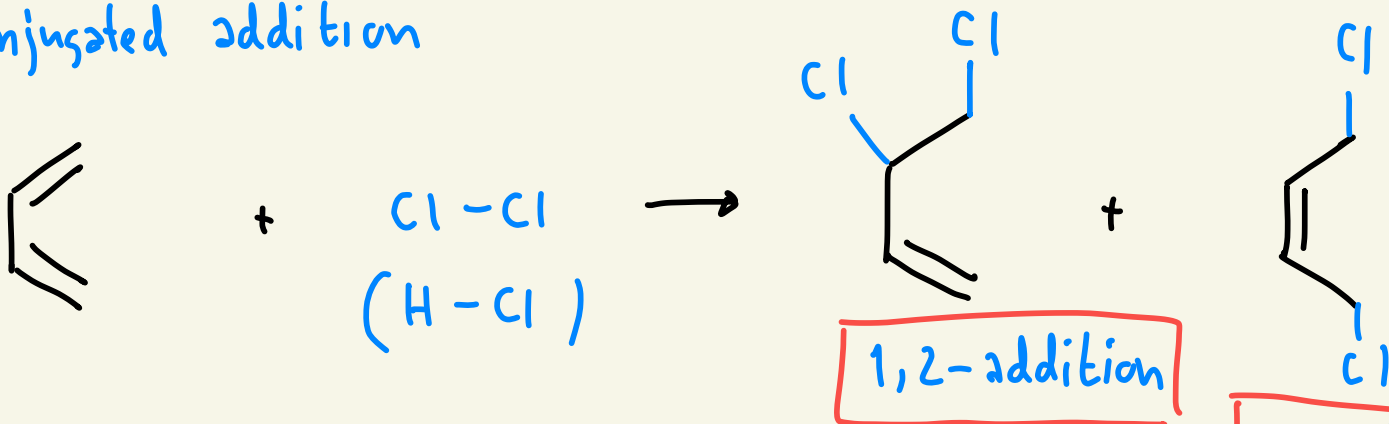


Conjugated diene

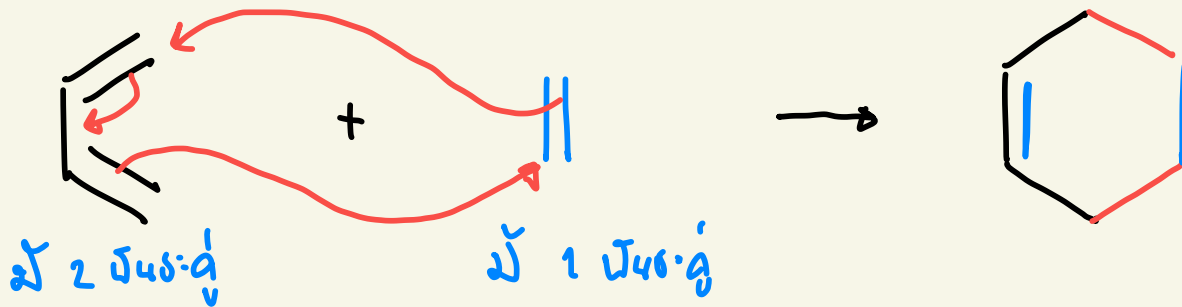
Quiz

① Conjugated addition



Quiz

② Diels-Alder reaction → Cycloaddition

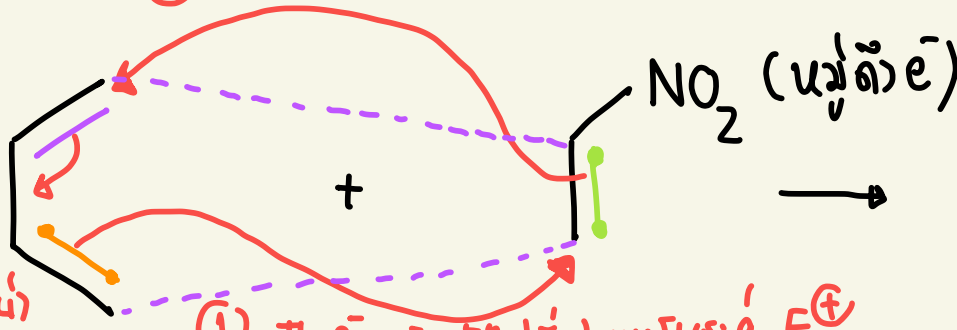


