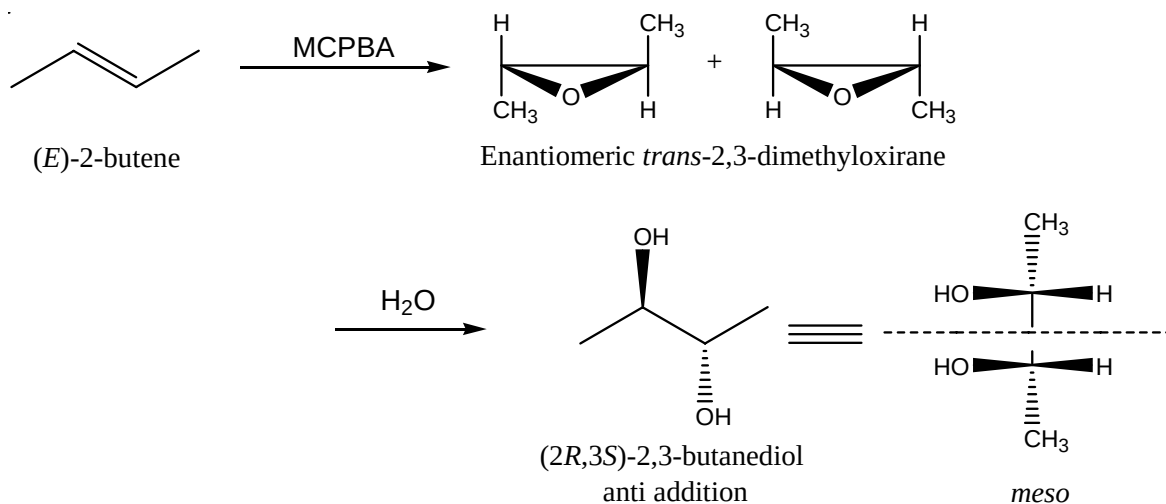
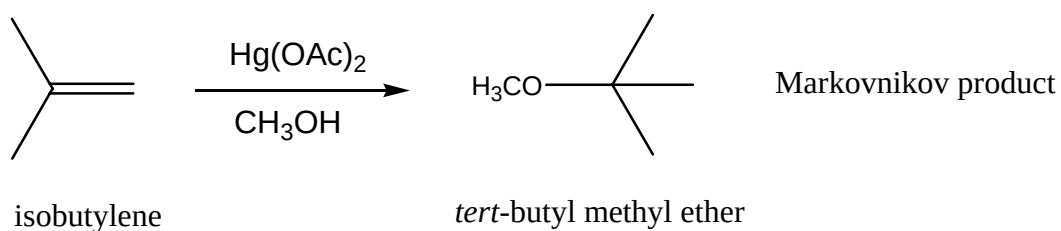


