CHM 234, Spring 2018

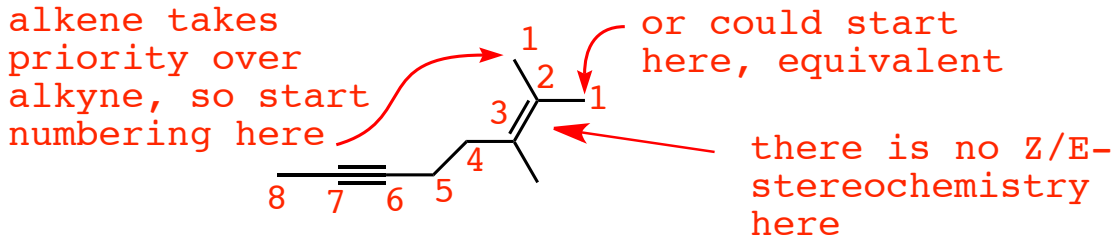
QUIZ #2 ANSWER KEY

(hit the RETURN Button to return to the Main Quiz Page)

QUESTION 1

MC28b

Which is the correct IUPAC name for the following structure?



A. 2,3-dimethyloct-(2Z)-en-6-yne

B. 6,7-dimethyloct-6-en-2-yne

C. 2,3-dimethyloct-2-en-6-yne

D. 6,7-dimethyloct-(6E)-en-2-yne

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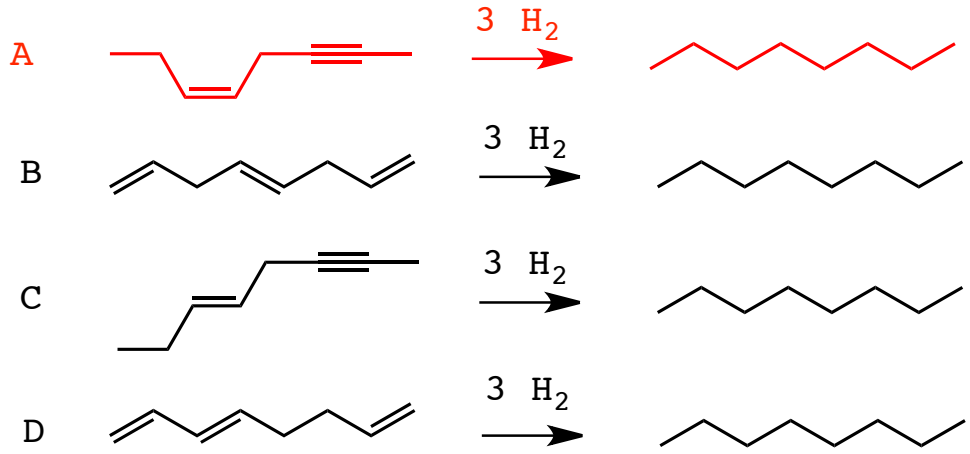
alkene takes priority over alkyne in this example because the lowest # the alkene and the alkyne can get when numbering is 2, in a tie the alkene "wins"

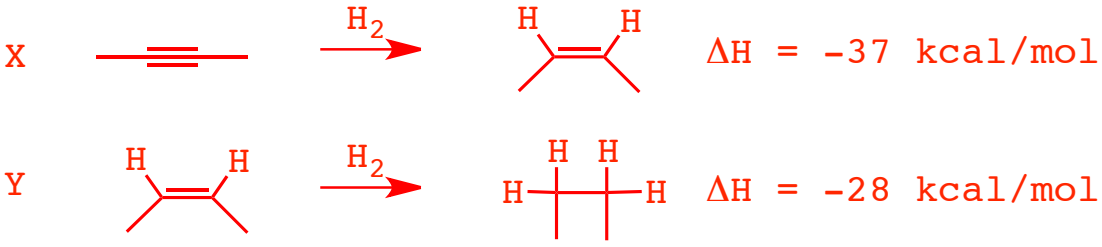
QUESTION 2

MC28c

Which is the most exothermic reaction?



