eg: 

(Parent value- 253 nm)

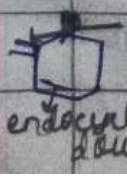
iii) Heteroannular diene-
cyclic diene in which double bonds in conjugation are present in different rings.



(Parent value- 215 nm)

iv) Endocyclic double bond-
It is a double bond present in a ring. 

v) Exocyclic double bond- It is a double bond in which one of the doubly bonded atoms is a part of ring system. eg:  (Parent value- 5 nm)





Ring A → 1 endocyclic + 1 exocyclic

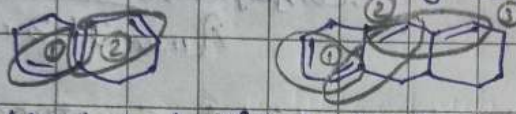
Ring B → 1 endocyclic

According to these rules, each type of diene / triene system is having a certain fixed value at which absorption takes place, known as basic / parent value.

Thus $\lambda_{max}$ for a particular compound.

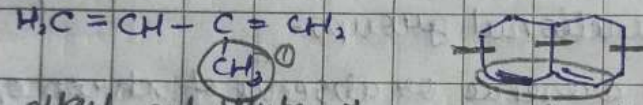
Parent value + alkyl substituents or ring residues contribution + double bond extending conjugation + polar groups (-Cl, Br, -OR)

- Double bond extending conjugation -



Value = +30 nm

- Alkyl substitute / Ring residue -

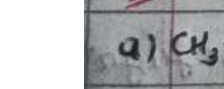


alkyl substitute = 1 ring residue = 3

Value for each ring residue / alkyl substitute = +5 nm

| Auxochromes | value |
|---|---|
| -OR | 6 nm |
| -SR | 30 nm |
| -Cl, -Br | 5 nm |
| $-NR_2$ | 60 nm |
| $-OCOCH_3$ | 0 nm |

- Examples :

a) 

Parent value for homoannular diene = 253 nm
Two alkyl substituents = 2 × 5 = 10 nm
Two ring residues = 2 × 5 = 10 nm
$\lambda_{max}$ = 273 nm

b) 

Parent value for heteroannular diene = 215 nm
Four ring residues = 20 nm (4 × 5)
$\lambda_{max}$ = 235 nm