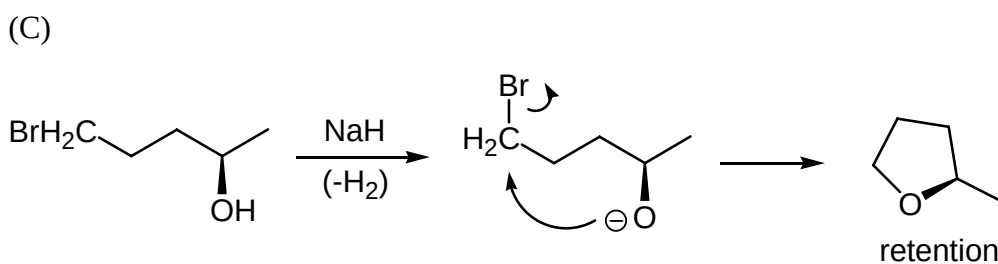
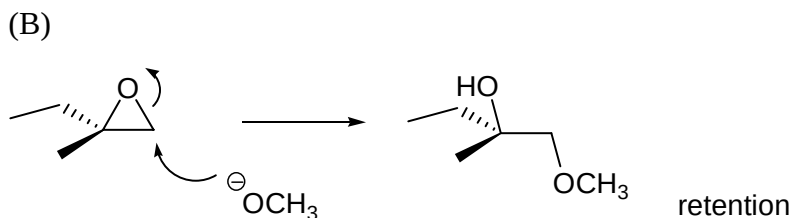
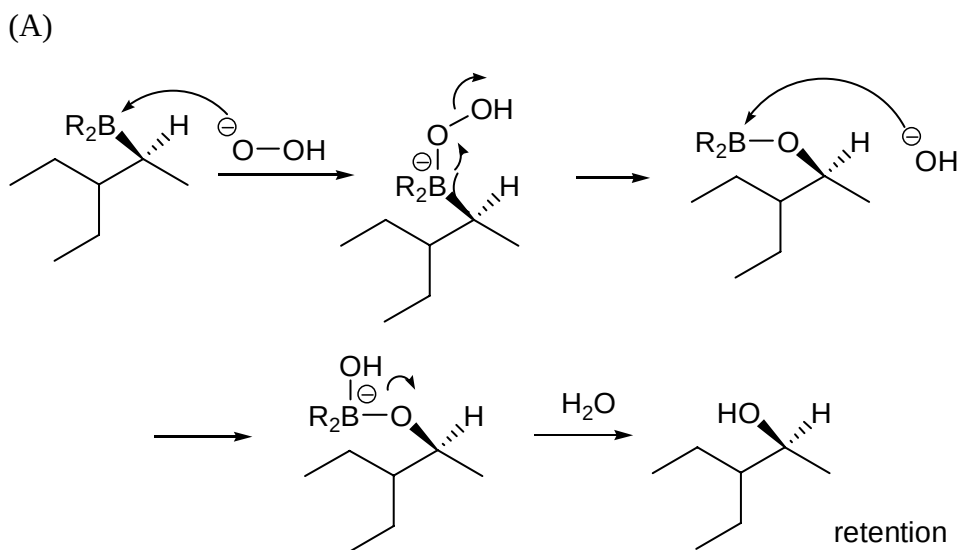
I. 1) Ans: (A)



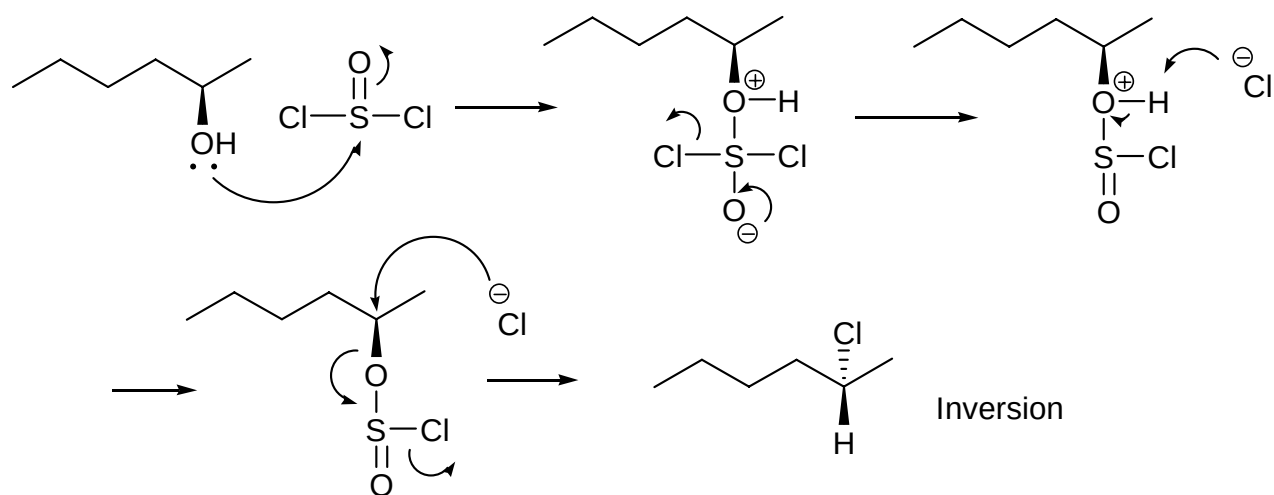
I. 2) Ans: (A)



I. 3) Ans: (D)



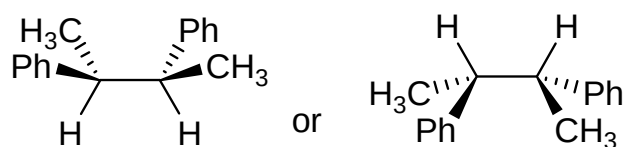
(D)



I. 4)

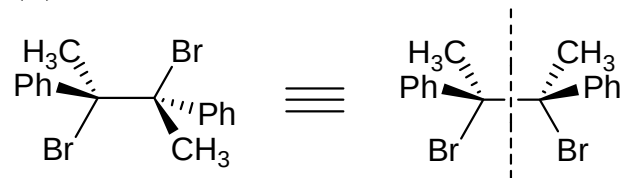
(B)

(A)



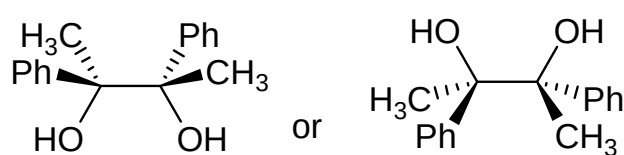
syn addition, not *meso*

(B)



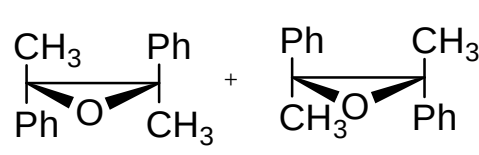
anti addition, *meso*

(C)



syn addition, not *meso*

(D)

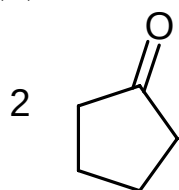


not *meso*

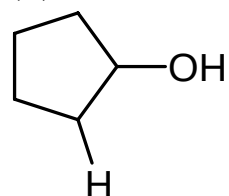
I. 5)

(B)

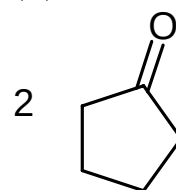
(A)



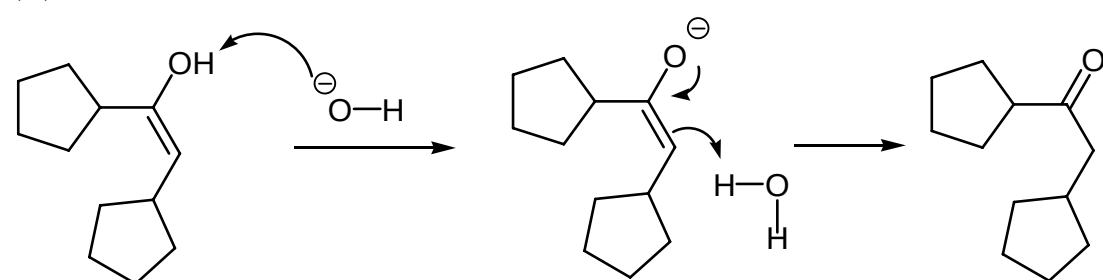
(B)



(C)



