

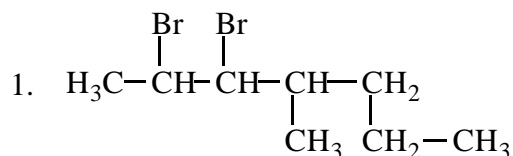
## Chemistry 2321

Test No. 4

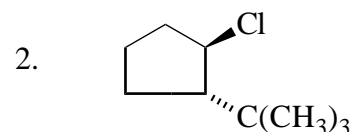
Professor M. Pomerantz

### OLD TEST QUESTIONS

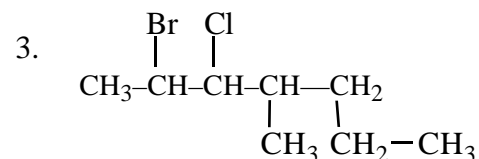
Select the proper IUPAC name for the compounds shown.



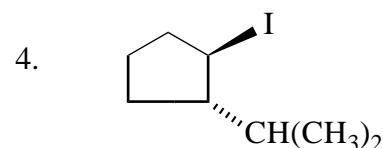
- a) 2,3-bromo-4-methylheptane                      d) 2,3-dibromo-4-methylhexane  
 b) 2,3-bromo-4-methylhexane                      e) 2,3-dibromo-4-methylheptane  
 c) 2,3-dibromo-5-ethyl-4-methylpentane



- a) *cis*-1-chloro-2-isopropylcyclopentane                      d) *trans*-1-*tert*-butyl-2-chlorocyclopentane  
 b) *trans*-1-chloro-2-isopropylcyclopentane                      e) *cis*-1-*tert*-butyl-2-chlorocyclopentane  
 c) *trans*-1-isopropyl-2-chlorocyclopentane

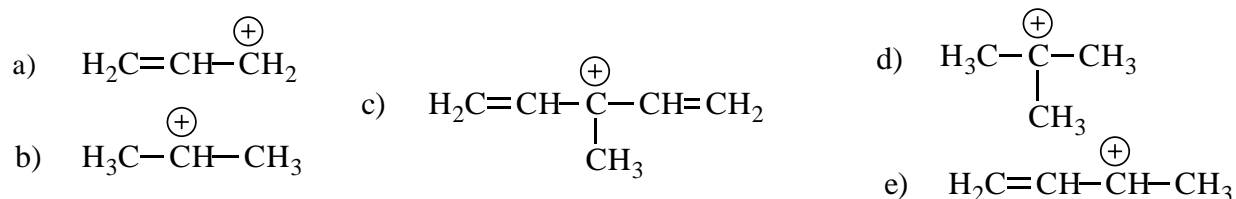


- a) 2-bromo-3-chloro-4-methylheptane                      d) 2-bromo-3-chloro-4-propylpentane  
 b) 2-bromo-3-chloro-4-methylhexane                      e) 6-bromo-5-chloro-4-methylheptane  
 c) 2-bromo-3-chloro-5-ethyl-4-methylpentane

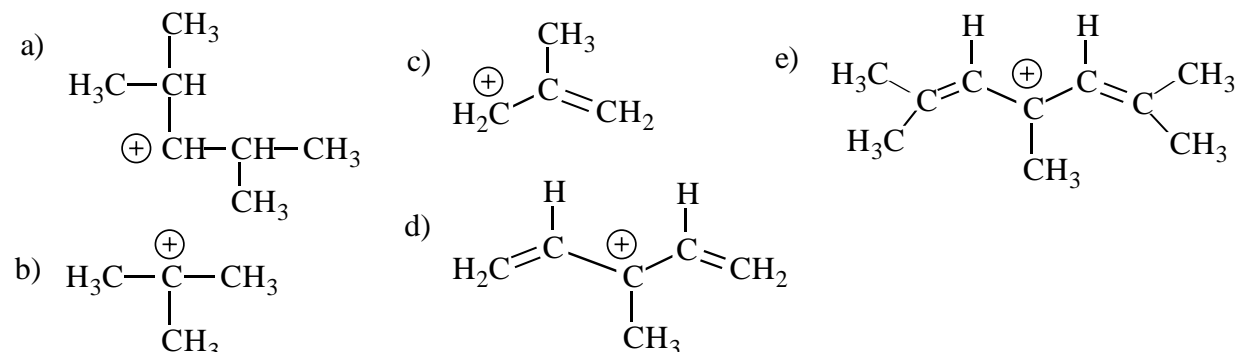


- a) *cis*-1-iodo-2-isopropylcyclopentane                      d) *trans*-1-isopropyl-2-iodocyclopentane  
 b) *trans*-1-iodo-2-isopropylcyclopentane                      e) *trans*-1-iodo-2-isobutylcyclopentane  
 c) *cis*-1-isopropyl-2-iodocyclopentane