Each reaction is obviously exothermic since they all convert 3 π-bonds (higher energy electrons) into σ-bonds (lower energy electrons) by reduction with hydrogen to give the same product octane. The product energy is the same in each case, it is the energies of the reactants that are different. From the notes you know that reaction X below is more exothermic than reaction Y:

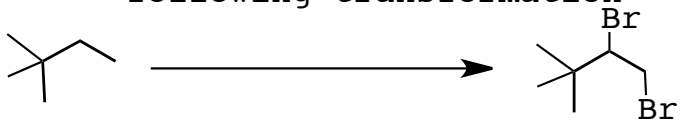


The easiest way to answer this question then is simply to say that reduction of alkynes is more exothermic than alkenes, thus A and C must be more exothermic than B and D. Structure A contains a higher energy cis-alkene compared to the trans alkene in C, thus reaction A must be overall more exothermic.

QUESTION 3

MC27aa

Give the best reaction sequence to accomplish the following transformation

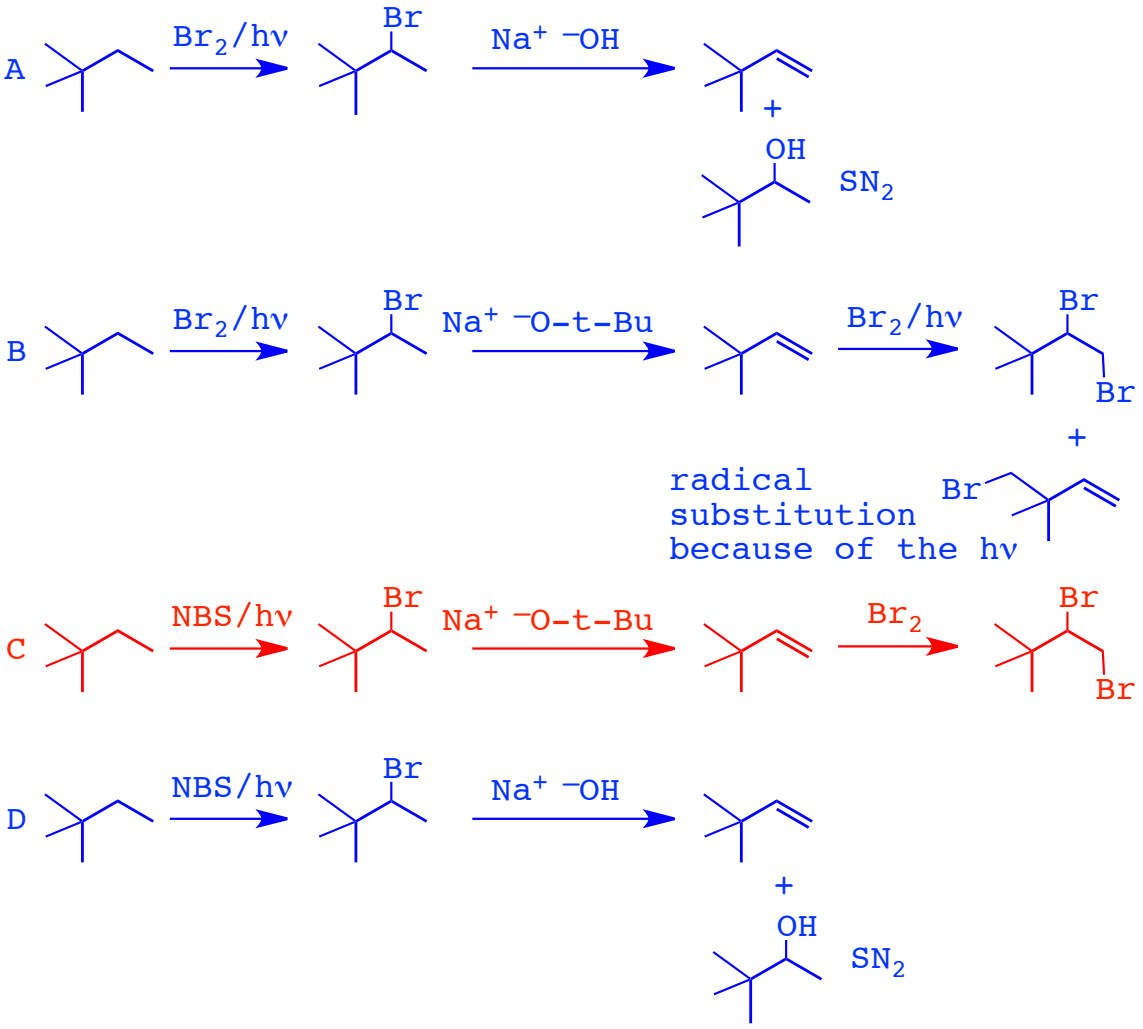


A 1. $Br_2/h\nu$ 2. $Na^+ {}^-OH$ 3. NBS/hν