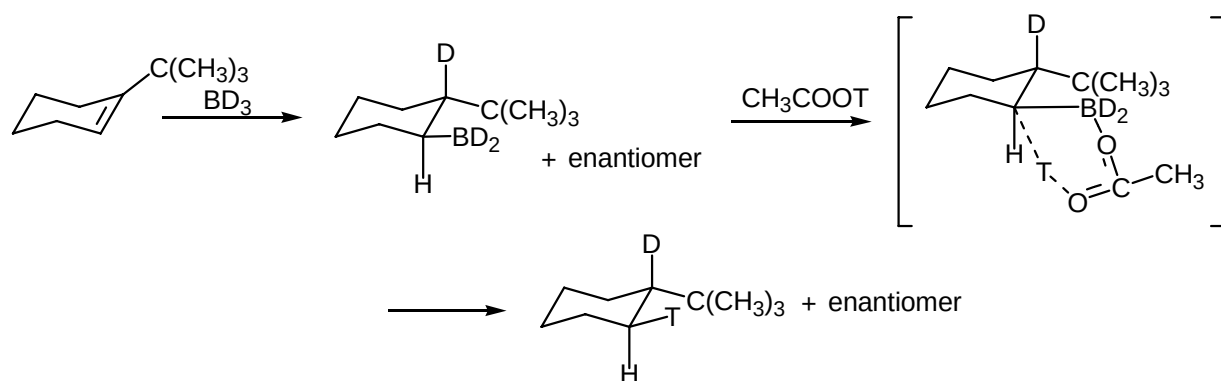
(D)



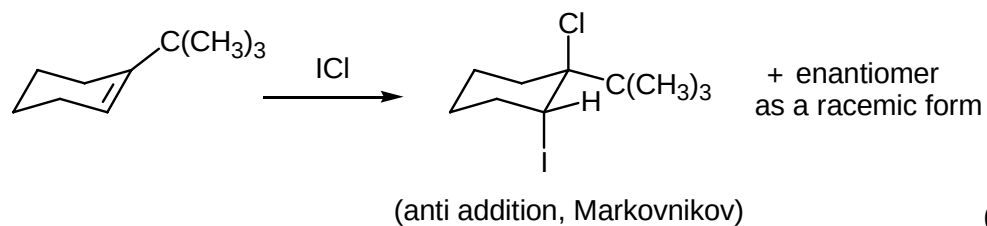
vinylic alcohol
(unstable)

ketone

II. (a)



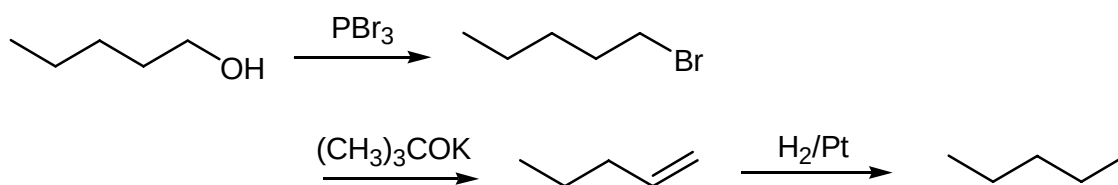
(b)



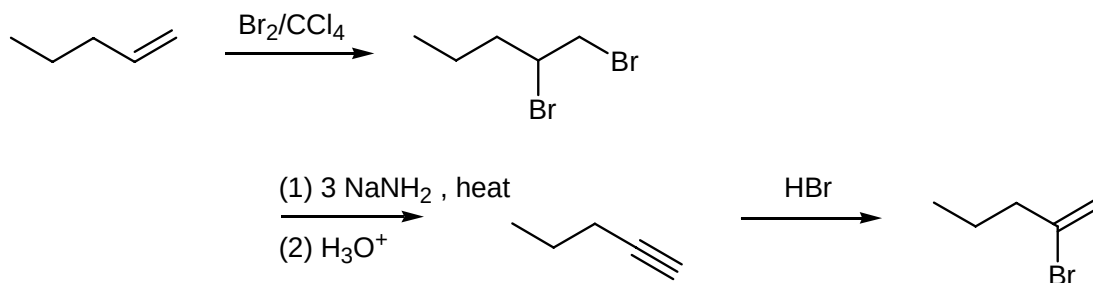
(課本 574 頁第 15 題)

III.

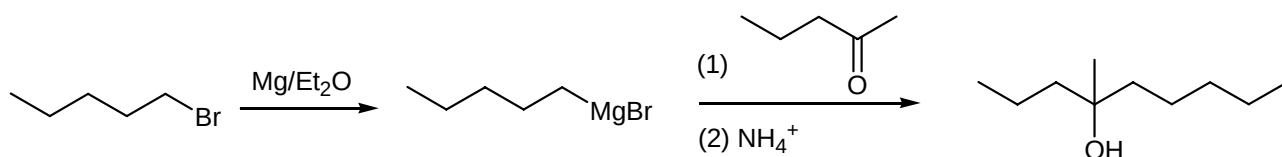
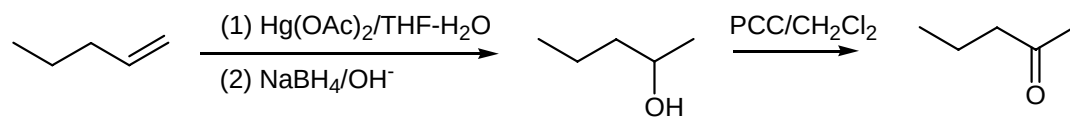
(a)



(b)



(c)



(課本 570 頁 12-17 題)

IV.

(a) $\text{PCC}/\text{CH}_2\text{Cl}_2$

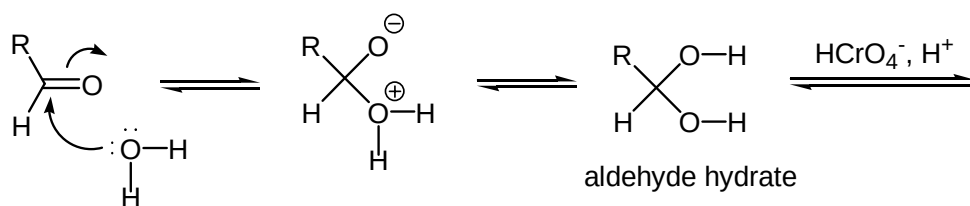
(b) O_3 , then Zn , HOAc

(c) LiAlH_4

(d) NaBH_4

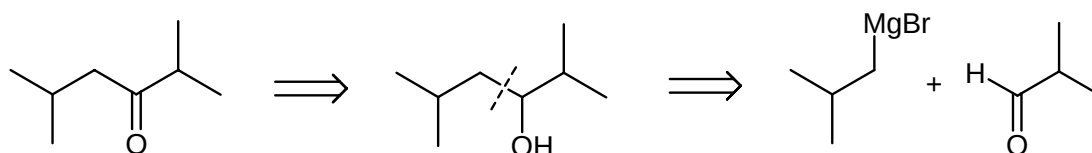
(課本 543 頁 12-4 題; 課本 550 頁 12-5 題)

V. 因為 aldehyde 在水溶液中形成 aldehyde hydrate 可進一步被氧化成酸

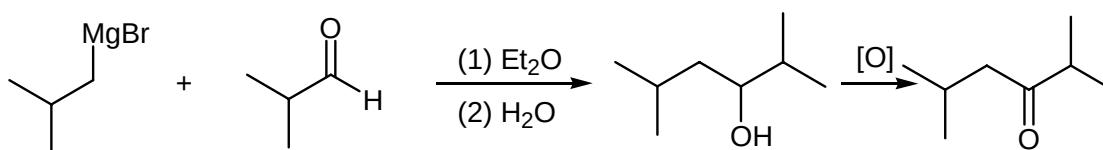
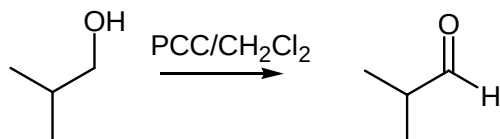
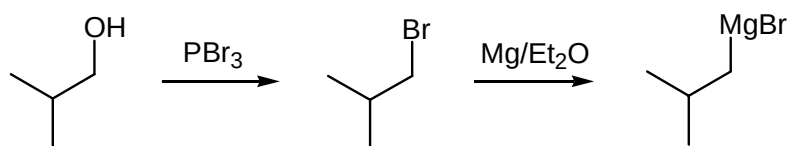


