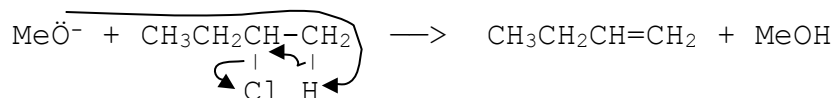
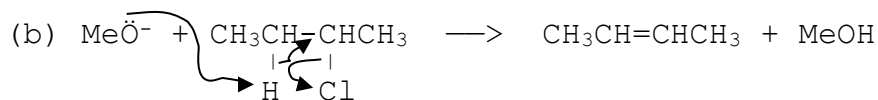


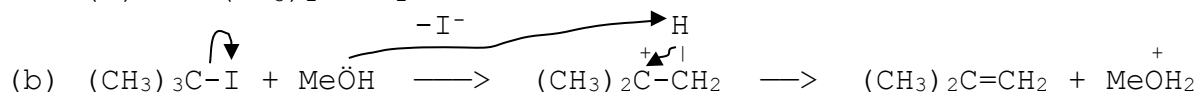
Answers to Puzzles of Chapter 7
Elimination Reactions of Alkyl Halides

7.1 ΔS° is about zero because 2 molecules become 2 molecules.

7.2 (a) \rightarrow $\text{CH}_3\text{CH}=\text{CHCH}_3 + \text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$



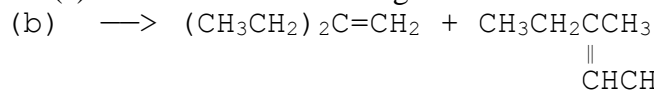
7.3 (a) \rightarrow $(\text{CH}_3)_2\text{C}=\text{CH}_2$



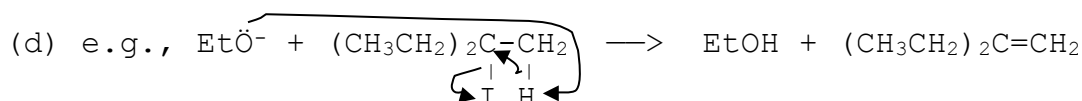
7.5 Because it is so bulky.

7.6 (a) weak, good E1 base (b) strong, good E2 base (c) strong, good E2 base
(d) strong, good E2 base

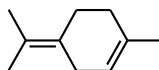
7.7 (a) E2 because of the strong base



(c) $\text{CH}_3\text{CH}_2\text{C}(\text{CH}_3)_2$ is major because it has more (3) C substituents



7.8 (a) no, because the new C=C in limonene has only 2 C substituents, whereas the new C=C in



the following isomer has 4 C substituents:

(b) The enzyme could bind the base in a position relative to the carbocation to ensure that the desired proton is taken.

7.9 (c) & (d), because they are the weak bases.

7.10 Yes, because the leaving group's conjugate acid is strong with a K_a of 2×10^{-6} . So the leaving group is a weak base.

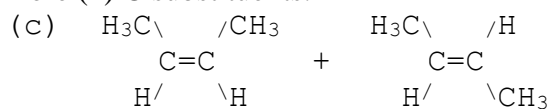
7.11 (a) no: it has no β H (b) yes: I^- is a good L (c) yes: Cl^- is a good L
(d) no: it has no good L (e) no: it has no good L (f) yes: Br^- is a good L

(g) no: it has no good L (h) no: it has no β H

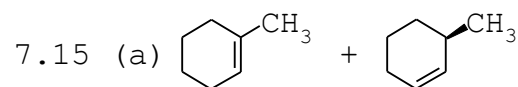
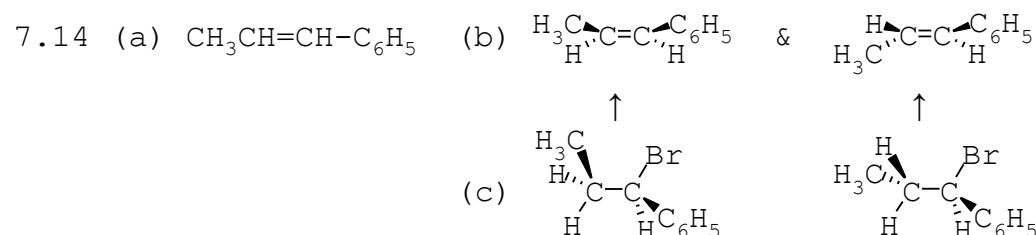
7.12 (a) no: it has no β H (b) no: it is 1° (c) yes: it is 2° with a good L
 (d) no: it has no good L (e) no: it has no good L (f) yes: it is 3° with a good L
 (g) no: it has no good L (h) no: it has no β H

7.13 (a) E1 because of the weak base, H_2O .

(b) $\text{CH}_2=\text{CHCH}_2\text{CH}_3 + \text{CH}_3\text{CH}=\text{CHCH}_3$; $\text{CH}_3\text{CH}=\text{CHCH}_3$ predominates because its C=C has more (2) C substituents.