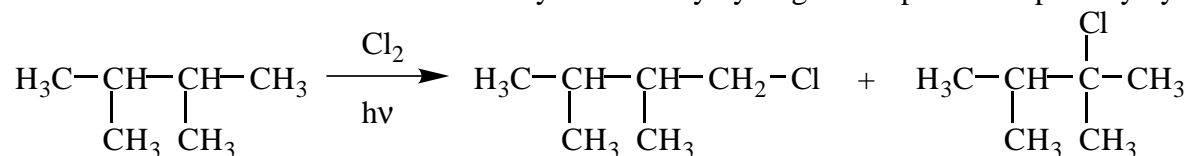
5. Which of the following is the most stable carbocation?



6. Which of the following is the most stable carbocation?

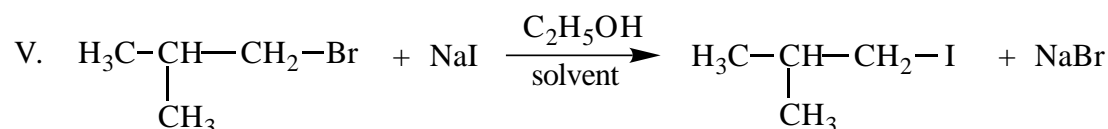
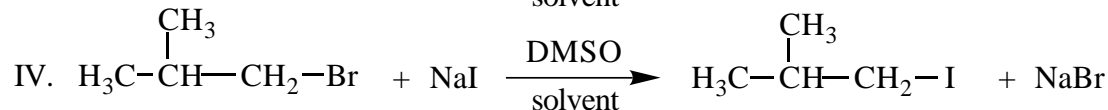
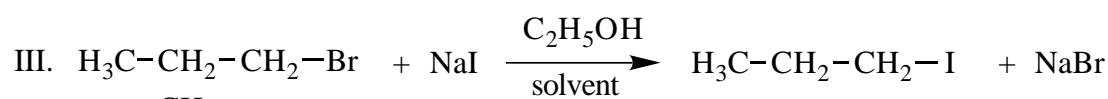
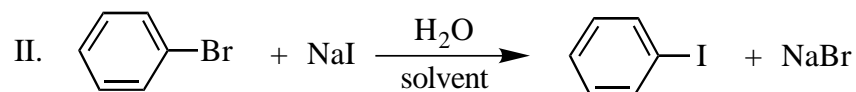
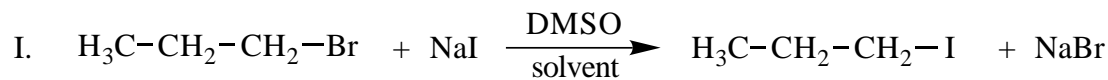


7. In the free radical chlorination of 2,3-dimethylbutane the two products shown are formed in **equal amounts**. Calculate the relative reactivity of a tertiary hydrogen compared to a primary hydrogen.