Diels-Alder reaction

1950

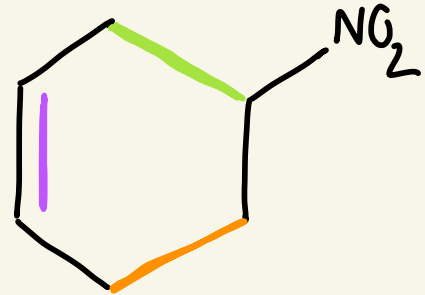
② $\pi-e^-$ dienophile เป็นตัวรับของ diene

③ เป็น diene
ตัวรับ

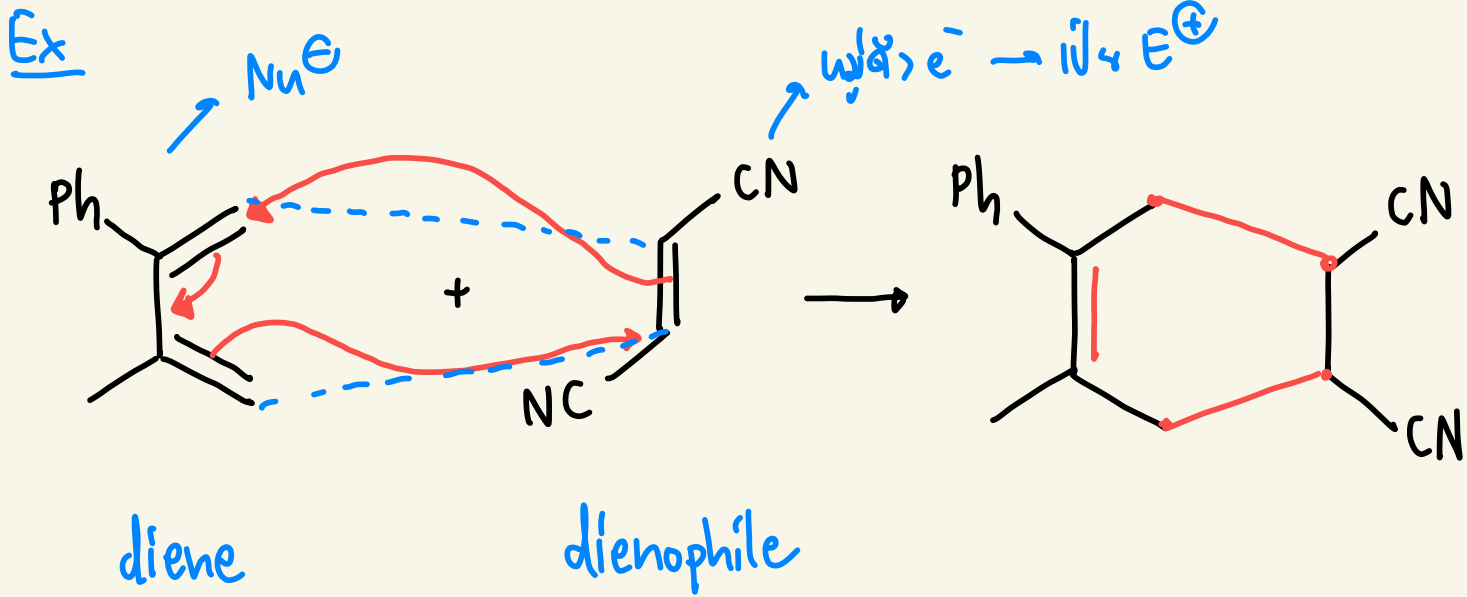


Nucleophile
(-)

Electrophile
(+)