(課本 546 頁 549 頁)

VI. Retrosynthetic analysis

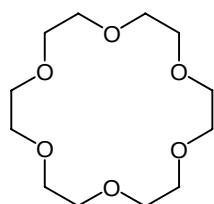


Synthesis

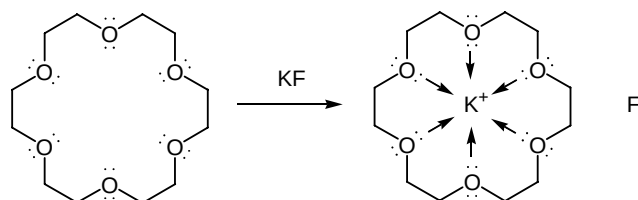


(課本 559 頁)

VII. (a)

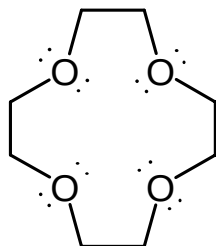


(b)如圖，crown ether為phase-transfer catalyst，18-crown-12 中，氧原子上的孤對電子可與鉀離子配位，且環內的空間恰可容納鉀離子包覆其中，包覆上一層類碳氫的外殼，故可增加KF在CH₃CN中的溶解度。



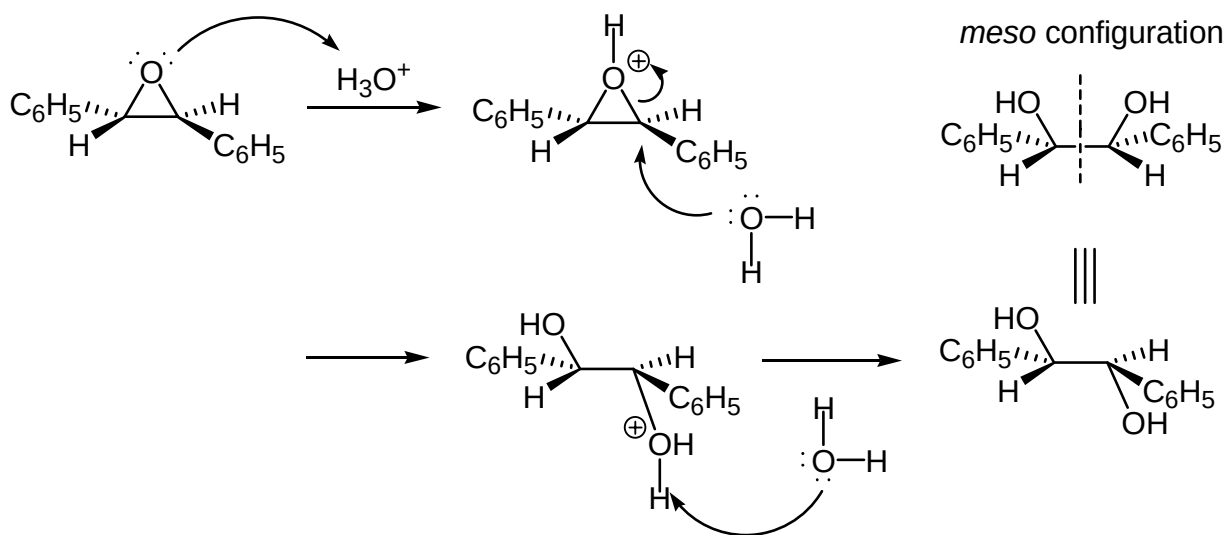
(c) S_N2 反應需要 polar aprotic 溶劑，而 KF 為一離子化合物，在 aprotic 溶劑中的溶解度不高，利用 crown ether 可使 KF 溶解於 aprotic 有機溶劑之中，且 crown ether 將鉀離子包覆，釋出裸露的氟離子，增加其 nucleophilicity，故 crown ether 可加速 KF 的 S_N2 反應。