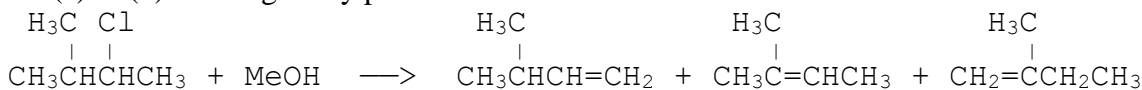
The 2nd, *E* stereoisomer predominates because it has less steric repulsion.



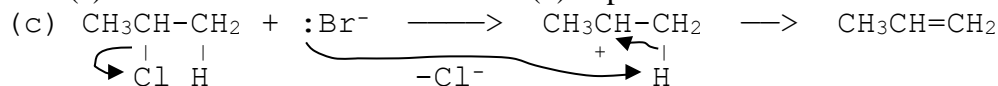
2 isomer products are possible here because both β Cs have Hs that are trans to Br and therefore can be diaxial, anti with it.

(b) The first above because its C=C has more (3) C substituents.

7.16 (a) & (b) Among many possibilities:

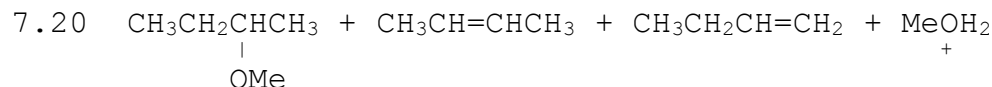


7.17 (a) E1 because Br^- is a weak base. (b) A protic solvent such as methanol.

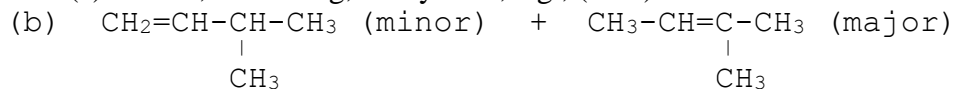


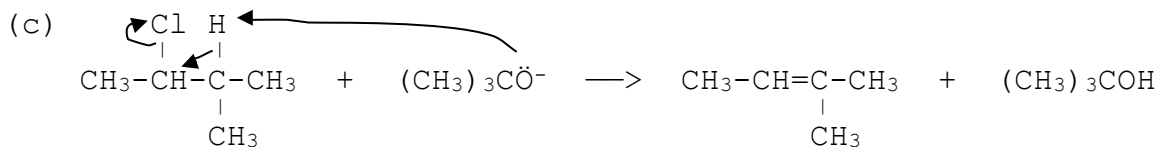
7.18 (a) \uparrow [base] (b) \uparrow basicity (c) aprotic solvent

7.19 (a) 3° electrophile (b) bulky strong base (c) \uparrow T



7.21 (a) For E2, use strong, bulky base, e.g., $(\text{CH}_3)_3\text{CO}^-$



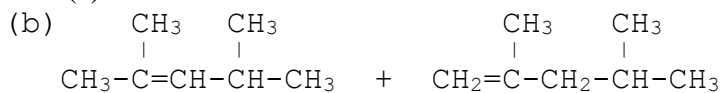


7.22 (a) E2; the strong base won't wait for C⁺ to form.

(b) CH₃CH=CHCH₂CH₂CH₃ + CH₃CH₂CH=CHCH₂CH₃; both would predominate

(c) e.g., DMSO, an aprotic solvent

7.23 (a) E1 because the ethanol base is weak.

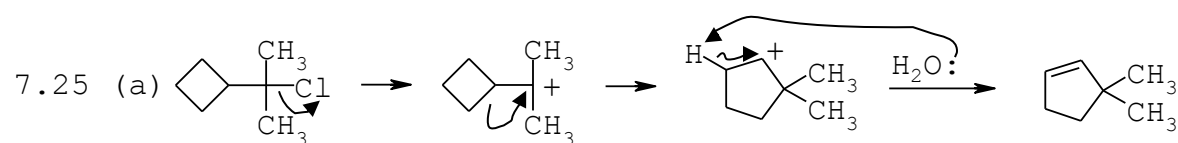


7.24 (a) second elie because its Br⁻ L is a weaker base.

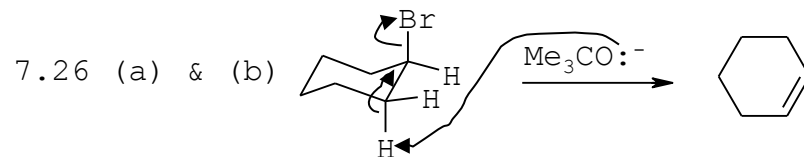
(b) first elie because it's 3° (not 2°) and yields a C=C with more (2) C substituents.

(c) first elie because it alone has a β H.

(d) in propanone because E2 with an anion base prefers an aprotic solvent.



(b) 3° C⁺ → 2° C⁺ because much ring strain is released concurrently.



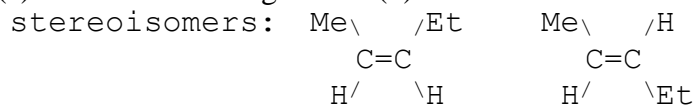
7.27 The 2nd stereoisomer, because it alone has a β H trans to a Cl, which can be anti, diaxial.