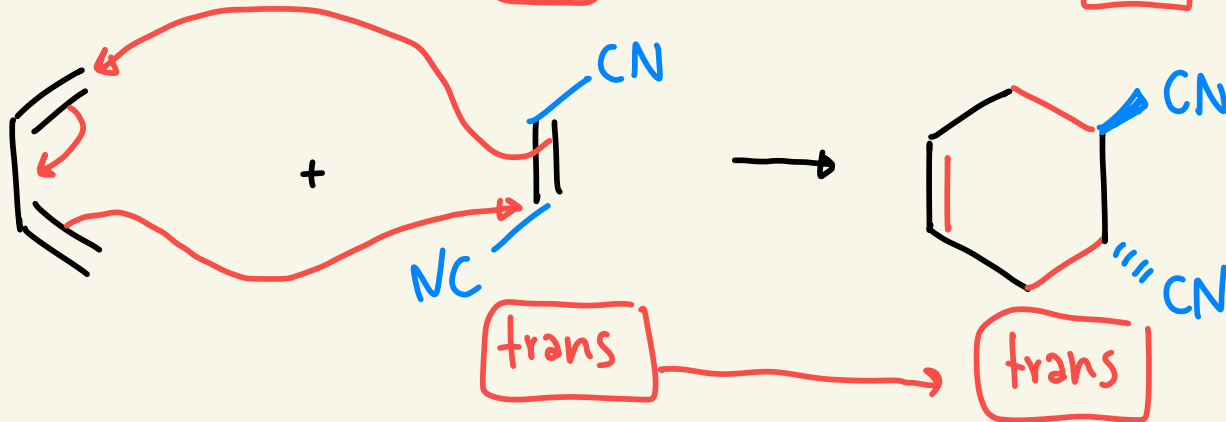
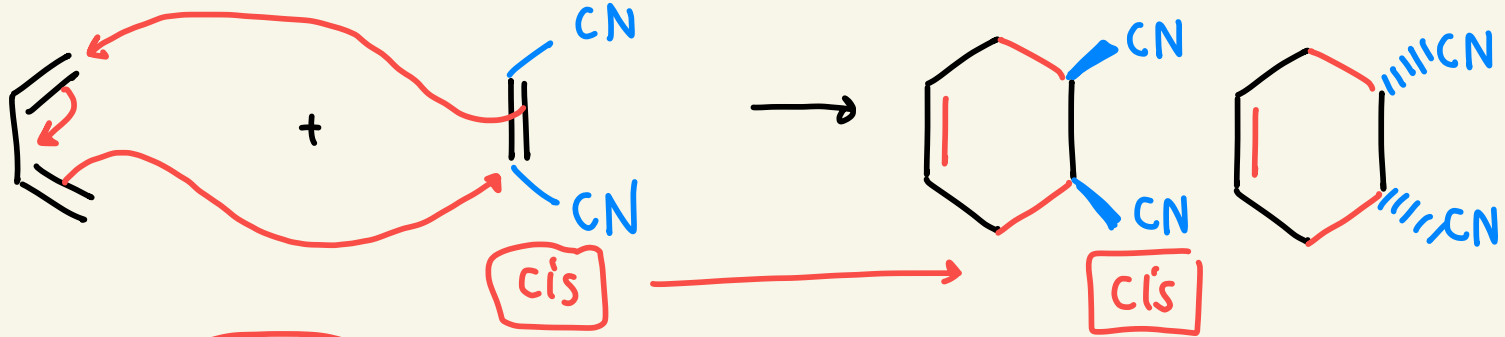
2) 6 1,3-cyclohexene
cyclohexene

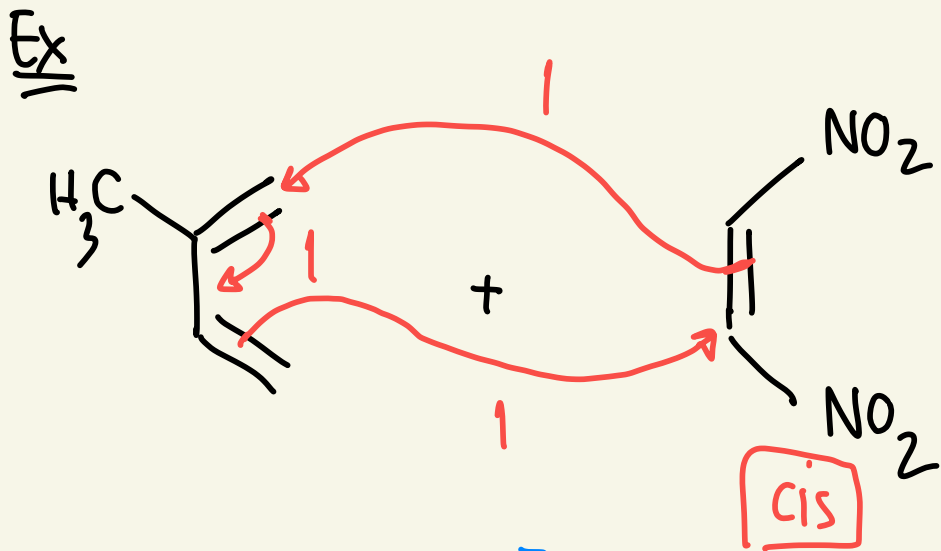


* Nu^- $\rightarrow$ Nu^+

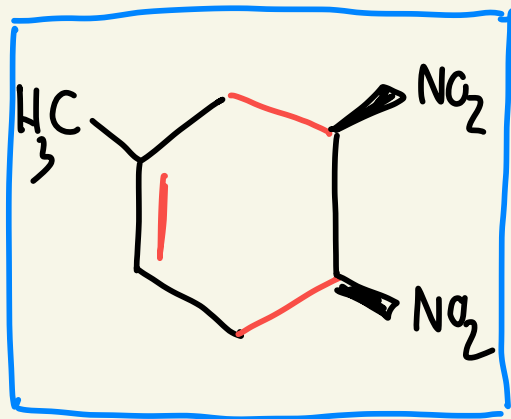
Rule of DA

① สารตั้งต้น + Product ถูกกำหนดด้วย สารตั้งต้น (dienophile)



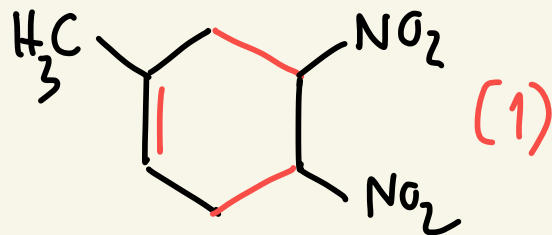


① Mechanism (3)



② Product (2)

③ Stereochem? all cis (1)



(1)

② Dienophile (ดีไฟล์) ตัวที่มี ดึงอิเล็กตรอน e^- (Electron Withdrawing Group) (EWG)

↓
ตัวทำให้เป็น electrophile

① CH3-CH=CH2
ไม่มี e^-
(X)

② C#N-CH=CH2
(✓) ไดอิลีน

③ C=O-CH=CH2
(✓) ดีคาร์บอโนล

④ [O-][N+](=O)-CH=CH2
(✓) ดีไนโตร

⑤ CC(=O)-CH=CH2
(✓) ดีคีโตน

⑥ H2C=CH2
(X)

⑦ c1ccccc1C=O
(X) ไม่มี e^-

⑧ O=C1C=CC(=O)CC1
(✓) ดีควาโดรอน

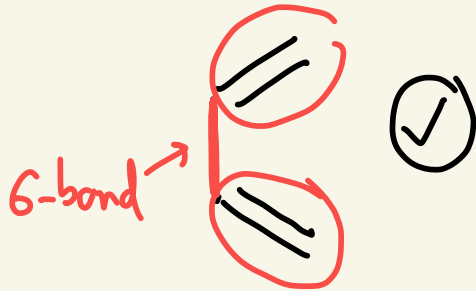
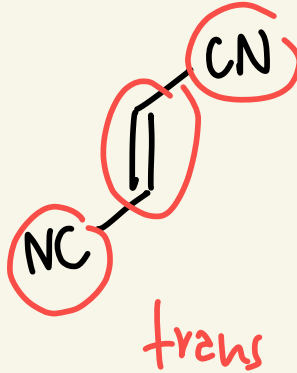
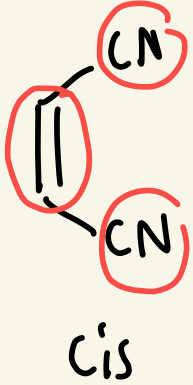
⑨ O=C1OC(=O)C=CC1
(✓) ไดอิลีน

