

# Chemistry 2541, Fall 2017

## Midterm Exam 3

(100 points)

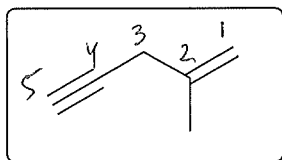
Key

### Important notes:

- Please use the provided Scantron form for your answers; you can keep the sheet with the questions and can use it as scratch paper
- Do not forget to write your name on the Scantron form
- You will not receive credit for unmarked answers or for more than one mark on answer line
- Your scores will be posted on eGradebook; graded Scantron forms will not be returned to students.

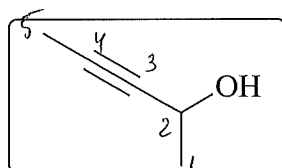
Questions 1-28 (84 pts): Please mark the appropriate box on the front of the Scantron form (3 pts each).

1. What is the IUPAC name for the compound shown in the box?



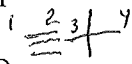
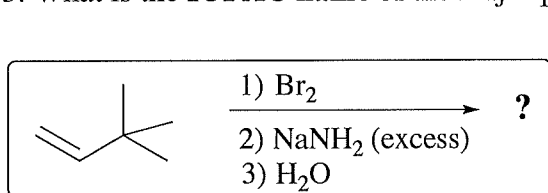
- A) (*E*)-2-methyl-5-pentyn-1-ene      B) 2-methyl-1-penten-4-yne  
 C) 2-methyl-1-hexen-4-yne      D) 4-methyl-1-hexyn-4-ene

2. What is the IUPAC name for the compound shown in the box?



- A) 3-pentyn-2-ol      B) 2-pentyn-4-ol  
 C) 2-methyl-3-butynol      D) 1-methyl-3-butyn-2-ol

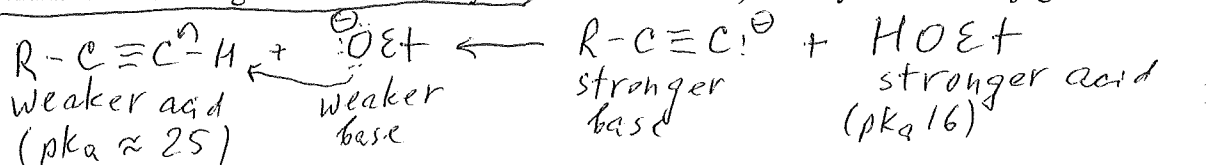
3. What is the IUPAC name of the major product for the reaction shown in the box?



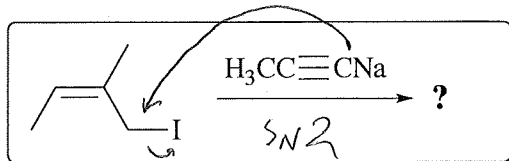
- A) 4,4-dimethyl-2-pentyne      B) 3,3-dimethyl-1-butyne  
 C) 4,4-dimethyl-1-pentyne      D) 3,3-dimethyl-1-pentyne

4. A terminal alkyne, 1-butyne is **NOT deprotonated** by the ethoxide ion. What does this indicate?

- A) Alkynyl anion is a weaker base than the hydroxide ion      B) 1-Butyne is stronger base than ethanol  
 C) Ethanol is a stronger acid than 1-butyne      D) 1-Butyne is the conjugate base of ethanol



5. What is the **IUPAC name** of the major product for the reaction shown in the box?

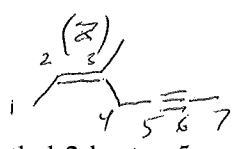


A) 2-methyl-1-hepten-5-yne

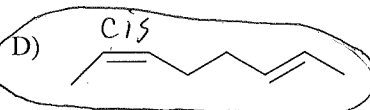
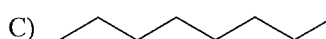
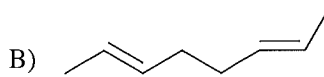
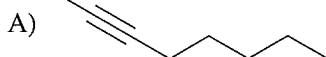
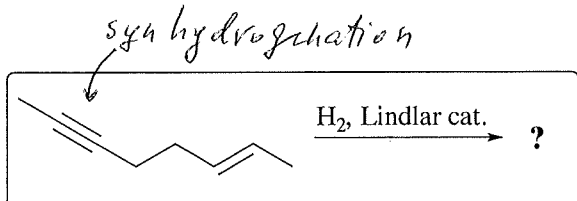
B) (E)-3-methyl-2-hepten-5-yne