7.28 Unusually large steric hindrance hinders the base plucking a β H to form the 2nd product, even though its C=C is stabler with more (3) C substituents.

7.29 (a) I⁻, S_N2 (b) HO⁻, S_N2 (c) Me₃CO⁻, E2

(d) e.g., EtOH (weak base for E1 with C⁺ rearrangement).

7.30 (a) E2 occurs with a good L (b) constitutional isomer: CH₃CH=CHCH₂CH₃

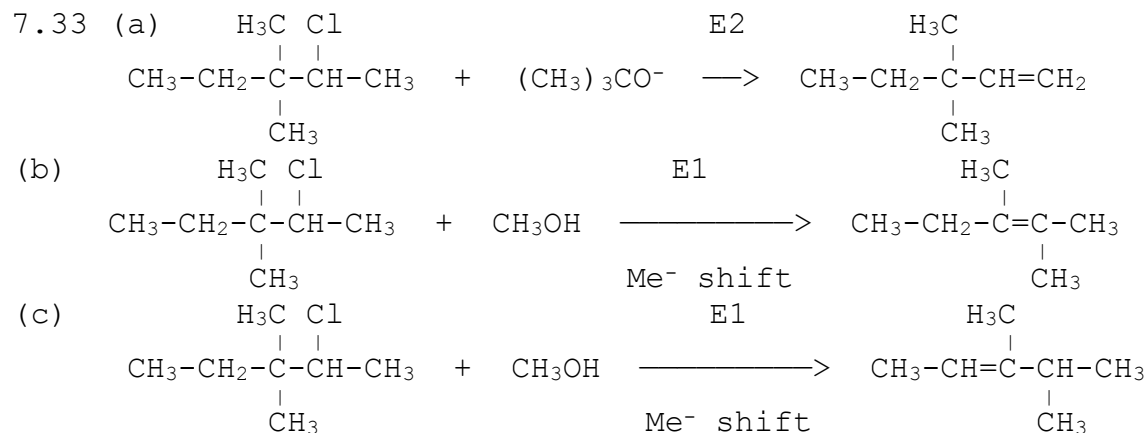


(c) 2nd stereoisomer

7.31 Because a planar C=C would be hard to make on a cube.

7.32 (a) CH₃-CH₂-CH₂-OH (S_N2) (b) CH₃-CH=CH₂ (E2) (c) CH₃-CH=CH₂ (E2)

(d) CH₃-CH₂-CH₂-Br (S_N2)

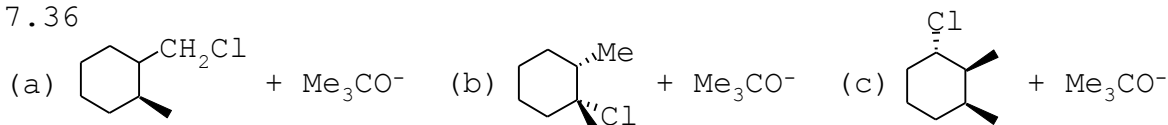


7.34 protic by H "bonding" to F⁻

7.35 (a) Me₂CH-O-CH₂-CH₃

(b) The 1st reaction because S_N2 prefers a 1° elie, while E2 prefers the 2° elie.

7.36

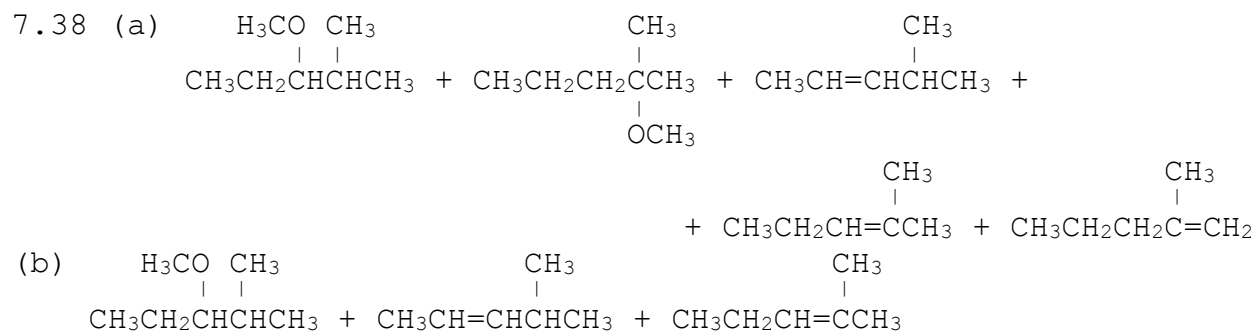



7.37 (a) S_N1: 2nd (3° elie) > 1st (2° elie); no reaction with 3rd (1° elie)

(b) S_N2: 3rd (1° elie) > 1st (2° elie); no reaction with 2nd (3° elie)

(c) E1: 2nd (3° elie) > 1st (2° elie); no reaction with 3rd (no β H)

(d) E2: 2nd (3° elie) > 1st (2° elie); no reaction with 3rd (no β H)



7.39  because resonance stabilizes it.

7.40

