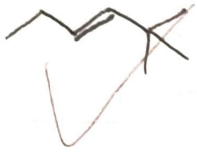
I. 1 B 2 B 3 C 4 C 5 C 6 C 7 C 8 A 9 D 10 B

11. E 12 B 13 D 14 C 15 D 16 C 17 C 18 A 19 ABC 20 D

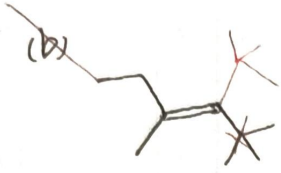
21. B >> C >> E C.

II.

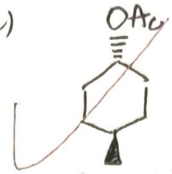
1. (a)



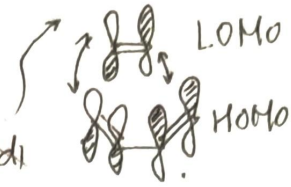
(b)

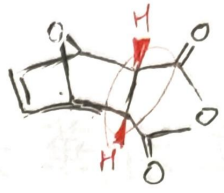


(c)

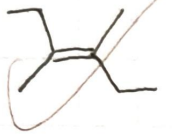


(d)

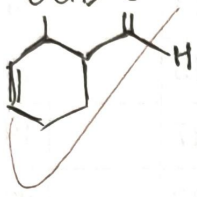




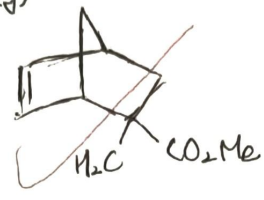
(e)



(f)

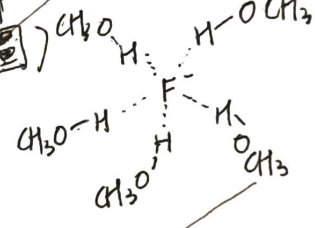


(g)



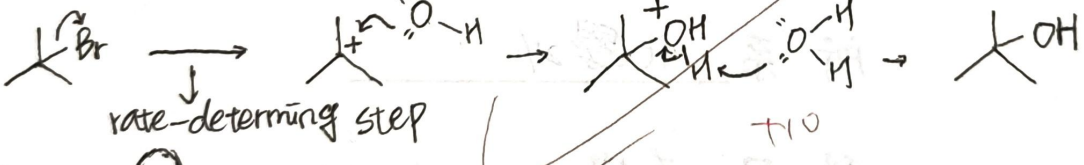
(h)

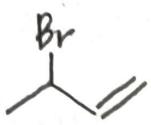
2. 因為在 apptic polar solvent 中沒有氫鍵作用，因此強鹼(F^-)即為最好的親核試劑；反之，若在 protic solvent 中，F^- 最易與溶劑產生強氫鍵作用，因此會被包住(如圖) polar



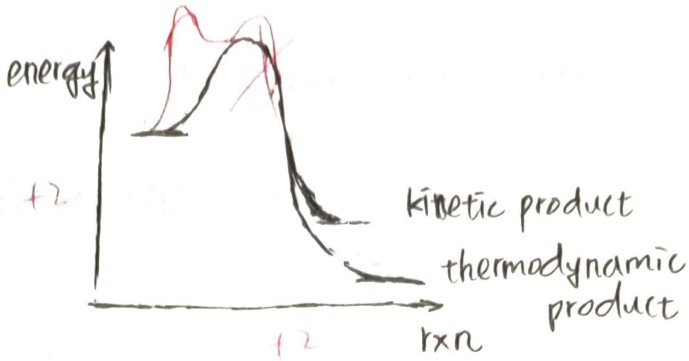
所以最弱的親核試劑(I^-)則變成最好的。 原本

3.