C) 2-methyl-2-heptyne

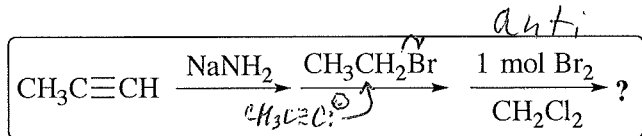
D) (Z)-3-methyl-2-hepten-5-yne



6. What is a main **product** of the reaction shown in the box?



7. What is the **IUPAC name** of the major product for the reaction sequence shown in the box?

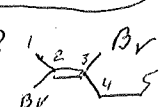


A) (E)-2,3-dibromo-2-pentene

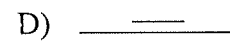
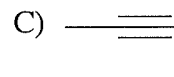
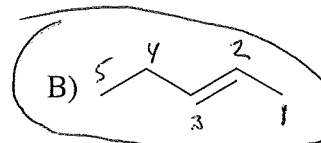
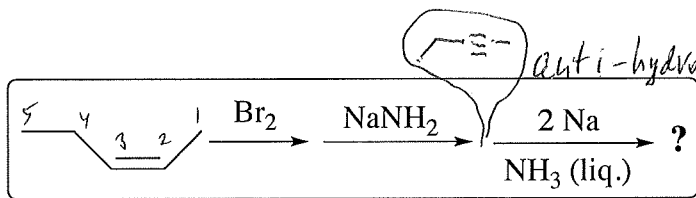
B) 2,3-dibromopentane

C) (Z)-2,3-dibromo-2-pentene

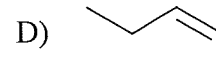
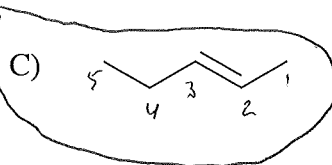
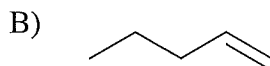
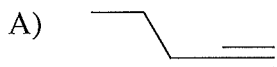
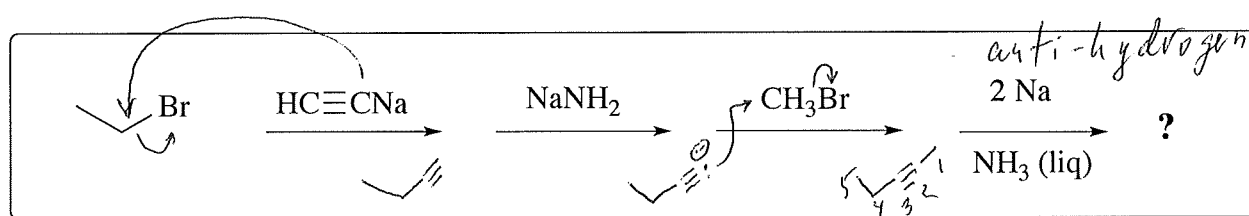
D) 3,3-dibromopentane



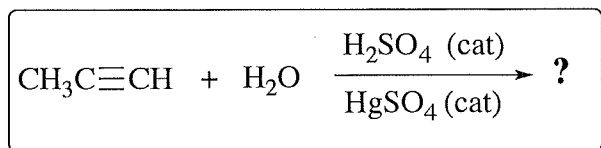
8. What is the main **product** of the reaction shown in the box?



9. What is the main **product** of the reaction sequence shown in the box?



10. What is the main **product** of the reaction shown in the box?



A) CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>OH

B) CH<sub>3</sub>CH(OH)CH<sub>3</sub>

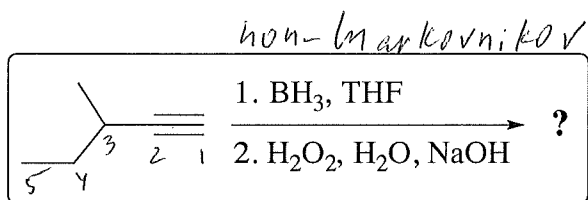
C) CH<sub>3</sub>CH<sub>2</sub>CHO

D) CH<sub>3</sub>COCH<sub>3</sub>

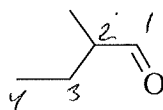
markovnikov hydration



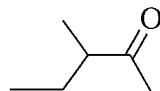
11. What is the main **product** of the reaction shown in the box?



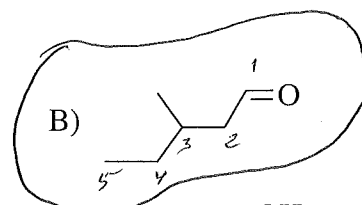
A)



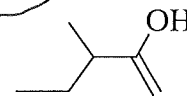
C)



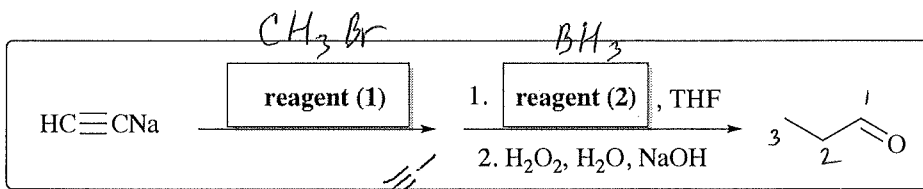
B)



D)



12. Which **sequence of reagents** can be used for the reaction shown in the box?



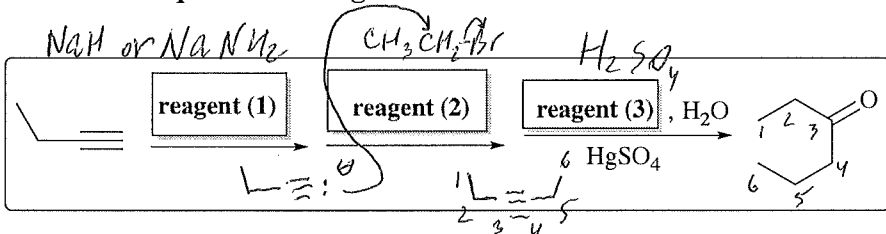
A) (1) CH<sub>3</sub>Br, (2) BH<sub>3</sub>

B) (1) CH<sub>2</sub>CH<sub>3</sub>Br, (2) BH<sub>3</sub>

C) (1) CH<sub>3</sub>Br, (2) H<sub>2</sub>SO<sub>4</sub>

D) (1) CH<sub>2</sub>CH<sub>3</sub>Br, (2) HgSO<sub>4</sub>

13. Which **sequence of reagents** can be used for the reaction shown in the box?



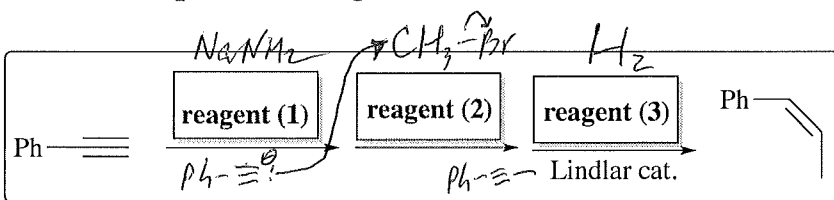
A) (1) NaNH<sub>2</sub>, (2) C<sub>2</sub>H<sub>5</sub>Br, (3) H<sub>2</sub>SO<sub>4</sub>

B) (1) NaNH<sub>2</sub>, (2) CH<sub>3</sub>Br, (3) H<sub>2</sub>SO<sub>4</sub>

C) (1) Br<sub>2</sub>, (2) NaNH<sub>2</sub>, (3) BH<sub>3</sub>

D) (1) NaNH<sub>2</sub>, (2) CH<sub>3</sub>Br, (3) BH<sub>3</sub>

14. Which **sequence of reagents** can be used for the reaction shown in the box?



A) (1) NaNH<sub>2</sub>, (2) CH<sub>3</sub>Br, (3) H<sub>2</sub>

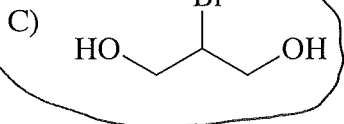
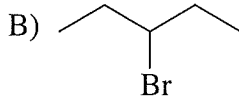
B) (1) CH<sub>3</sub>Br, (2) NH<sub>3</sub>, (3) Na

C) (1) CH<sub>3</sub>CH<sub>2</sub>Br, (2) NaNH<sub>2</sub>, (3) H<sub>2</sub>

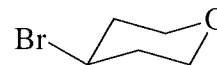
D) (1) Br<sub>2</sub>, (2) NaNH<sub>2</sub>, (3) H<sub>2</sub>

15. Which one of the following compounds has **high solubility in water**?

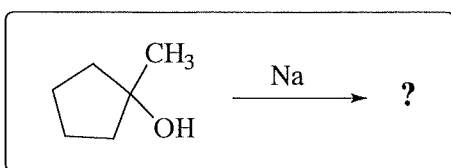
A) CHBr<sub>3</sub>



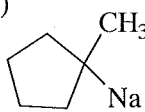
D)



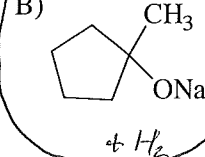
16. What is the main **product** of the reaction shown in the box?



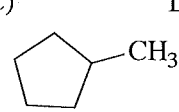
A)



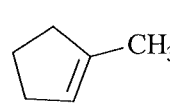
B)



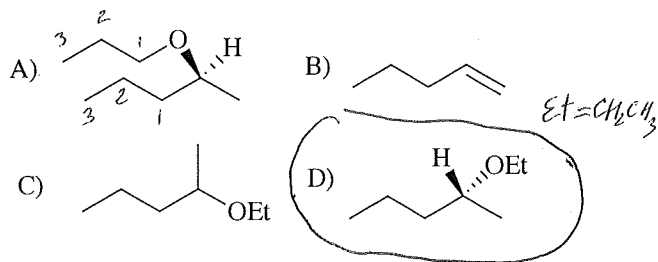
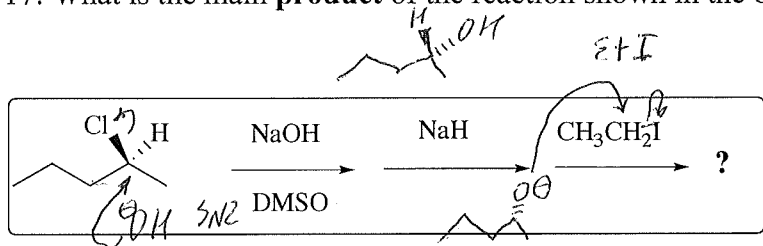
C)



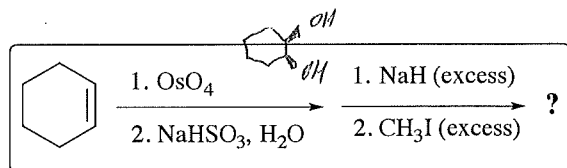
D)



17. What is the main **product** of the reaction shown in the box?

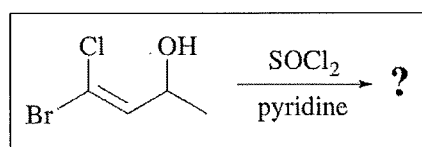


18. What is the **IUPAC name** of the major product for the reaction sequence shown in the box?



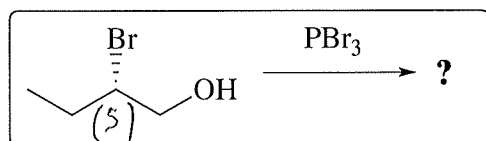
- A) *cis*-1,2-dimethoxycyclohexane B) *cis*-1,2-dimethylcyclohexane  
 C) *trans*-1,2-dimethoxycyclohexane D) *trans*-1,2-dimethylcyclohexane

19. What is the IUPAC name of the major product for the reaction shown in the box?



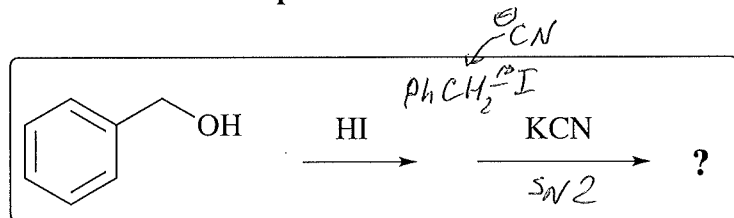
- A) (*E*)-1-bromo-1,3-dichloro-1-butene B) (*Z*)-1-bromo-1,3-dichloro-1-butene  
 C) (*E*)-1-bromo-1,3-dichloro-2-butene D) (*Z*)-1-bromo-1,3-dichloro-2-butene

20. What is the **IUPAC name** of the major product for the reaction shown in the box?



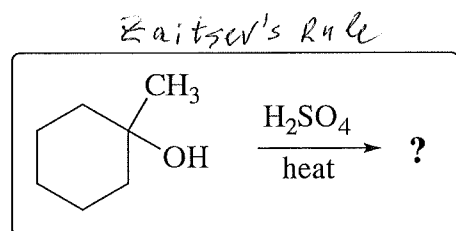
- A) (2*S*,3*S*)-2,3-dibromobutane B) (2*R*,3*S*)-2,3-dibromobutane  
 C) (*R*)-1,2-dibromobutane D) (*S*)-1,2-dibromobutane

21. What is the main **product** of the reaction shown in the box?

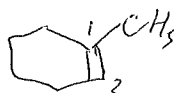


- A) PhCH<sub>2</sub>CH<sub>2</sub>CN B) PhCH<sub>2</sub>CN  
 C) PhCH=CH<sub>2</sub> D) PhCHO

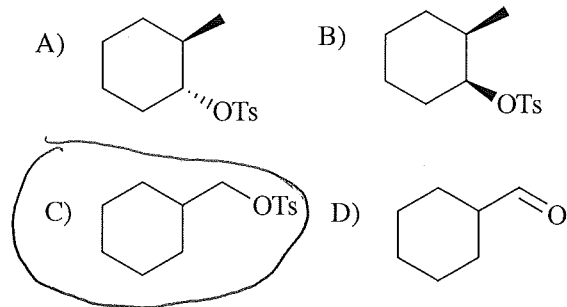
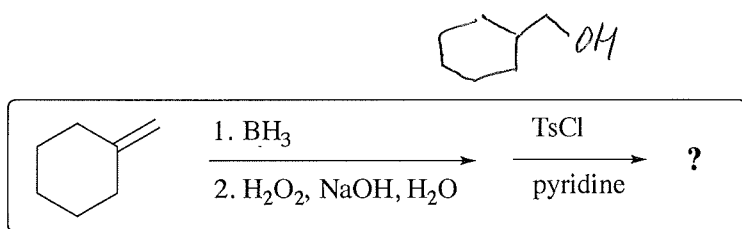
22. What is the **IUPAC name** of the major product for the reaction shown in the box?



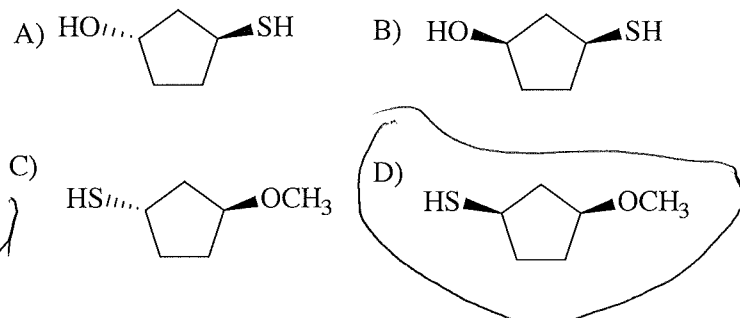
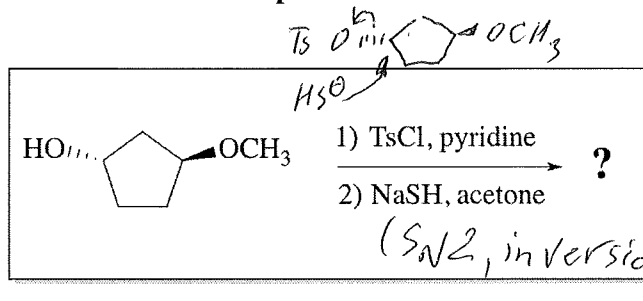
- A) 1-methylcyclohexene B) 3-methylcyclohexene  
 C) 4-methylcyclohexene D) methylenecyclohexene



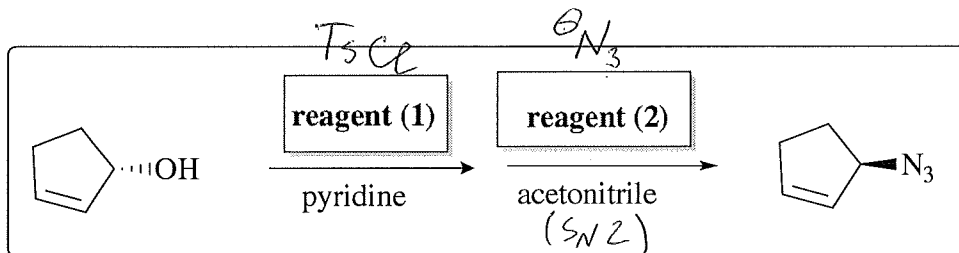
23. What is the main **product** of the reaction shown in the box?



24. What is the main **product** of the reaction shown in the box?

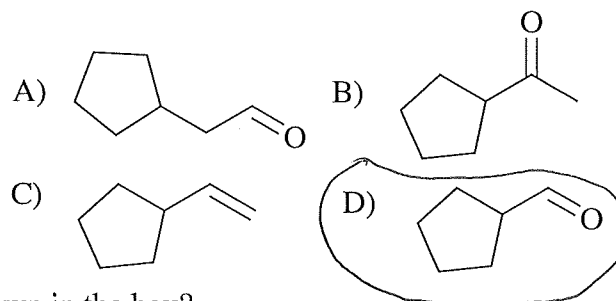
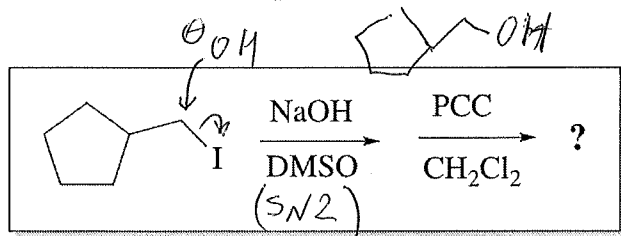


25. Which **sequence of reagents** can be used for the reaction shown in the box?

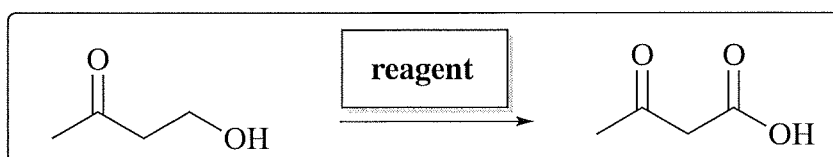


- A) (1)  $\text{NaN}_3$ , (2) IBX  
 B) (1) IBX, (2)  $\text{NaN}_3$   
 C) (1) TsCl, (2)  $\text{NaN}_3$   
 D) (1)  $\text{NaN}_3$ , (2) TsCl

26. What is the main product of the reaction sequence shown in the box?

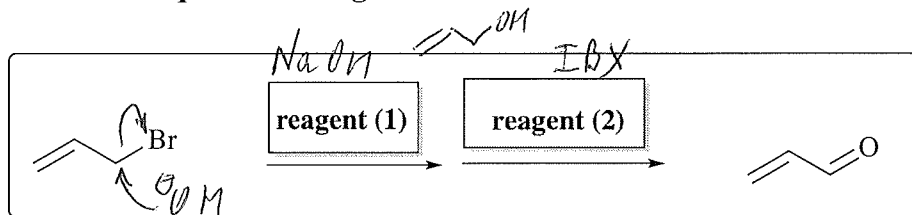


27. Which **reagent** can be used for the reaction shown in the box?



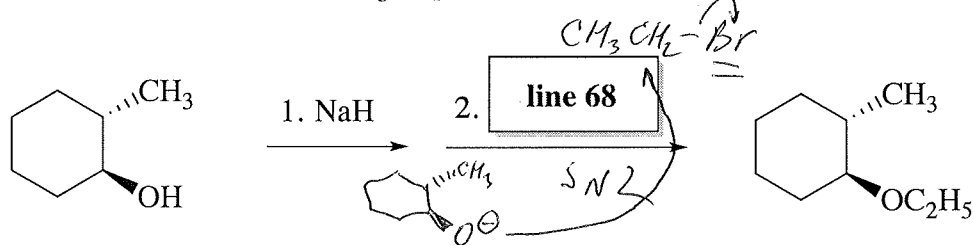
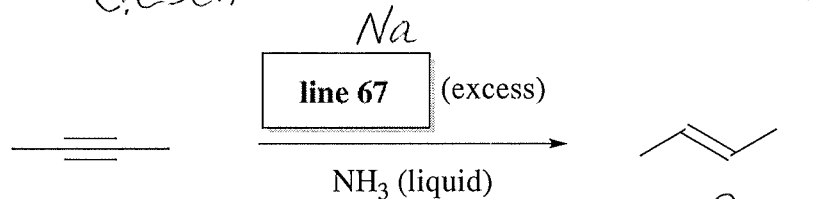
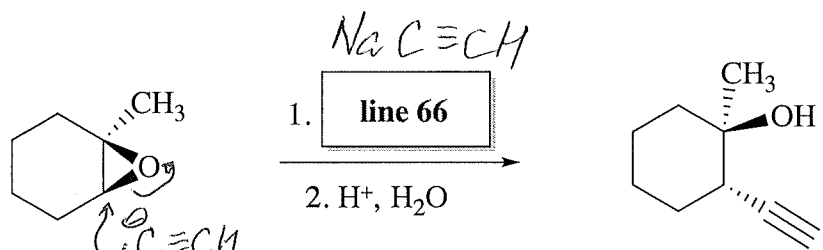
- A) IBX  
 B)  $\text{H}_2\text{CrO}_4$   
 C) PCC  
 D) NBS

28. Which **sequence of reagents** can be used for the reaction shown in the box?



- A) (1) NaOH, (2) IBX  
 B) (1) CH<sub>3</sub>ONa, (2) PCC  
 C) (1) NBS, (2) PCC  
 D) (1) NaOH, (2) H<sub>2</sub>CrO<sub>4</sub>

Question 29: Provide the reagents that give the indicated products in high yield. Please write your answers in **boxes 66-69** on the back of the Scantron form (4 pts each).



+ NaBr = leaving group in SN2

