

Name:

ID No:

**University of Canterbury**  
**CHEM272**

**Semester Test**  
**2009**

Time allowed: 50 min

*Answer all four questions.*

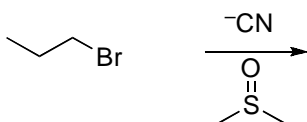
*Total marks: 40*

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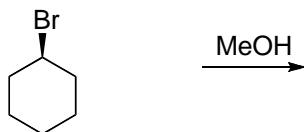
1. [12 marks]

- (a) Predict, giving your reasons, whether the following reactions will take place by  $S_N1$  or  $S_N2$  mechanisms. Give the structure of the products showing the stereochemistry where appropriate, and show the mechanism of each reaction.

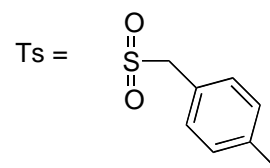
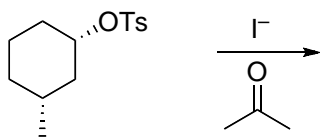
(i)



(ii)



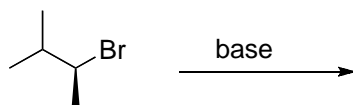
(iii)



- (b) Predict what would happen to the *rate* of reaction (i) in part (a) above if the Br was changed for F. Explain your answer.

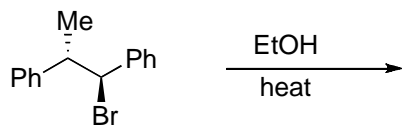
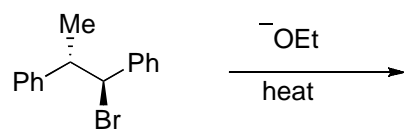
2. [14 marks]

- (a) The following compound is capable of eliminating by both E1 and E2 mechanisms. Use structural diagrams to illustrate these two mechanisms. Explain the regioselectivity that you would expect to observe in these reactions.

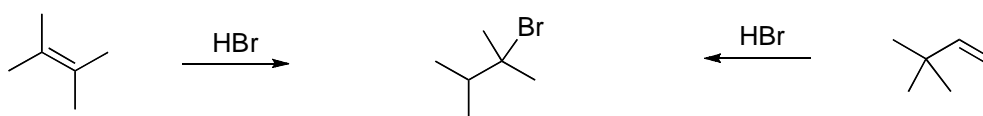


- (b) Explain how the choice of base will determine whether the reaction proceeds via an E2 or an E1 mechanism.

- (c) Use mechanisms to predict the stereochemical outcome of the following elimination reactions:

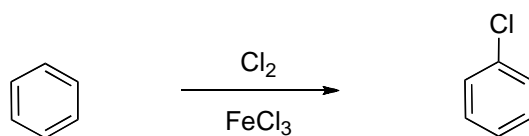


3. [6 marks]  
The two isomeric alkenes below give the same product following treatment with HBr.  
Provide mechanisms to explain this observation.

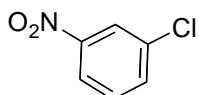


4. [8 marks]

(a) Provide a mechanism for the following reaction and account for the role of  $\text{FeCl}_3$ .



(b) Propose an efficient synthesis of the following compound from benzene.



*End*