(d) 不行，如圖，12-crown-4 中，環內空間太小無法有效包覆鉀離子。

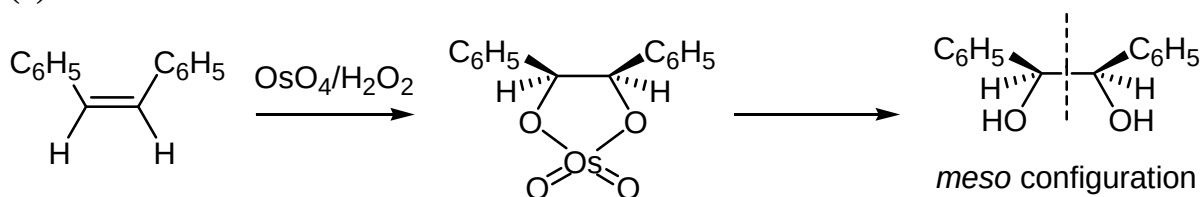


(課本 527 頁)

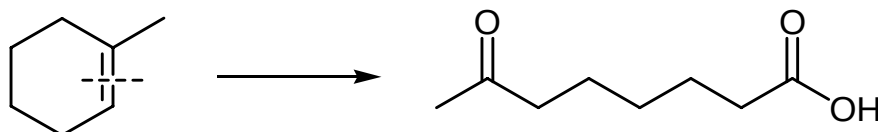
VIII. (a)



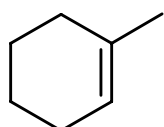
(b)



IX. C_7H_{12} 不飽和數 2，含有一個雙鍵一個環或兩個雙鍵，但惟一產物中碳數和起始物一樣，故不可能為兩個雙鍵(會裂解成數個碳數較少的產物)，所以起始物為一個雙鍵一個環，而觀察 $C=O$ 鍵的位置可發現:

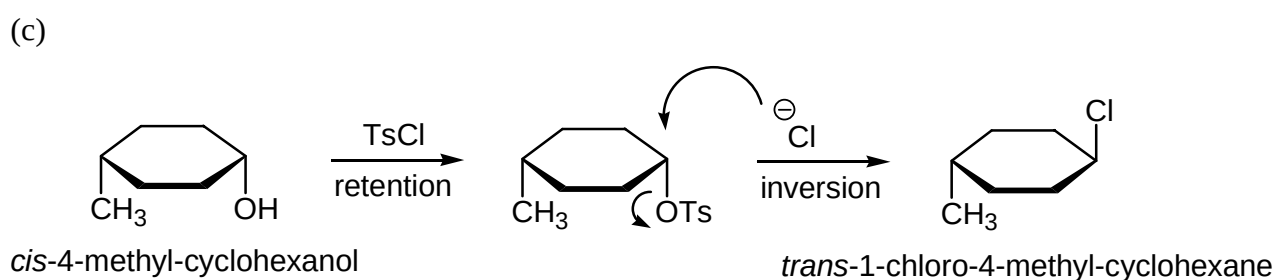
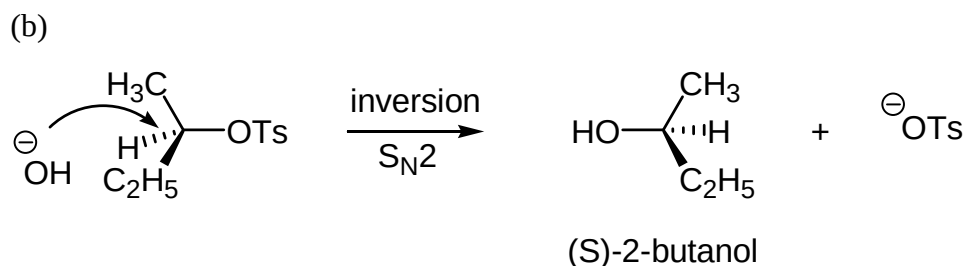
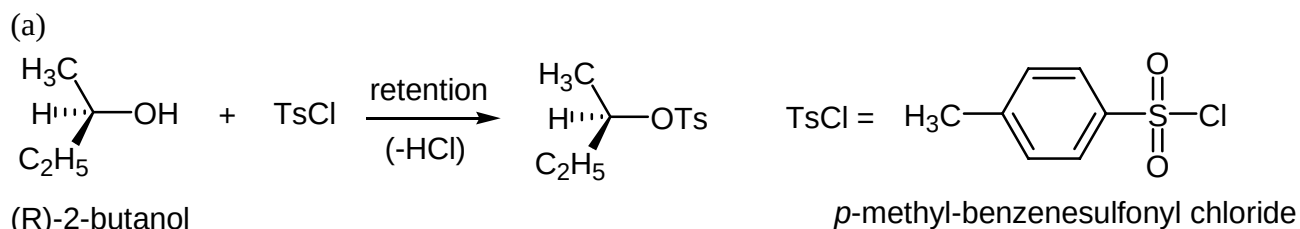