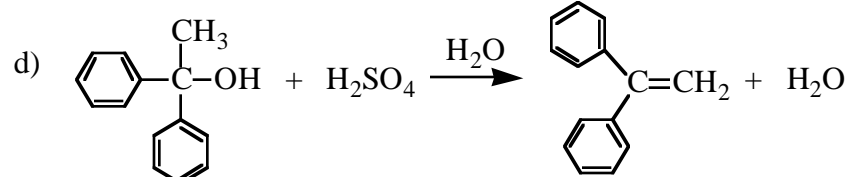
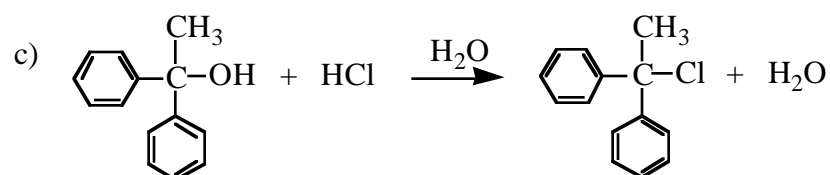
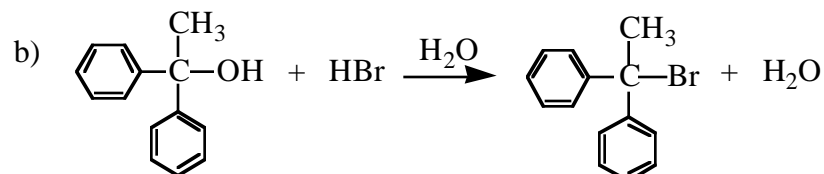
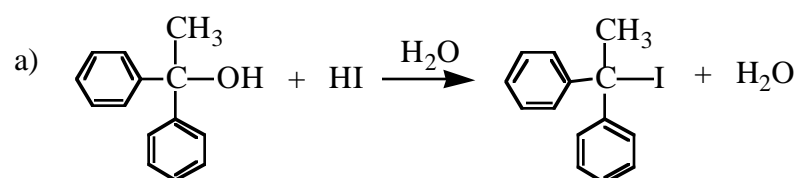


- a) 5 : 1d) 1 : 6  
 b) 6 : 1e) 3 : 1  
 c) 1 : 5

**Given the following reactions:**



8. Which of the above is the **fastest** reaction?  
 a) I d) IV  
 b) II e) V  
 c) III
9. Which of the above will **not** occur?  
 a) I only d) both I and V  
 b) II only e) all will occur  
 c) V only
10. Which of the following reactions is **significantly faster** than the others?

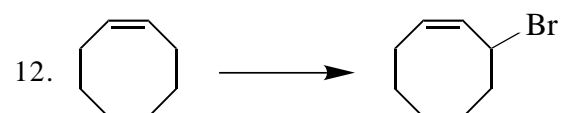


- e) all have essentially the same rate

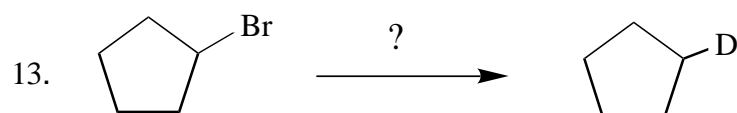
What reagent(s) can be used to carry out the following reactions without major side reactions?



- a) NaBr / DMSO  
 b) Br<sub>2</sub> / CCl<sub>4</sub> / Δ  
 c) PBr<sub>3</sub>  
 d) SOCl<sub>2</sub>  
 e) NBS / DMSO / Δ

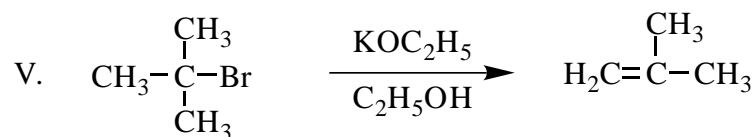
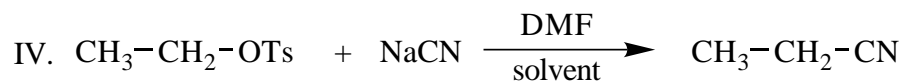
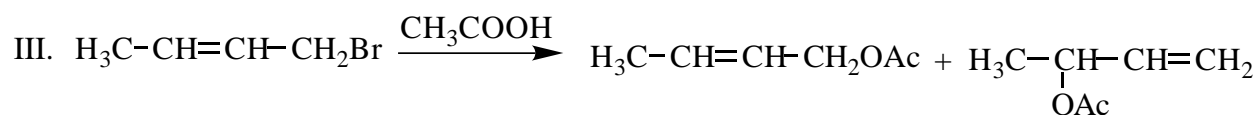
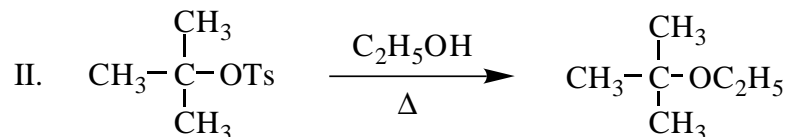
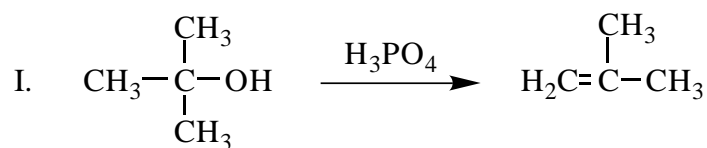