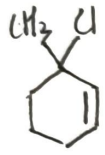
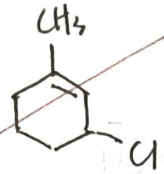


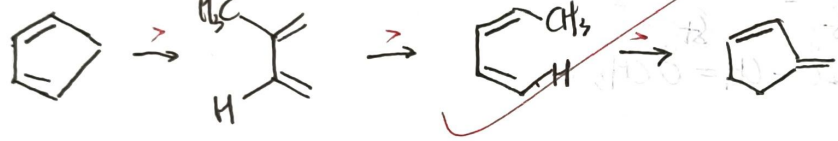
4.  : kinetic product

 : thermodynamic product

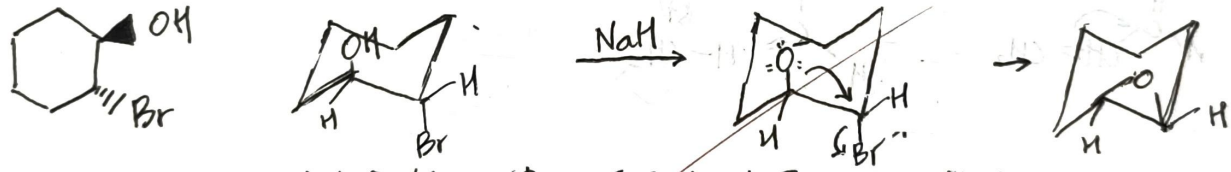


1,2 加成形成最快所以是 kinetic product，而 1,4 加成是雙鍵上的烷取代基數較多所以較穩定，是 thermodynamic product，而 the reaction coordinate diagram 則顯示，kinetic product 形成較快，thermodynamic product 較穩定。再次

5.  : kinetic product  : thermodynamic product

7. 

☆ 穩 > < or "Reactive" ⟷ "unreactive"

8. 

因為只有反式才會較好使 O 原子上的電子從背後打上去進行 SN_2 反應.

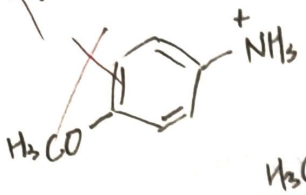
9. $CH_3CH_2CH_2CH_2Br \xrightarrow{CH_3O^-} CH_3CH_2CH=CH_2 \xrightarrow[CH_2Cl_2]{Br_2} CH_3CH_2\underset{Br}{\underset{|}{CH}}-\underset{Br}{\underset{|}{CH_2}} \xrightarrow{3\ NH_2^-}$

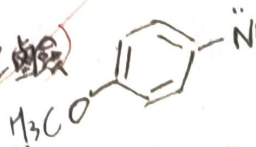
Bulky base.

$CH_3CH_2C\equiv\overset{\ominus}{C}H \xrightarrow[H_2O_2/H_2O]{HgSO_4} CH_3CH_2\overset{OH}{\underset{|}{C}}=CH_2 \rightarrow CH_3CH_2\overset{O}{\underset{\|}{C}}CH_3$

H_2SO_4.

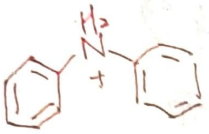
10. (+5)



因其共軛鹼  有共軛結構 且接有拉電子基

H_3CO- 使其更穩定，越穩定的鹼越弱，其共軛酸則越強

共軛：



① Me O — ⟷ MeO = Resonance make benzene electron "rich"!! ⇒ donor.

② Me O — inductively withdraw

Overall: effect ① > ②.

11.

(A) (+17)

$CH_3C(CH_3)=CH-\overset{+}{C}HCH_3 \leftrightarrow CH_3-\overset{+}{C}(CH_3)-CH=CHCH_3$

(B)

$CH_3\overset{-}{C}H-C\equiv CH \leftrightarrow CH_3CH=C=\overset{-}{C}H$

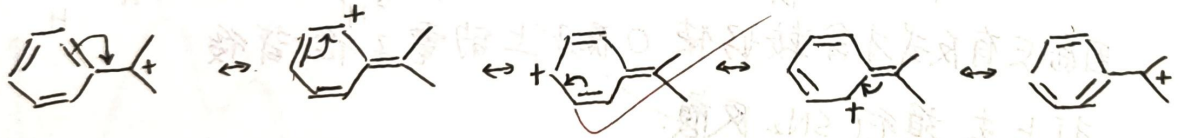
(C) formal charge.

