

INDIAN INSTITUTE OF TECHNOLOGY GANDHINAGAR

Physical Organic Chemistry – CH 506

[End-Sem Exam]

Name: _____

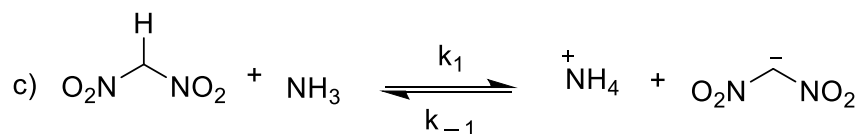
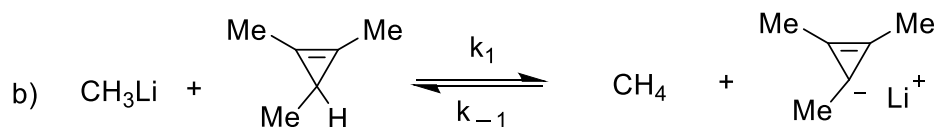
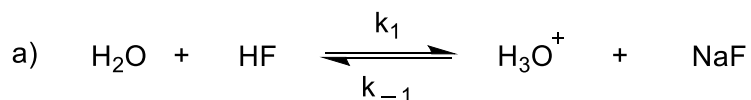
Date: 29/11/2016

Marks: [40]

Duration: 2.5 h

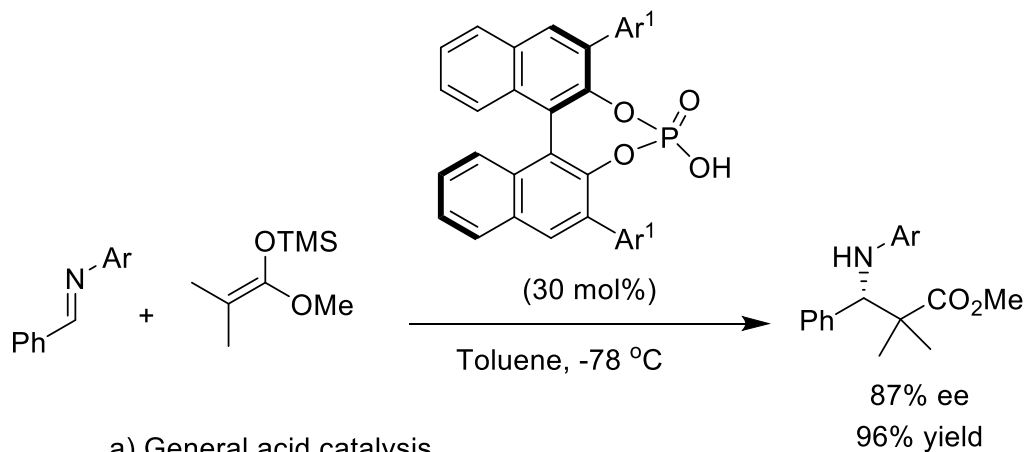
1. In the following reactions predict whether k_1 is greater than k_{-1} or not.

(6 marks)



2. The following reaction is a

(2 marks)



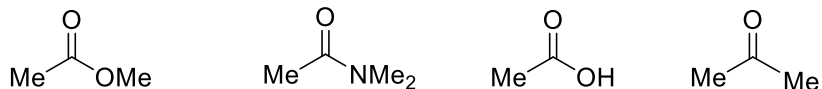
- a) General acid catalysis
- b) General base catalysis
- b) Specific acid catalysis
- b) Specific base catalysis

3. For aromatic electrophilic substitution reactions such as nitration of substituted benzenes, reaction constant ' ρ ' should be (2 marks)

a) around +0.5 b) around -0.5 c) around +5 d) around -0.5

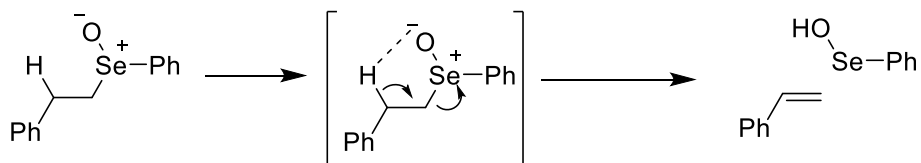
4. Rank the following bases in decreasing order of basic strength (strongest base first).