- a) Br<sub>2</sub> / CCl<sub>4</sub> / Δ  
 b) PBr<sub>3</sub>  
 c) HBr  
 d) NBS / CCl<sub>4</sub> / hν  
 e) NaBr / DMSO



- a) 1) NaNH<sub>2</sub>; 2) D<sub>2</sub>O  
 b) 1) KOH / EtOH; 2) D<sub>2</sub> / Pd/C  
 c) 1) KO<sup>t</sup>-Bu / *t*-BuOH; 2) D<sub>2</sub> / Pd/C  
 d) 1) Mg / Et<sub>2</sub>O; 2) D<sub>2</sub> / Pd/C  
 e) 1) Mg / Et<sub>2</sub>O; 2) D<sub>2</sub>O

**Given the following reactions:**



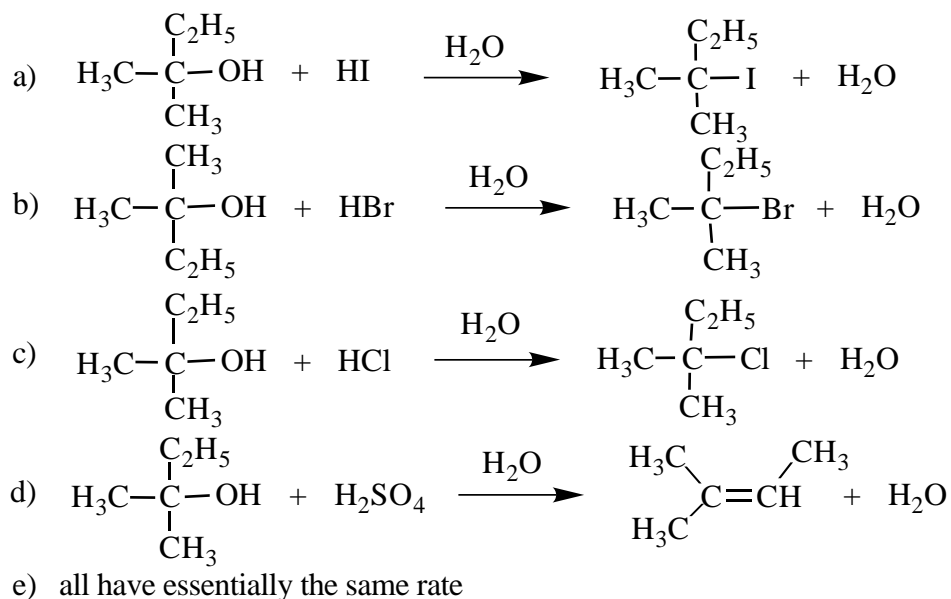
14. An E2 reaction is:

- a) I  
 b) II  
 c) III  
 d) IV  
 e) V

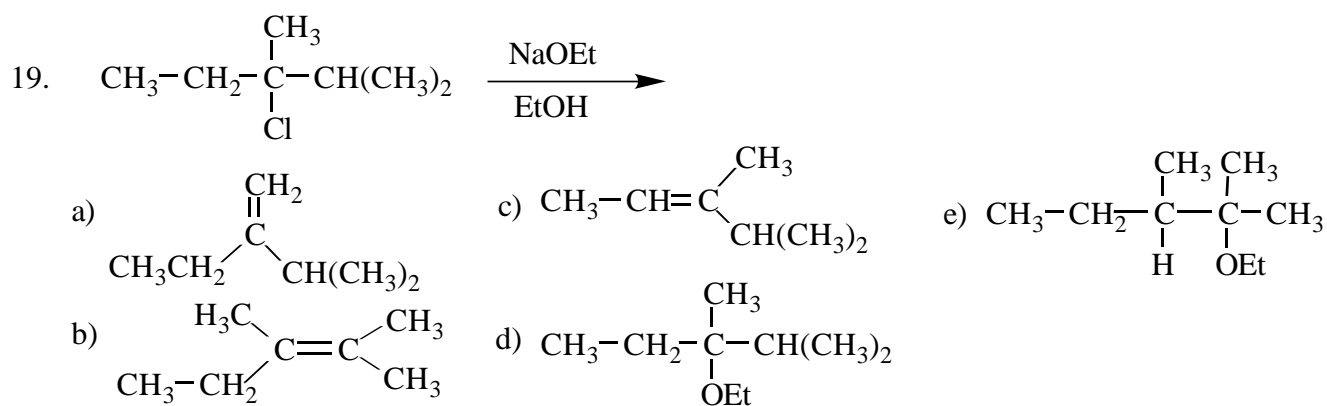
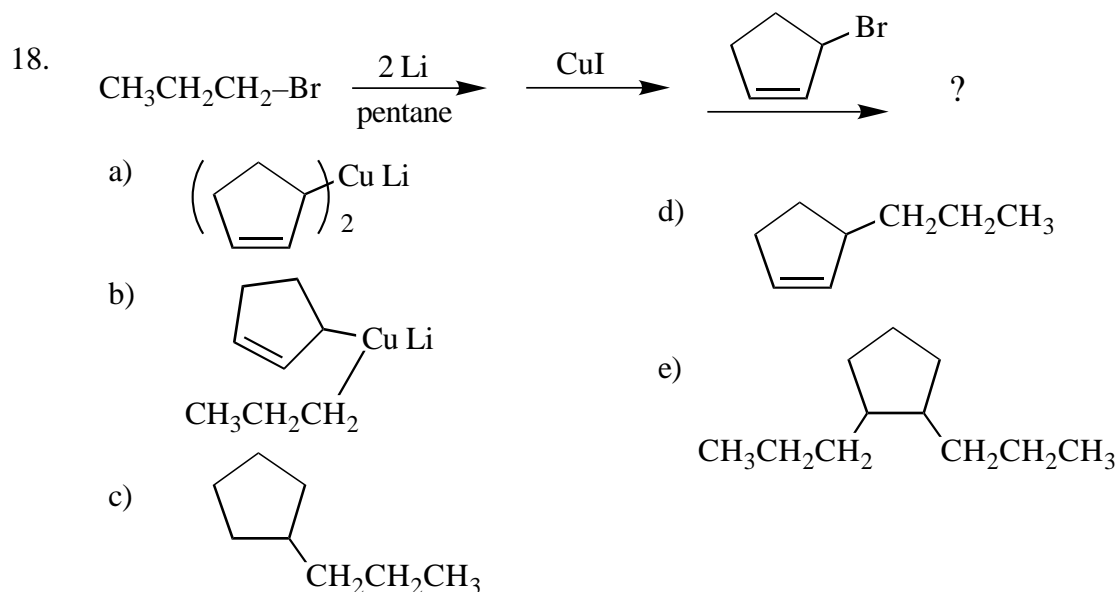
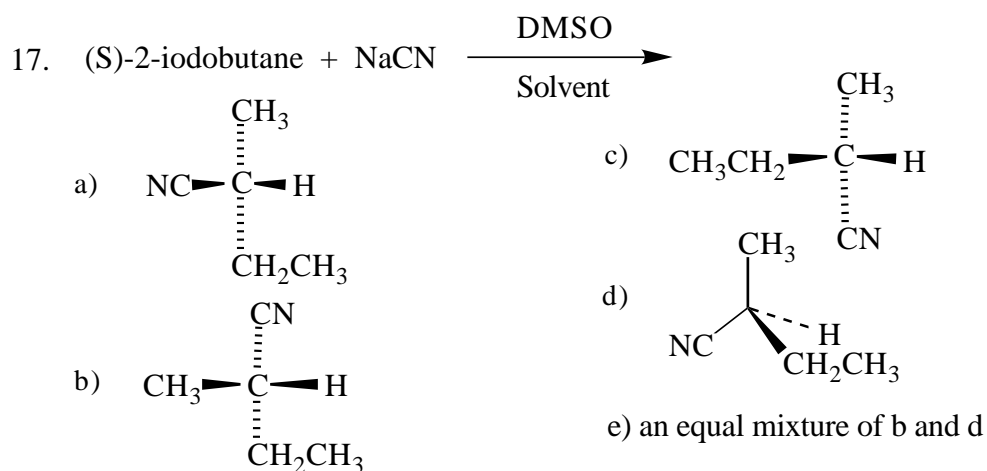
15. Reaction(s) which involve carbocations are:

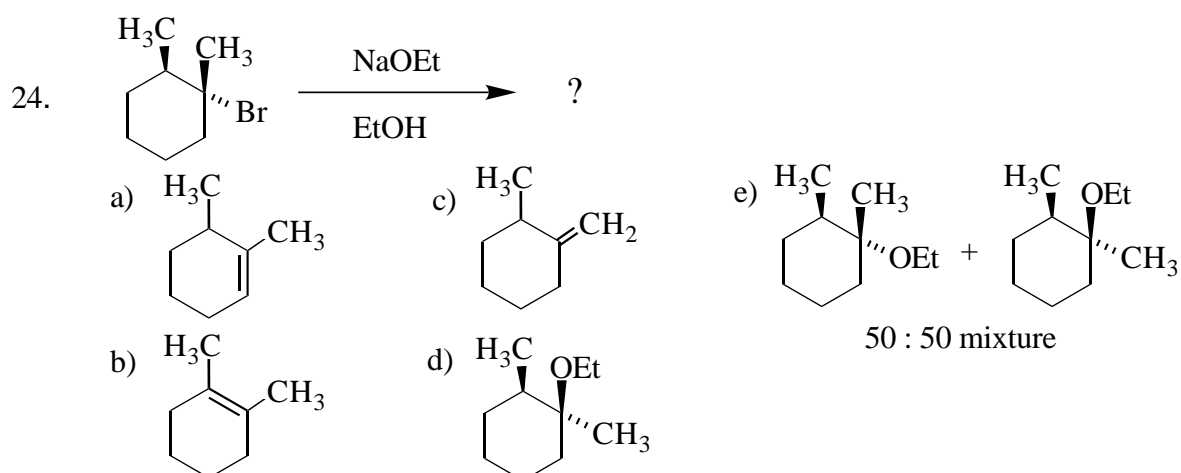
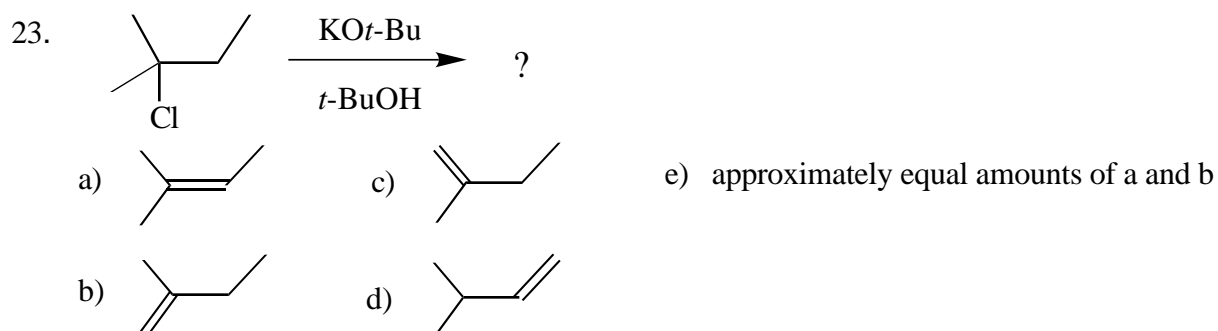
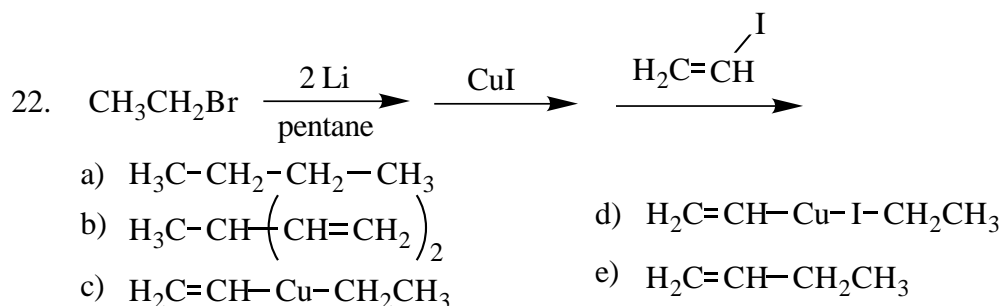