⑩ ClC(=O)-CH=CH2
(✓) ดีคีโตน

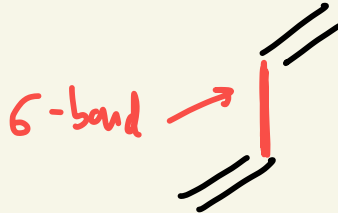
Red arrows and notes show resonance structures for ⑦ and ⑧, indicating electron withdrawal from the diene system.

③ Diene (๔ 2 ⇒) ที่ให้ DA ได้ดี → s-cis

↓
sigma (σ-bond)
พหุ:เดี่ยว

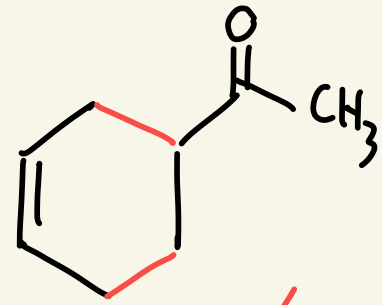
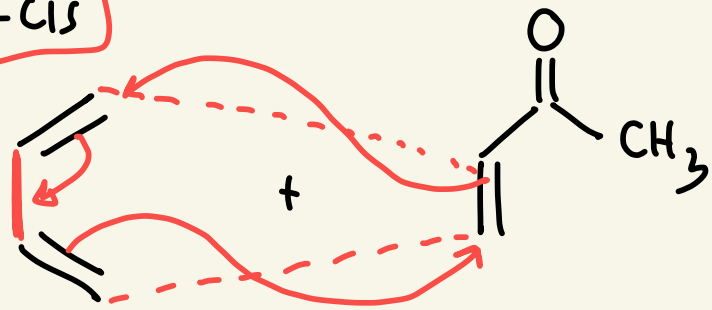