$H_2C=CH-\ddot{O}CH_3 \leftrightarrow H_2\overset{\delta-}{C}-CH=\overset{\delta+}{O}CH_3$ +2

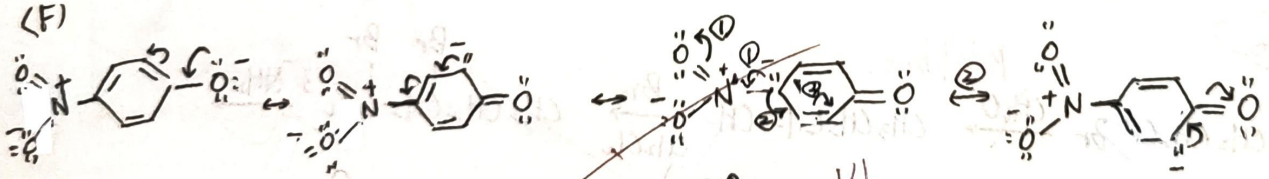
(D)

+2

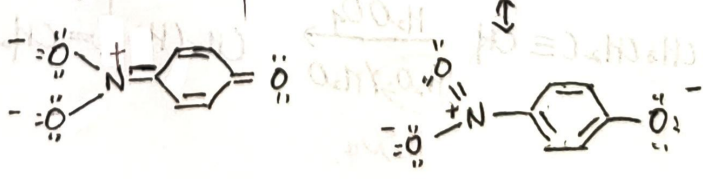
(E)



(F)

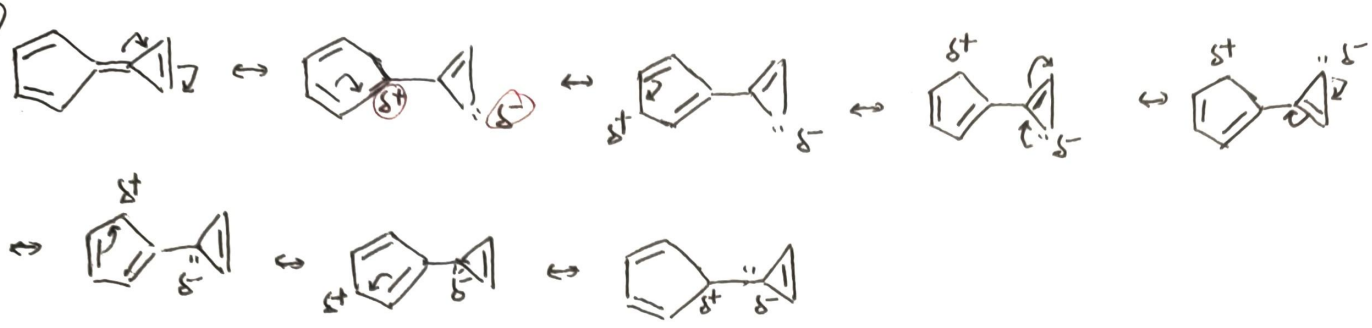


+4

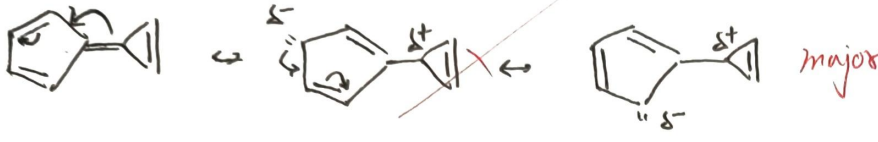


(G)

①



②



major

Both parts are aromatic.

6. (+8.)

因為 sp-sp 鍵能量較 sp^2-sp^2 鍵高

因此 sp-sp 鍵長較短

Reason? s character....?