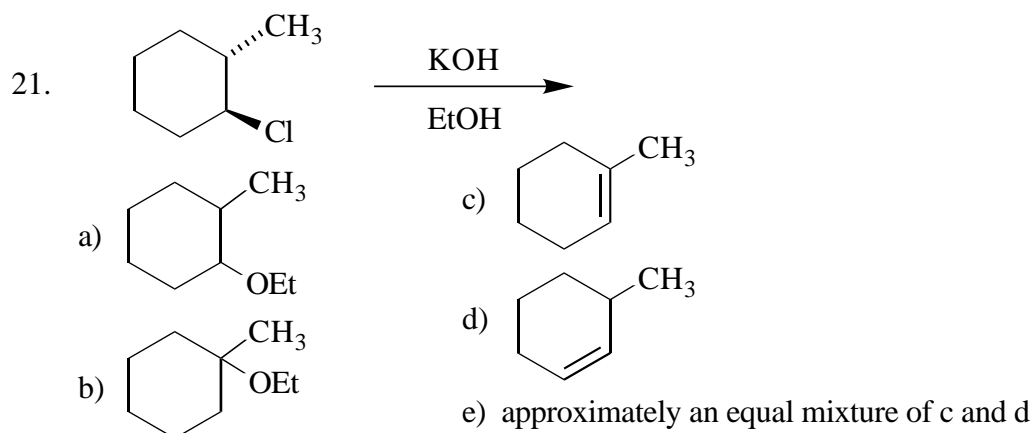
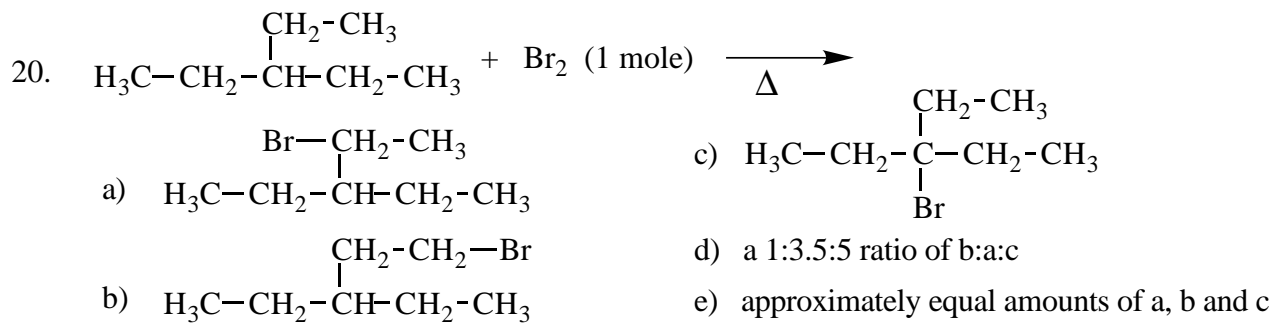
- a) I and II  
 b) V  
 c) I, II and III  
 d) I, II and IV  
 e) I, II and V