s-cis — พหุ:เดี่ยว อยู่ด้านเดียวกัน



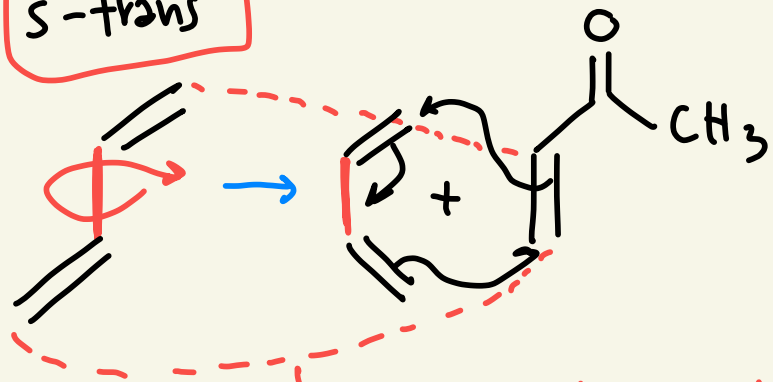
s-trans — พหุ:เดี่ยว อยู่ด้านตรงกันข้าม

s-cis

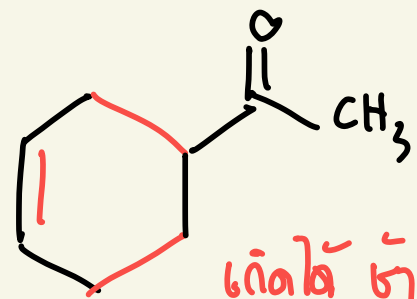


เกิดเร็ว ๑

s-trans



ไม่ได้

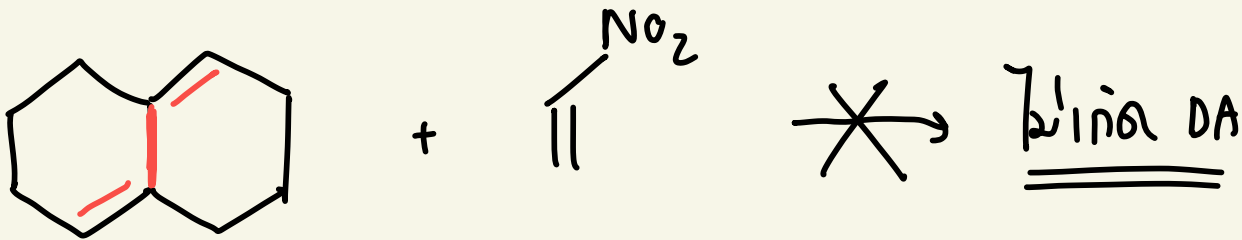


เกิดช้า ๒ เท่า

↓ พื้นที่ของ dienophile > s-cis → เกิดปฏิกิริยา
ยากกว่า

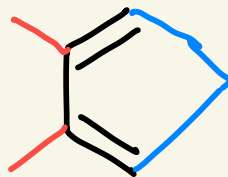
S-trans $\text{antialigned} \rightarrow \text{aligned DA}$

184

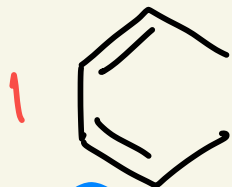


S-trans $\text{aligned} \rightarrow \text{antialigned}$

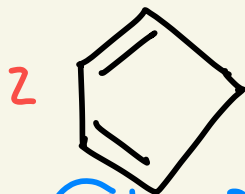
Diene ตัวไหนดี DA 6



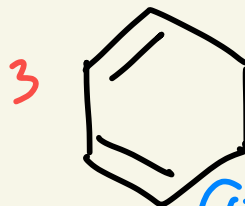
strongly unstable



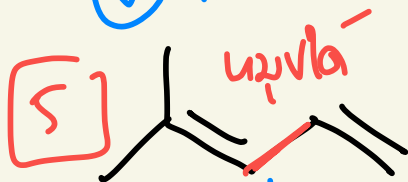
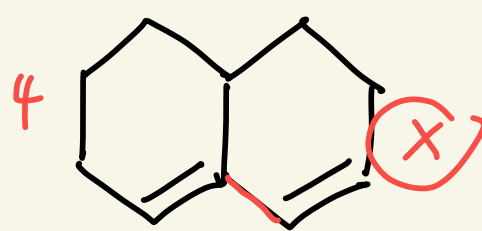
✓ ไม่รุนแรง