(2 marks)



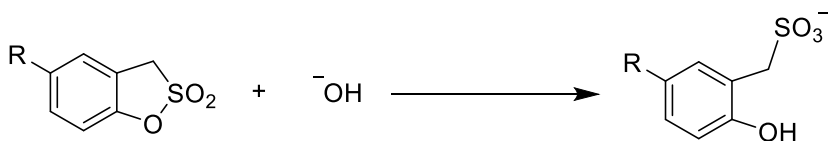
5. Draw a reaction coordinate vs energy diagram for the following reaction

(3 marks)



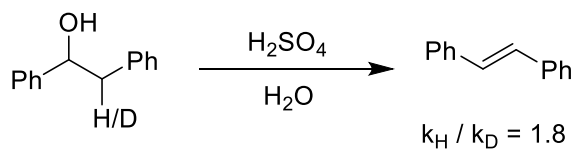
6. Predict a Hammett plot and approximate ' ρ ' value for the following reaction.

(3 marks)



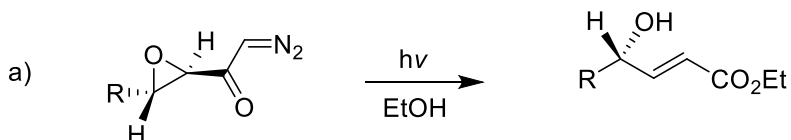
7. In the following reaction, k_H / k_D is found to be 1.8. Write a mechanism for this reaction and define the rate determining step.

(3 marks)



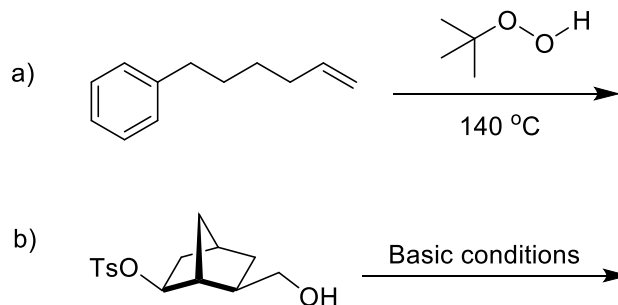
8. Write suitable mechanism for the following reactions.

(3 marks)



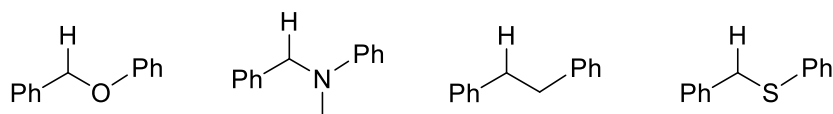
9. Draw the major products of the following reaction including stereochemistry. Also predict whether they are stereoselective or stereospecific reactions.

(6 marks)



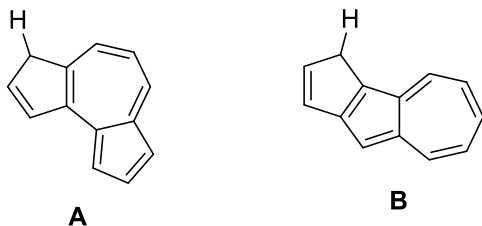
10. Rank the following acids in decreasing order of acid strength (strongest acid first).

(2 marks)



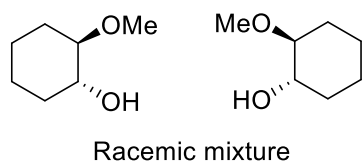
11. Hydrocarbon **A** ($pK \sim 14$) is considerably more acidic than **B** ($pK \sim 22$). Offer an explanation.

(3 marks)



12. Propose a kinetic resolution technique for the resolution of the following racemic mixture.

(3 marks)



13. What kind of isomeric products are possible from the following reaction?

(2 marks)