所以起始物為

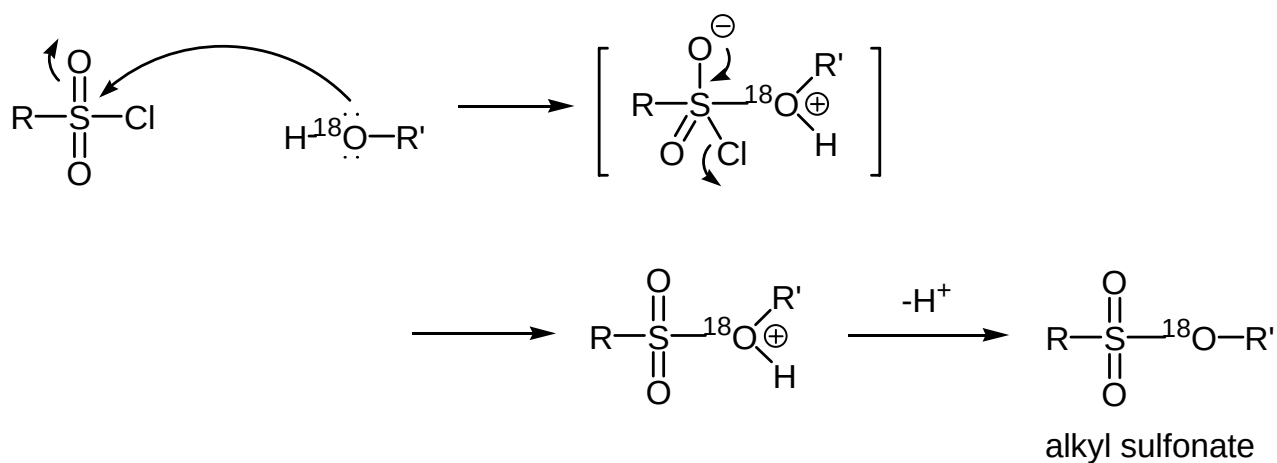


(課本 363 頁)

X.



(d) 可利用 $\text{H}^{18}\text{O}-\text{R}'$ 與 RSO_2Cl 反應，所形成的 alkyl sulfonate 中如含有 ^{18}O 即可證明反應中，alcohol 的 C-O 鍵不會斷裂。



((課本 509 頁 11.9 題; 課本 510 頁 11.11 題))