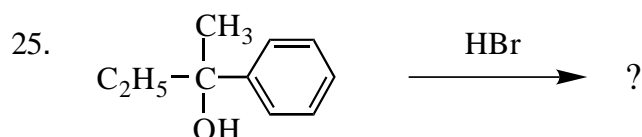
16. Which of the following reactions, if any, is significantly faster than the others?



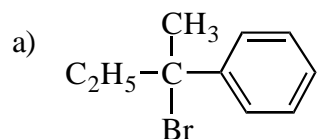
**What is the major organic product from the following reactions?**



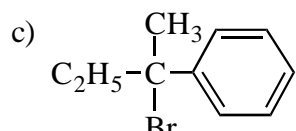




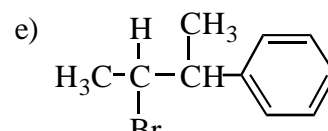
(R)-absolute configuration



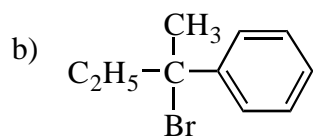
(R)-absolute config. only



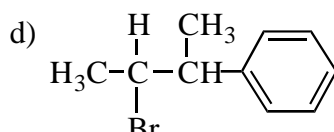
almost completely racemic



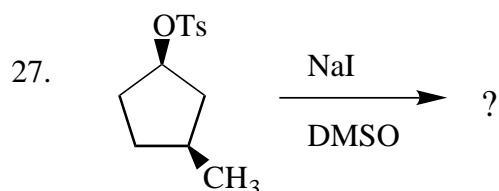
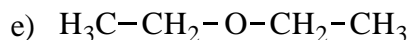
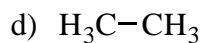
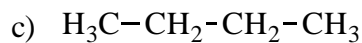
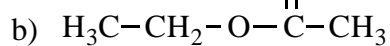
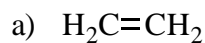
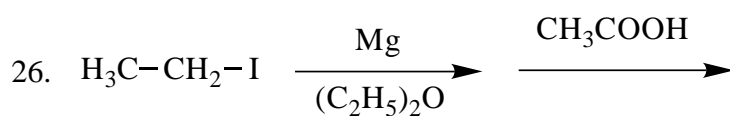
almost completely racemic



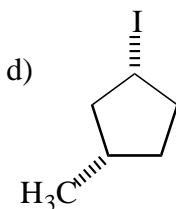
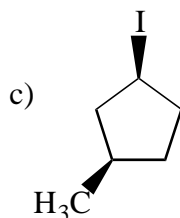
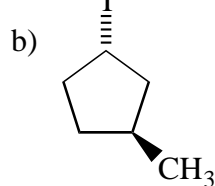
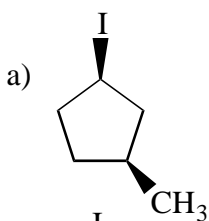
(S)-absolute config. only



optically active

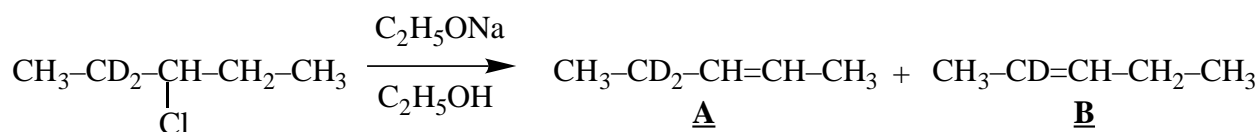


this absolute configuration



e) both b and c

28. Given the following E2 elimination reaction:



The ratio of A:B in the product will be approximately:

a) 7:1

b) 1:7

c) 1:1

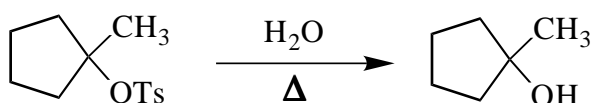
d) only A is formed

e) only B is formed

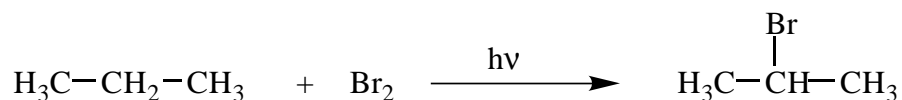
29. Which of the following is **NOT** an oxidation?

- a)  $\text{CH}_4 \longrightarrow \text{CH}_3\text{OH}$   
 b)  $\text{CH}_4 \longrightarrow \text{CH}_3\text{Cl}$   
 c)  $\text{CH}_2=\text{CH}_2 \longrightarrow \begin{array}{c} \text{O} \\ \diagup \quad \diagdown \\ \text{H}_2\text{C} \quad \text{CH}_2 \end{array}$   
 d)  $\text{CH}_2=\text{CH}_2 \longrightarrow \text{CH}_3\text{-CH}_2\text{-OH}$   
 e)  $\text{CH}_2=\text{CH}_2 \longrightarrow \begin{array}{c} \text{Br} \quad \text{Br} \\ | \quad | \\ \text{H}_2\text{C} \quad \text{CH} \end{array}$

30. Provide a **step-by-step mechanism** (show **each step** separately) for the following reaction.



31. Provide a **step-by-step mechanism** (show **each step separately**) for the **propagation steps only** for the bromination of propane to give 2-bromopropane.



Show **step-by-step** (include reagents and solvents/conditions where crucial) how you would convert the compound given to the product shown. You can use **any stable organic molecules containing ONE or TWO carbon atoms** in addition to the starting compound, any inorganic reagents and any solvents. **Write clearly** and **THINK!!!** Remember not to use reactions which give large amounts of undesired side products.

