CHEMISTRY 61
Exam 2: October 16, 2001
Dr. M.T. Crimmins

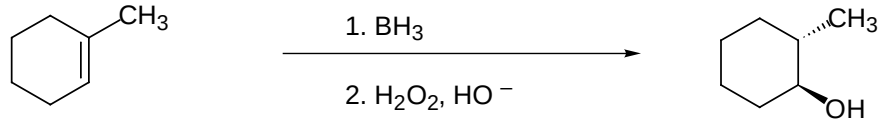
Name_____KEY_____

Pledge: I have neither given nor received aid on this exam.

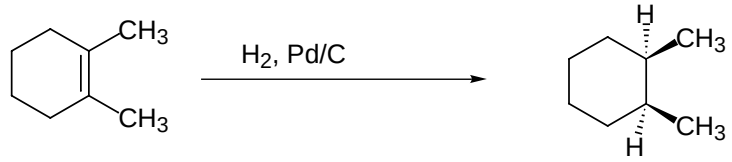
Signature_____

I. REACTIONS: Predict the major organic products of the following reactions.
**INDICATE STEREOCHEMISTRY AS NEEDED.** (4 points each)

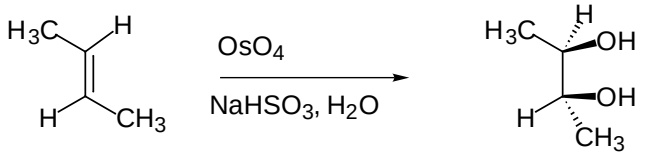
1.



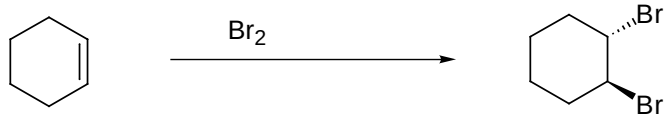

2.



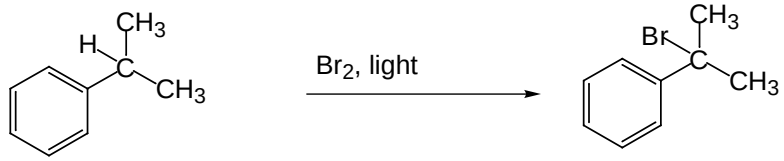

3.



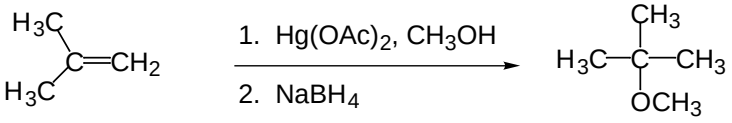

4.



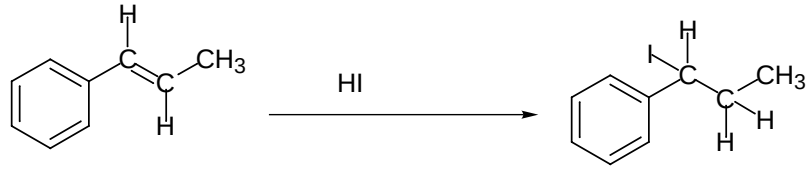

5.



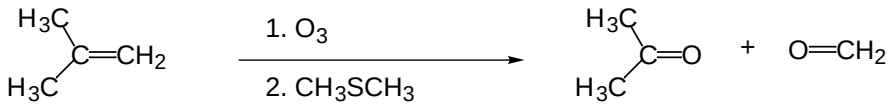

6.



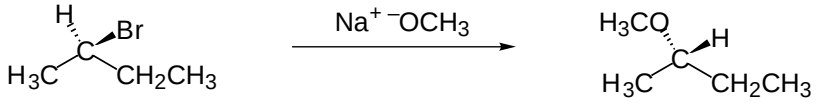

7.



8.




9.




10. Label each of the following as a Lewis acid or Lewis base. 2 points each.

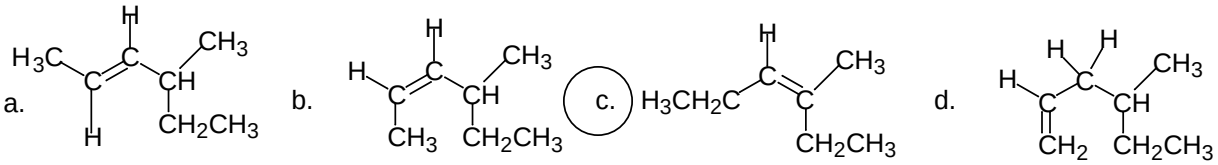
+$CH_3$ $BCl_3$ $H_2C=CH_2$

a. Lewis Acid b. Lewis Acid c. Lewis Base

II. Multiple Choice: Circle the best answer **(only one)**. (3 points each)

11. Which of the following alkenes has the lowest heat of hydrogenation?

C




11. Which of the following is the **most** stable carbocation?

A a. $C_6H_5(CH_3)_2C^+$ c. $H_2C=CHCH_2^+$
b. $CH_3CH_2^+$ d. $(CH_3)_3C^+$

12. Which of the following is the **most** acidic?

C a. **H**—$CH_2CH_3$ c. **H**–C≡CH
b. **H**—CH=$CH_2$ d. **H**—$CH(CH_3)_2$

13. Which of the following is the **most** acidic?

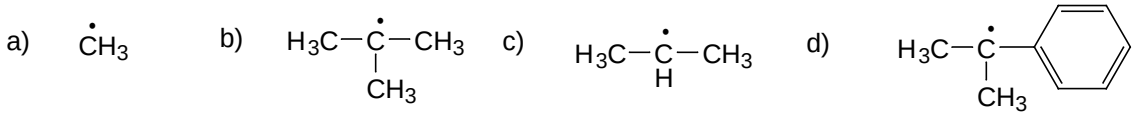
D a. HF c. HCl
b. HBr d. HI

14. Which of the following is the **least** acidic?

A a. $CH_3CO_2H$ c. $BrCH_2CO_2H$
b. $ClCH_2CO_2H$ d. $FCH_2CO_2H$

15. Which of the following free radicals is the **most** stable?

D



16. List four things which affect acidity. (1 point each)

_size of the atom bearing the charge_

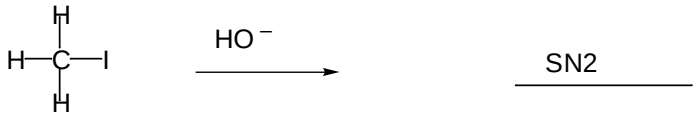
_electronegativity of the atom bearing the charge_

_Resonance___

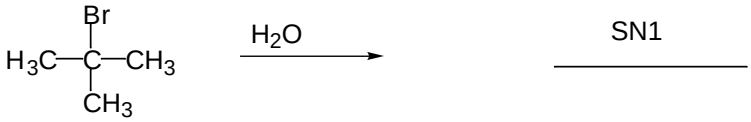
__Induction by nearby electron withdrawing groups__

hybndization of the atom bearing the charge

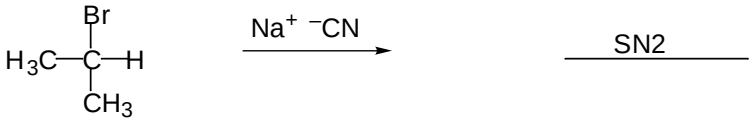
17. Would you expect the following to proceed by SN1 or SN2 mechanism? (2 points each)

a. 

SN2

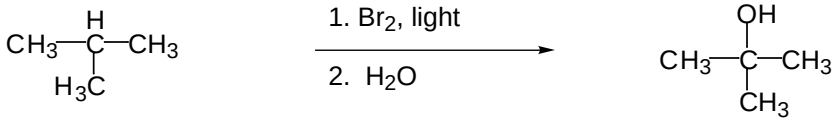
b. 

SN1

c. 

SN2

Syntheses: Give reagents to carry out the transformations below. (4 points each)

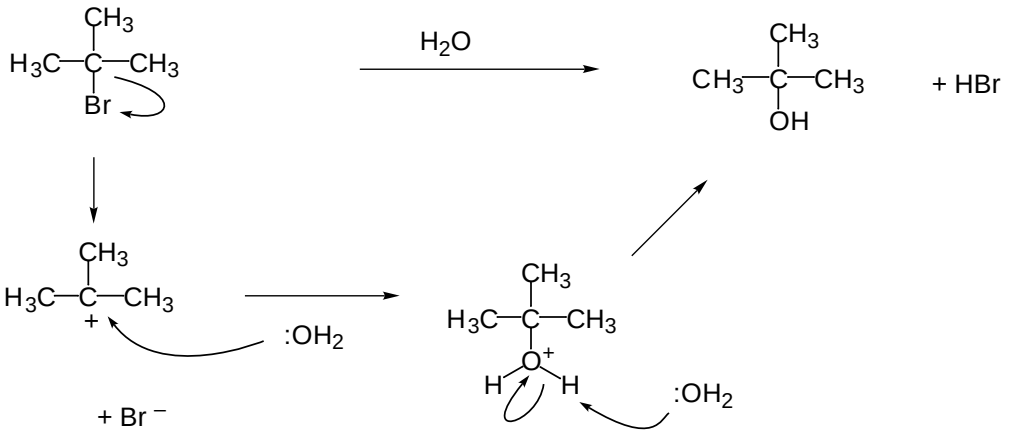
18. 


19. Choose from: SN1, SN2, free radical substitution, electrophilic addition, hydrogenation, dihydroxylation, ozonolysis, hydroboration. (2 points each)

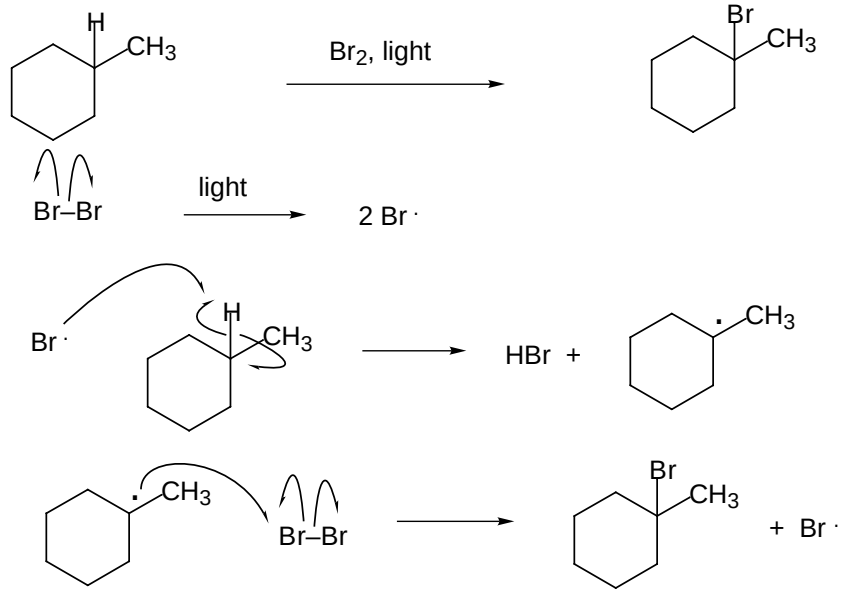
| | |
|---|---|
| stepwise reaction | _free radical substitution_ or _SN1__or electrophilic addition |
| stereospecific reaction | __SN2, or hydroboration or hydrogenation or dihydroxylation |
| concerted reaction | __SN2, or hydroboration or hydrogenation or dihydroxylation_ |
| chain reaction | ___free radical substitution |
| first order kinetics | ___SN1_____ |
| second order kinetics | ___SN2_____electrophilic addition_____ |
| inversion of stereochemistry | _____SN2_____ |
| racemization of stereochemistry | _____SN1_____ |

V. Mechanisms. Give a stepwise, detailed mechanism with arrows and intermediates for the following reactions. (4 points each)

20.




21.




22.