

CHEM242/BCHM206 – ORGANIC CHEMISTRY 2009

Organic Reactions and Reaction Mechanisms

MID TERM TEST

Monday, 7th September 2009, 7.30 p.m. to 8.30 p.m.

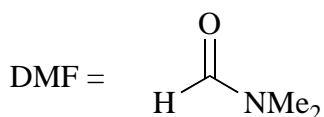
Students should answer *BOTH* questions

Time allowed: ONE HOUR

The numbers in square brackets indicate the marks that the Examiner normally expects to assign to each part of the question.

The following abbreviations have been used:

Me = CH₃-; Et = CH₃CH₂-; ^tBu = (CH₃)₃C-;
Ph = C₆H₅-; aq. = aqueous.



N,N-dimethylformamide

Aqueous work-up procedures are implied throughout, with concomitant protonation or deprotonation of charged intermediates. Assume reactions are carried out at ambient temperature unless otherwise indicated. All formulae depicting chiral molecules refer to racemic mixtures, unless a single enantiomer is explicitly specified.

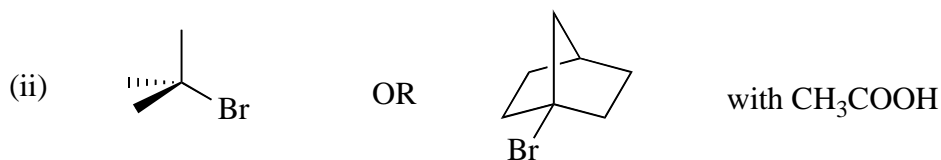
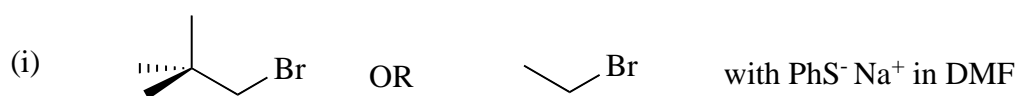
DO NOT TURN OVER THIS PAGE UNTIL YOU HAVE BEEN ASKED TO DO SO

1. a) Indicate briefly how the following factors may affect the rate of an S_N1 reaction:

- (i) The nature of the solvent
- (ii) The nature of the nucleophile

[2 x 4]

b) For **EACH** of the following pairs of substrates, explain which will react faster under the given reaction conditions. Include in your answer an explanation as to whether you expect the reaction to go by either an S_N1 or an S_N2 pathway in each case.

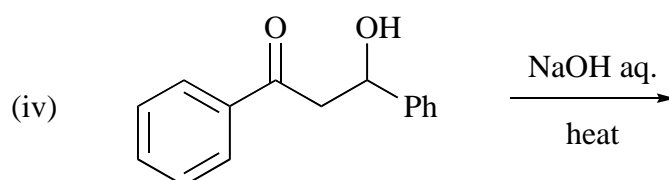
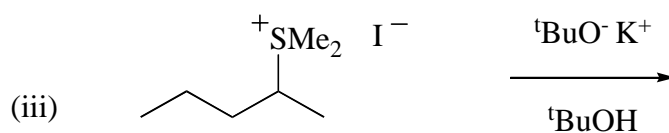
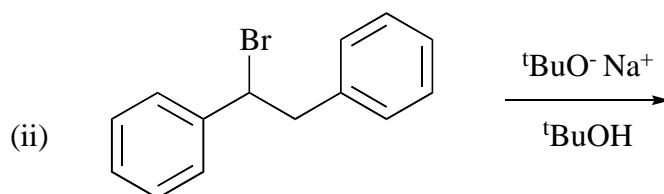
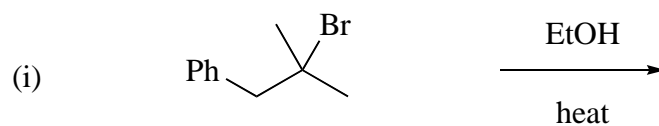


[3 x 4]

2. a) Sketch the reaction diagram for an E1 elimination reaction. Identify and label species at local energy maxima and minima.

[5]

b) Predict the major products for **THREE** of the following synthetic transformations. Give reaction mechanisms to explain how the products are formed.



[3 x 5]

END OF QUESTION PAPER