B 1. $Br_2/h\nu$ 2. $Na^+ {}^-O\text{-}t\text{-}Bu$ 3. $Br_2/h\nu$

C 1. NBS/hν 2. $Na^+ {}^-O\text{-}t\text{-}Bu$ 3. Br_2

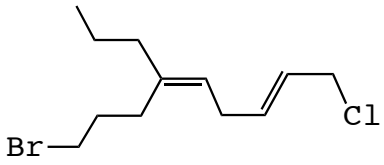
D 1. NBS/hν 2. $Na^+ {}^-OH$ 3. Br_2



QUESTION 4

MC26p

Which is the correct IUPAC name for the following structure?

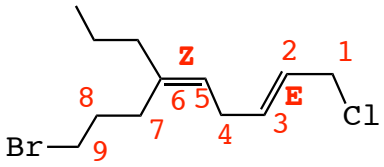


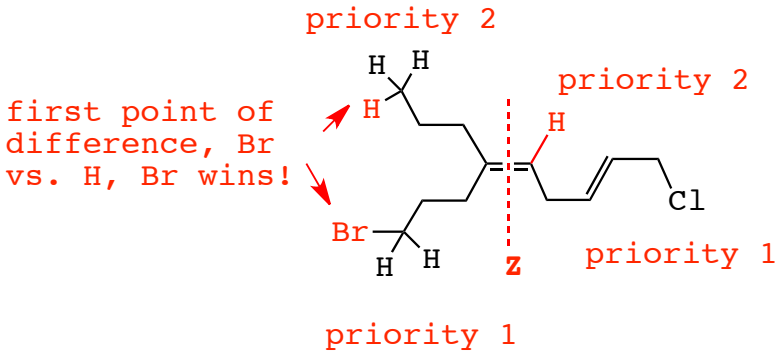
A 1-bromo-9-chloro-4-propyl-(4E,7E)-nonadiene

B 9-bromo-1-chloro-6-propyl-(2E,5E)-nonadiene

C 1-bromo-9-chloro-4-propyl-(4Z,7E)-nonadiene

D 9-bromo-1-chloro-6-propyl-(2E,5Z)-nonadiene

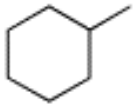


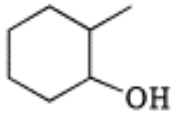


QUESTION 5

MC27k

Which correctly describes the reagents/conditions/ reaction sequence to synthesize the provided alcohol from methylcyclohexane (ignore stereochemistry)?



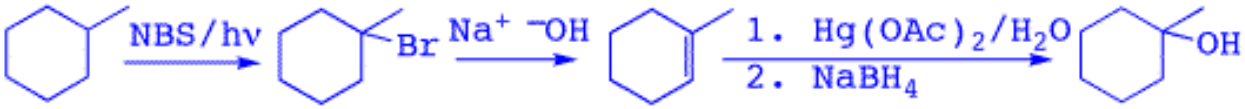


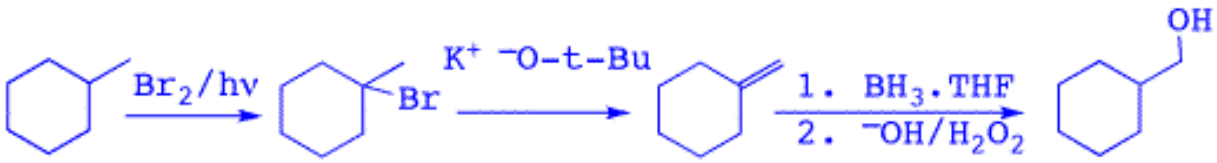
A 1. NBS/hv, 2. $Na^+ {}^-OH$, 3. $Hg(OAc)_2/H_2O$, 4. $NaBH_4$

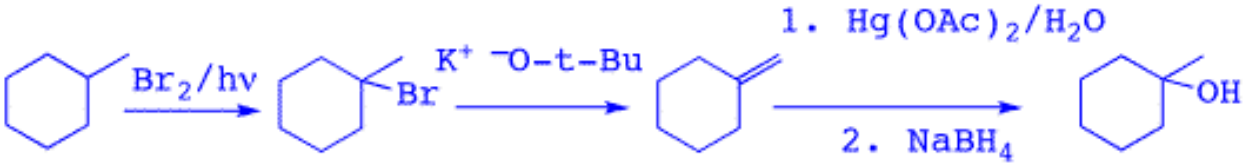
B 1. Br_2/hv, 2. $K^+ {}^-O\text{-}t\text{-}Bu$, 3. $BH_3.THF$, 4. $^-OH/H_2O_2$

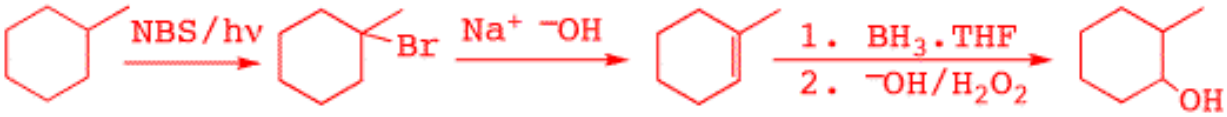
C 1. Br_2/hv, 2. $K^+ {}^-O\text{-}t\text{-}Bu$, 3. $Hg(OAc)_2/H_2O$, 4. $NaBH_4$

D 1. NBS/hv, 2. $Na^+ {}^-OH$, 3. $BH_3.THF$, 4. $^-OH/H_2O_2$





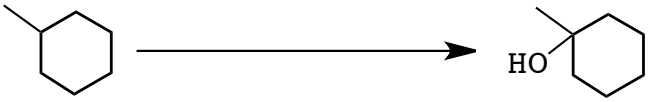




QUESTION 6

MC27z

Give the best reaction sequence to accomplish the following transformation

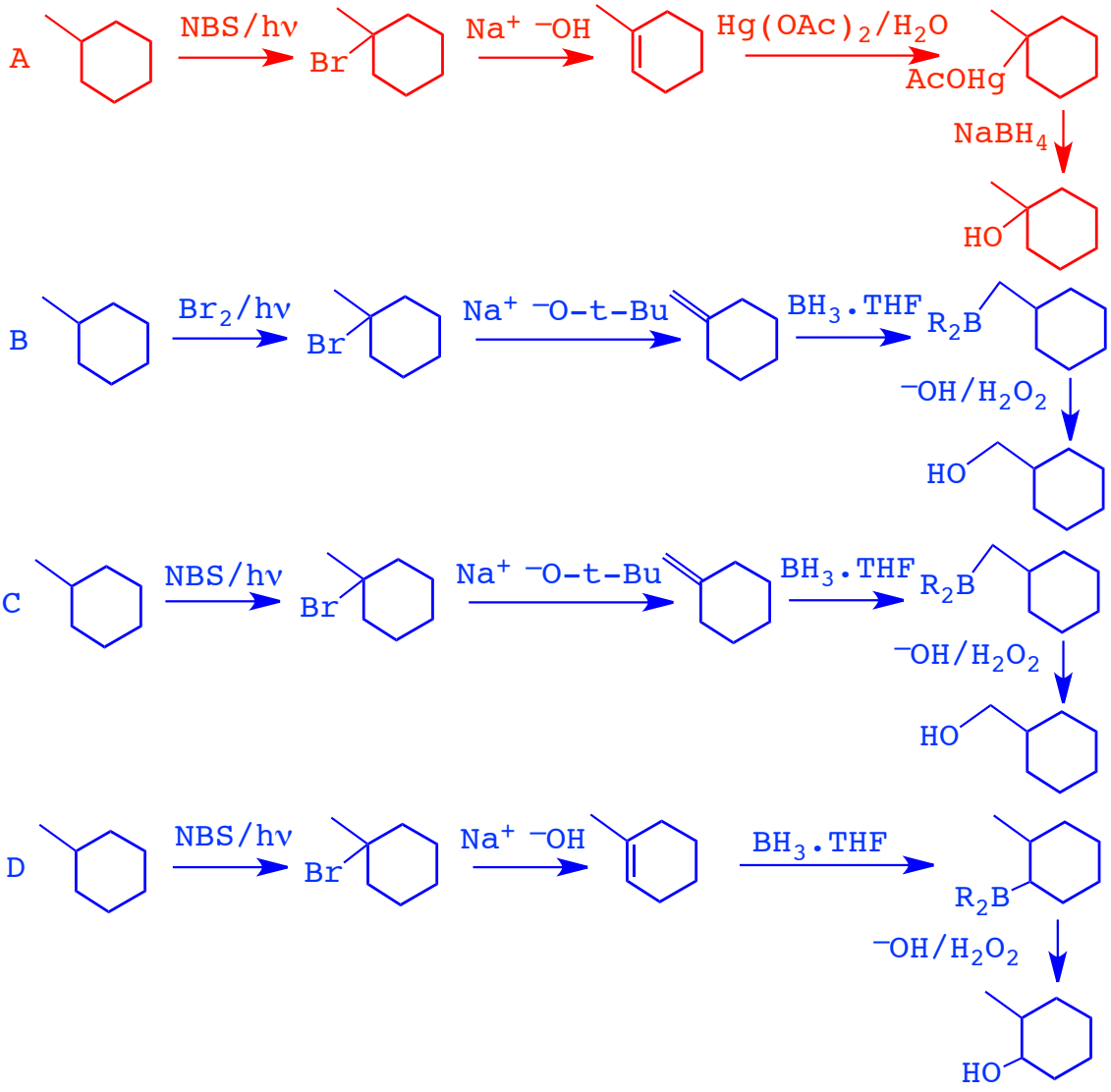


A 1. NBS/hν 2. Na^+ ^-OH 3. $Hg(OAc)_2/H_2O$ 4. $NaBH_4$

B 1. $Br_2/h\nu$ 2. Na^+ ^-O-t-Bu 3. BH_3.THF 4. $^-OH/H_2O_2$

C 1. NBS/hν 2. Na^+ ^-O-t-Bu 3. BH_3.THF 4. $^-OH/H_2O_2$

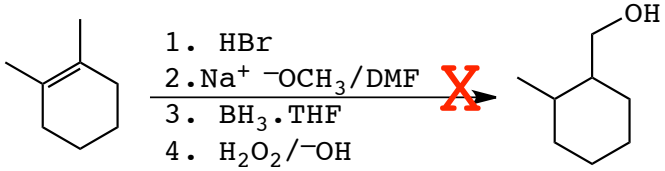
D 1. NBS/hν 2. Na^+ ^-OH 3. BH_3.THF 4. $^-OH/H_2O_2$

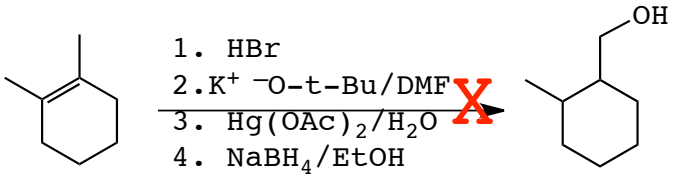


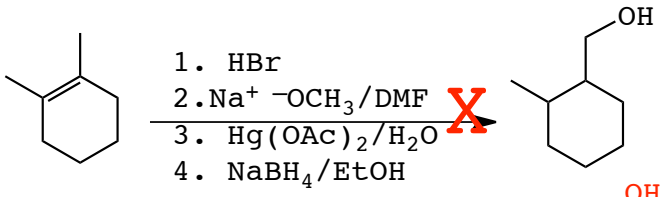
QUESTION 7

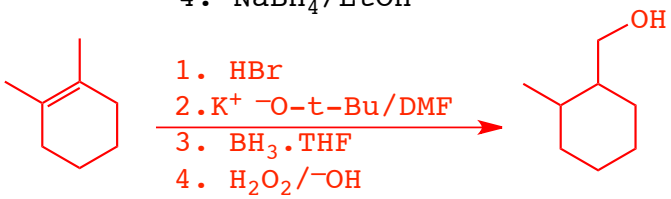
MC27o

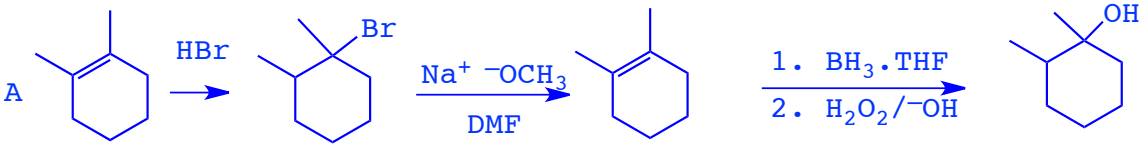
Which describes the best synthesis of those shown below (stereochemistry is ignored in this problem)?

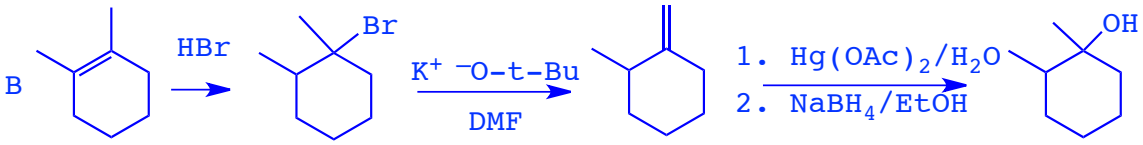
A 

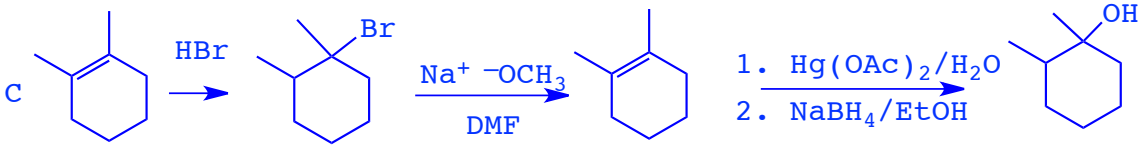
B 

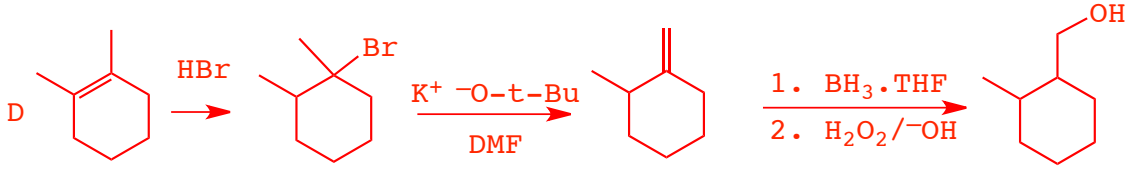
C 

D 

A 

B 

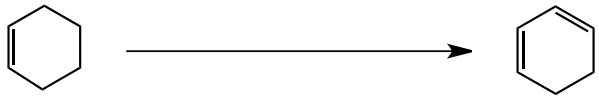
C 

D 

QUESTION 8

MC27x

Which are the best reagents/conditions to perform the following conversion?



A 1. NBS/hν 2. $Na^+ {}^-OH$

B 1. NBS/hν 2. $Na^+ {}^-O\text{-}tBu$

C 1. Br_2/hν 2. $Na^+ {}^-OH$

D 1. Br_2/hν 2. $Na^+ {}^-O\text{-}tBu$

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we need to add Br in the allylic position and AVOID addition of Br_2 to the C=C bond, which means that we must use NBS/hν instead of Br_2/hν. NBS/hν is useful for ALL radical brominations, including simple alkanes

we next need to make sure that we get elimination and not substitution, so we need a bulky base, not $Na^+ {}^-OH$