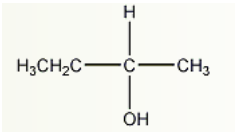
Preparatory chemistry course, Practical worksheets,
Elimination reactions

1. How many transition states does a two-step reaction have?
    a. None
    b. 1
    c. 2
    d. 4

2. How many intermediates does a one-step reaction have?
    a. None
    b. 1
    c. 2
    d. 4

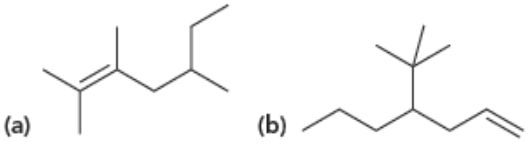
3. During a two-step reaction, which one of the following species has the highest energy?
    a. Reactants
    b. First transition state
    c. Intermediate
    d. Products

4. Which is the most likely leaving group when a nucleophile attacks this molecule?



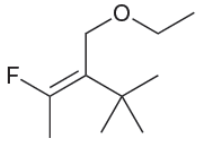
    a. H
    b. CH_3
    c. CH_2CH_3
    d. OH

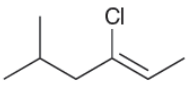
5. Provide a systematic name for each of the following compounds.



6. For each of the following compounds, draw its bond-line structure:
    a. 4-Ethyl-2-methyl-2-hexene
    b. 1,2 Dimethylcyclobutene

7. For each of the following alkenes, assign the configuration of the double bond as either E or Z:





Partly adapted from Klein, Organic Chemistry, 2nd edition, Wiley, 2015;
Crowe & Bradshaw, Chemistry for the Biosciences, 3rd edition, Oxford University Press, 2014

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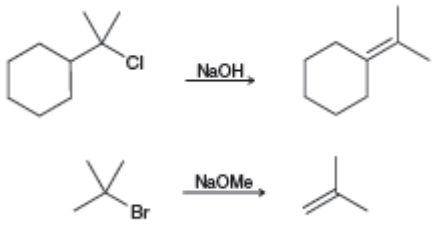
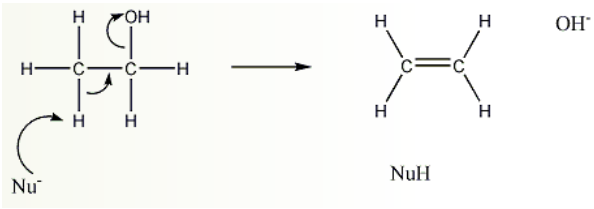
8. For each of the following elimination reactions, assume a concerted process is taking place and draw the mechanism:

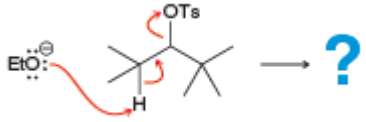


9. Which one of the following best describes this reaction?

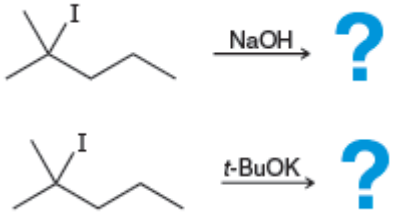


   a. An S_N1 reaction
   b. An S_N2 reaction
   c. An E1 reaction
   d. An E2 reaction

10. Carefully read the following curved arrows shown and draw the expected alkene that is produced by this elimination reaction. Is this mechanism concerted or stepwise?



11. Identify the major and minor products for each of the following E2 reactions



12. Draw the carbocation intermediate generated by the following substrates in an E1 mechanistic process: