CHEM 2410 Fall 2018 – Mid-Term Exam 2
10-24-18

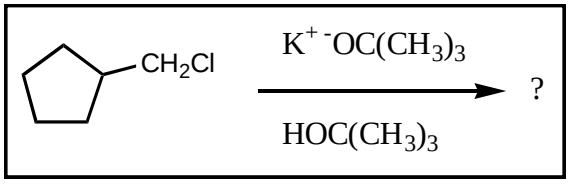
Time: 5:30pm – 6:30pm

Student Name: _____

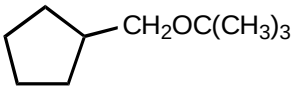
Student Number: _____

Instructor:	Prof. Andreana
Room #:	WO 1205

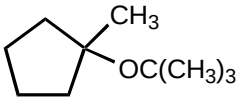
1. What would be the **major** organic product of the following E_2 reaction?



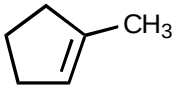
A)



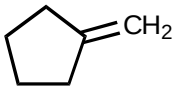
B)



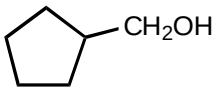
C)



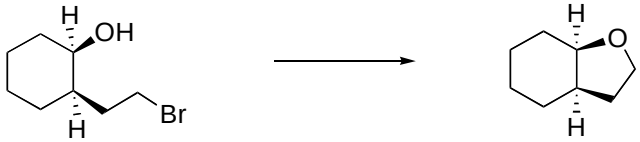
D)



E)

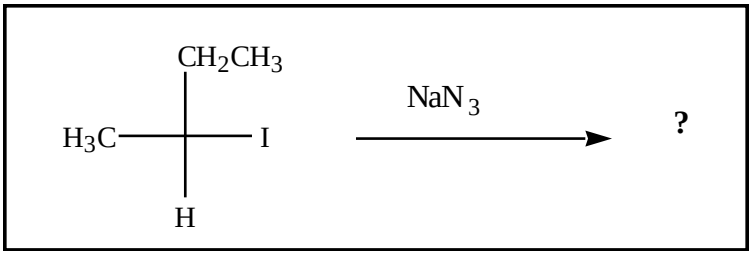


2. Which set of reagents will best accomplish the following reaction?

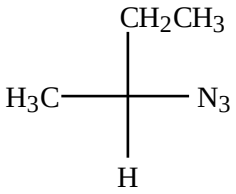


A) Br_2, acetone
B) H_2SO_4, H_2O
C) Br_2, hv
D) NaOEt, DMSO

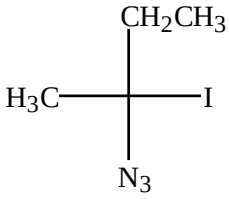
3. Predict the major product of the following S_N2 reaction:



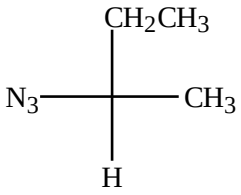
A)



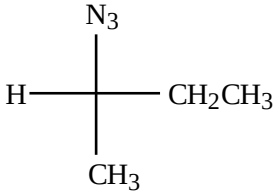
B)



C)

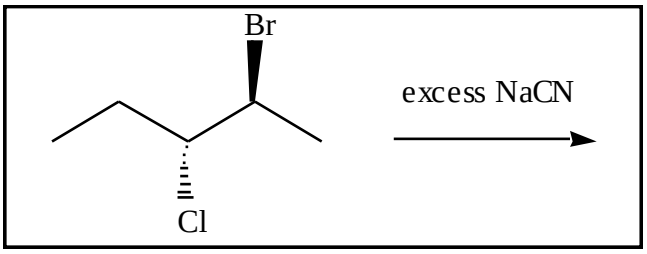


D)



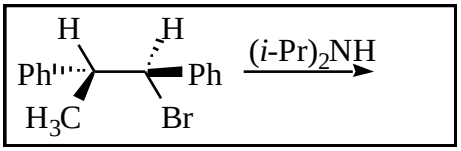
E) none of the above

4. What is the correct stereochemistry of the product of the following S_N2 reaction (Hint: Two ^-CN nucleophiles react – one at each chiral center):

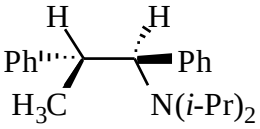


A) 3*R*,4*S*
B) 2*S*,3*R*
C) 2*R*,3*S*
D) 2*R*,3*R*
E) 3*R*,4*R*

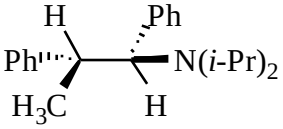
5. Predict the product of the following E_2 reaction.



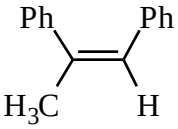
A)



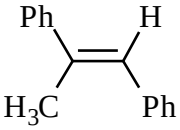
B)



C)



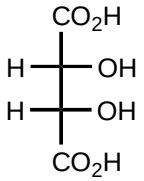
D)



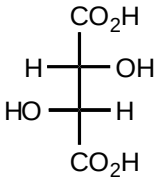
E) no reaction

6. Which of the following Fischer projections represents (2*R*,3*R*)-tartaric acid? Hint: The OH is priority 1 and the CO_2H is priority 2 for both chiral centers.

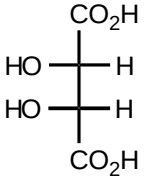
A)



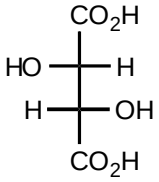
B)



C)

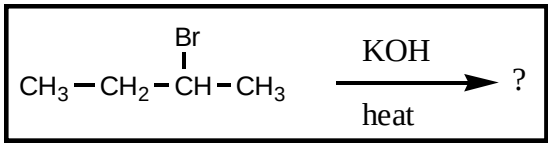


D)

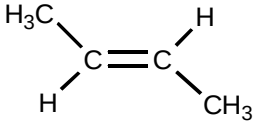


E) none of the above

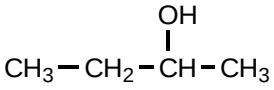
7. What would be the major product of the following E_2 reaction?



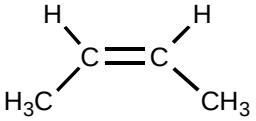
A)

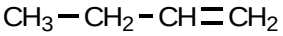


B)

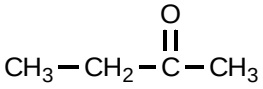


C)

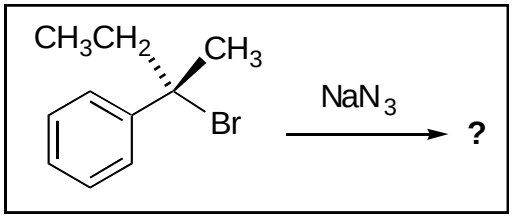


D) 

E)

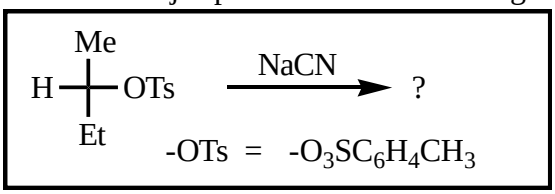


8. The **major** product of the following reaction conditions will result from (Hint: chiral starting compound is 3^o alkyl halide and the $Na^+ {}^-N_3$ is S_N2 conditions):

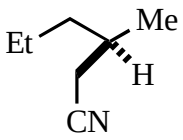


A) S_N2
B) S_N1
C) E2
D) E1
E) there is no way to know

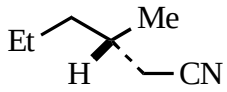
9. Predict the major product of the following S_N2 reaction:



A)

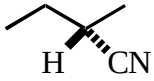


B)



C)

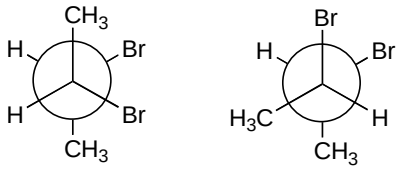
D)



E)

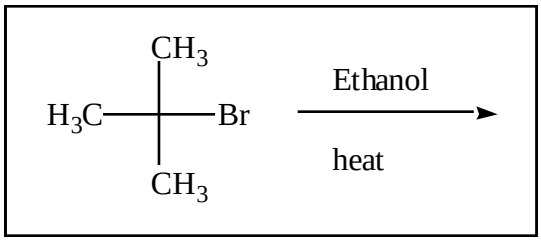
10. Which of the following can be used to synthesize (*R*)-2-cyanopentane from (*R*)-2-bromopentane?
    A) NaBr
    B) NaCN
    C) NaI followed by KCN
    D) NaCN followed by HI

11. How are the following compounds related?

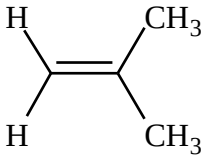


A) Diastereomers
B) Enantiomers
C) Meso compounds
D) Not related

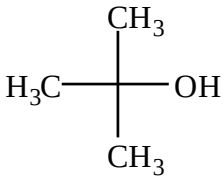
12. Circle the product of the following E_1 reaction:



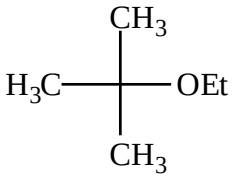
A)



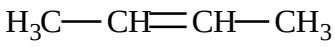
B)



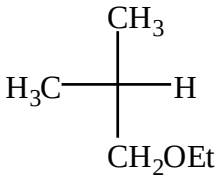
C)



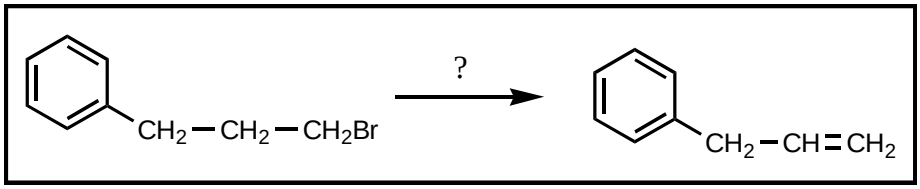
D)



E)

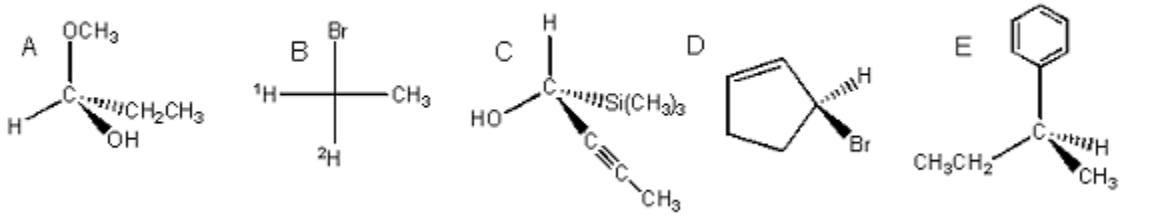


13. Which of the bases below would be best to accomplish the following reaction? Hint: Think E_2 and size of base!



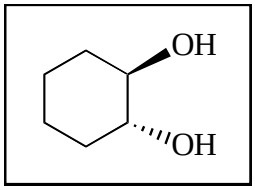
A) $CH_3O^-\ Na^+$
B) $CH_3CH_2O^-\ Na^+$
C) $(CH_3)_2CHO^-\ Na^+$
D) $(CH_3)_3CO^-\ Na^+$
E) $Na^+\ ^-OH$

14. Label the following carbons as either (R) or (S). ^2H is actually Deuterium and higher in priority than ^1H but lower than a methyl group.



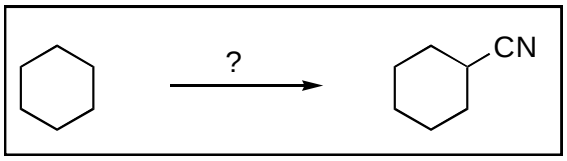
A) A = R, B = R, C = R, D = R, E = R
B) A = S, B = S, C = S, D = S, E = S
C) A = S, B = R, C = S, D = S, E = S
D) A = S, B = S, C = R, D = S, E = S
E) A = S, B = S, C = S, D = R, E = S

15. What would be the proper name of the following?

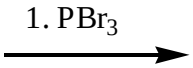


A) (1*R*,2*R*)-trans-1,2-cyclohexanediol
B) (1*R*,2*S*)-trans-1,2-cyclohexanediol
C) (1*S*,2*R*)-trans-1,2-cyclohexanediol
D) (1*S*,2*S*)-trans-1,2-cyclohexanediol
E) (1*S*,2*R*)-cis-1,2-cyclohexanediol

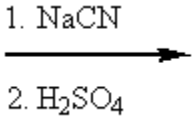
16. What reactants are required to achieve the following transformation?



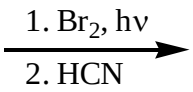
A)



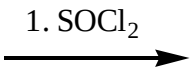
B)



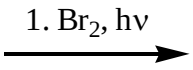
C)



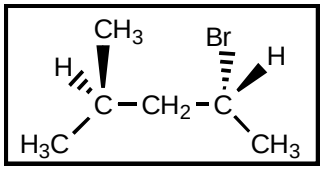
D)



E)

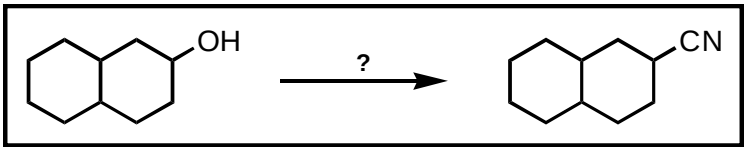


17. What would be the complete name of the following?



A) (2*R*,4*S*)-2-bromopentane
B) (*R*)-2-bromo-4-methylpentane
C) (*S*)-4-bromo-2-methylpentane
D) (2*R*,4*R*)-2-bromo-4-methylpentane
E) (*S*)-2-bromo-4-methylpentane

18. What reactants are required to achieve the following transformation? Hint: Go to Question 9 for assistance.



A)

$\xrightarrow{\text{NaCN}}$

B)

$\xrightarrow[\text{2) KCN}]{\text{1) NaOH}}$

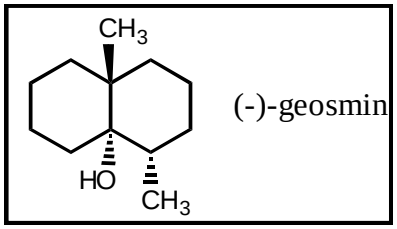
C)

$\xrightarrow[\text{2. KCN}]{\text{1. } Cl-\overset{\overset{O}{\|}}{\underset{\underset{O}{\|}}{S}}-CH_3 \text{, pyridine}}$

D)

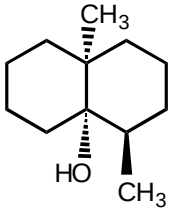
$\xrightarrow[\text{2) NaCN}]{\text{1) } Br_2 \text{ / light}}$

19. The structure of (-)-geosmin is shown below. Which structure would be that of its enantiomer, (+)-geosmin?

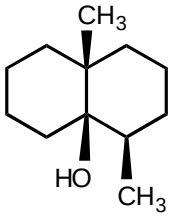


(-)-geosmin

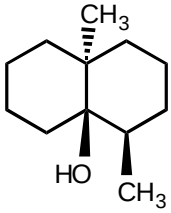
A)



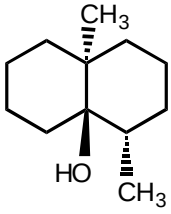
B)



C)

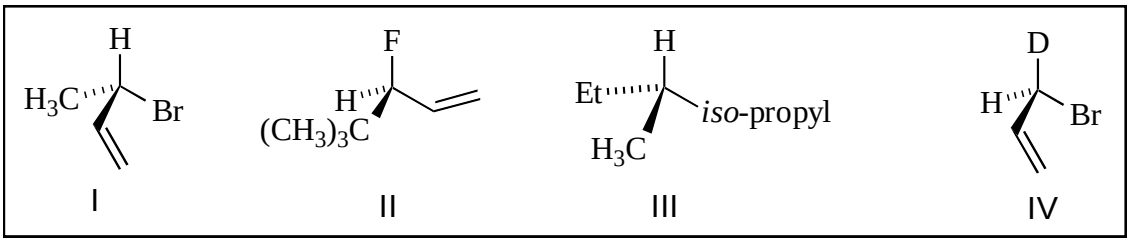


D)



E) none of the above

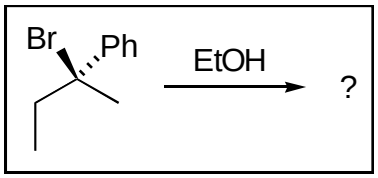
20. Which of the following molecules have the *S* configuration? Hint: In II, the F has priority 1 ranking, the tert-butyl 2 ranking and the olefin 3 ranking.



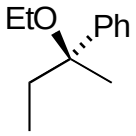
A) I, II
B) I, III
C) III, IV
D) I, II, IV
E) all of the above

Bonus Questions (2 X) Points per Question = 5 PTS

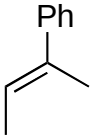
21. Predict the **major** product of the following S_N1 solvolysis reaction:



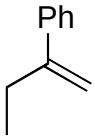
A)



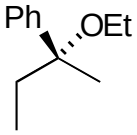
B)



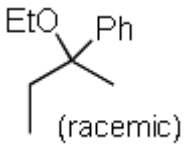
C)



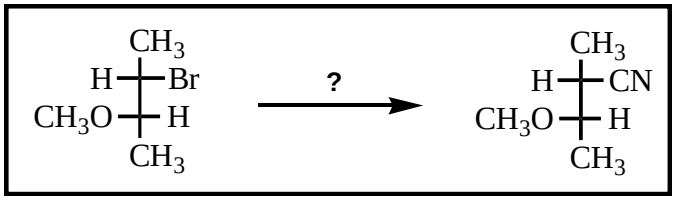
D)



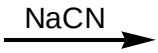
E)



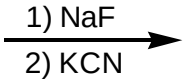
22. Indicate the reagents required to achieve the following transformation:



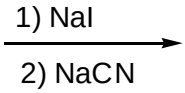
A)



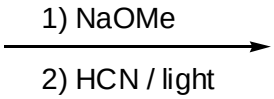
B)



C)



D)



Answer Key

1. D
2. D
3. C
4. C
5. D
6. B
7. A
8. C
9. C
10. C
11. C
12. A
13. D
14. D
15. A
16. C/E
17. B
18. C
19. C
20. A
21. E
22. C