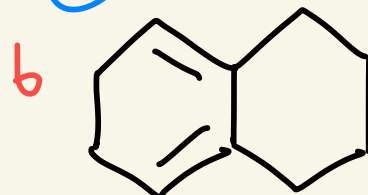
✓ หนัก



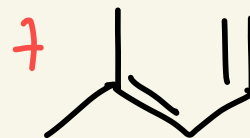
✓ หนัก



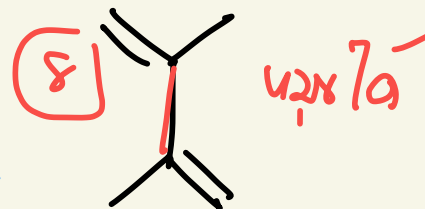
✓ หนัก



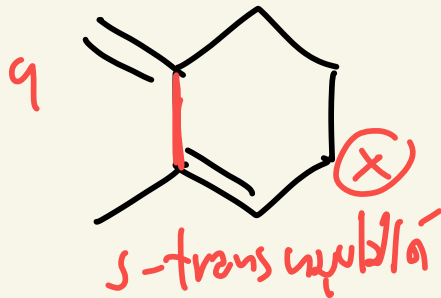
✓ หนัก



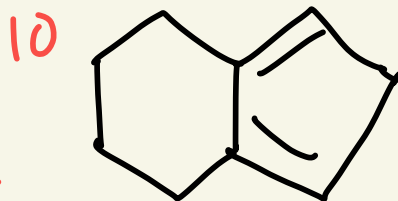
✓ ไม่รุนแรง



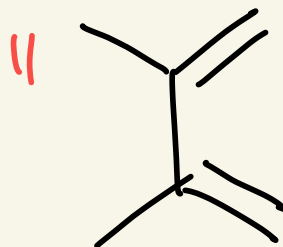
✓ ไม่รุนแรง



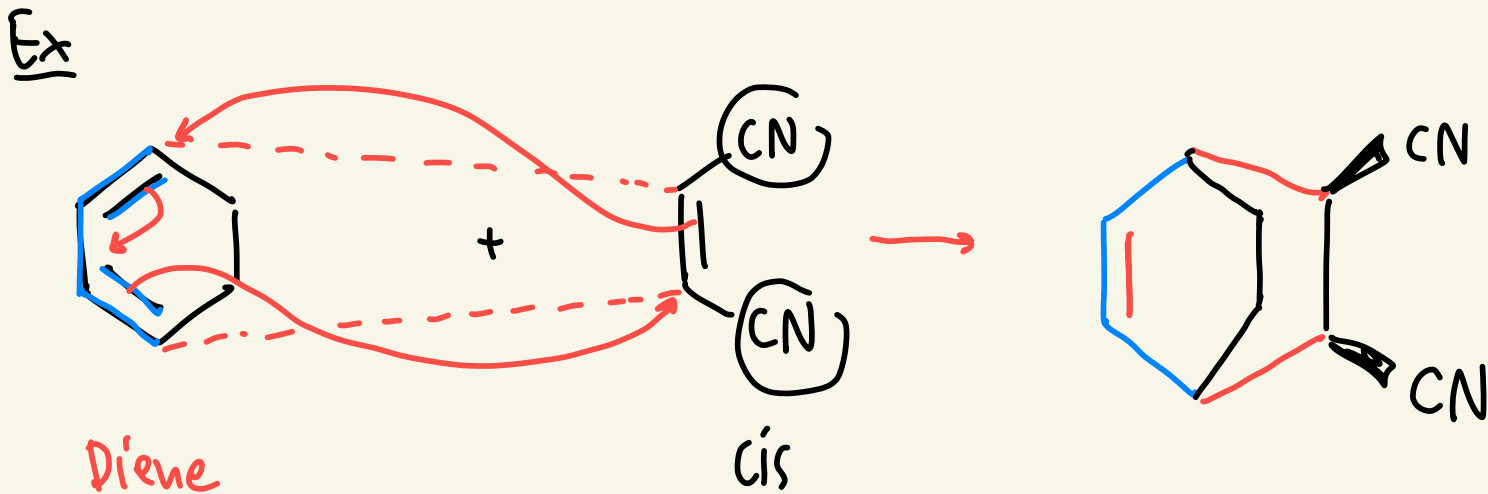
s-trans ไม่รุนแรง



✓ ไม่รุนแรง



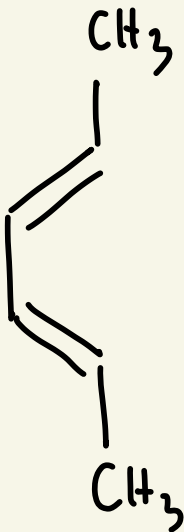
✓ ไม่รุนแรง



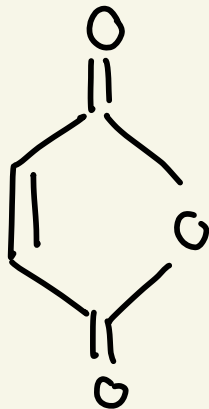
Practice

① ផ្សេងគ្នា ② ផ្សេងគ្នា ③ 5-γ-ស្តេរ៉ូអ៊ីស្មែរ (ស្តេរ៉ូ)

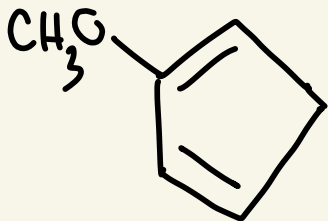
①



+



②



+

