NATIONAL OPEN UNIVERSITY OF NIGERIA
Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja
Faculty of Science

JULY 2017 Examination

COURSE TITLE. Organic synthesis

COURSE CODE: CHM 416

COURSE UNIT: 2 Units

INSTRUCTION: Answer question one and any other three questions

TIME: 2 Hours

1a) With respect to oxidation, the different types of alcohols can be oxidized by a variety of reagents,

i) List these reagents. (4 marks)
ii) Describe oxidation of secondary alcohols. (10 marks)
iii) ¨All alcohols can be oxidized¨. True or False? Explain your answer (briefly). (4 marks)

1b) Discuss the hydroxylation of alkenes. (7 marks)

2a) Give the definitions of Reduction as a chemistry concept. (3 marks)

2b) List two methods of achieving reduction. (2 marks)

2c) Using a specific example, explain how a metal hydride can be employed as a reducing agent. (10 marks)

3a) List the two notable methods by which the C=O group of ketones and aldehydes can be converted into a CH_2 Group. (2 marks)

3b) With the aid of structural mechanisms, explain one of the methods mentioned in (3a) above.

(13 marks)

4a) Explain the dehydrohalogenation of a vinyl halide to give an alkyne. (6 marks)

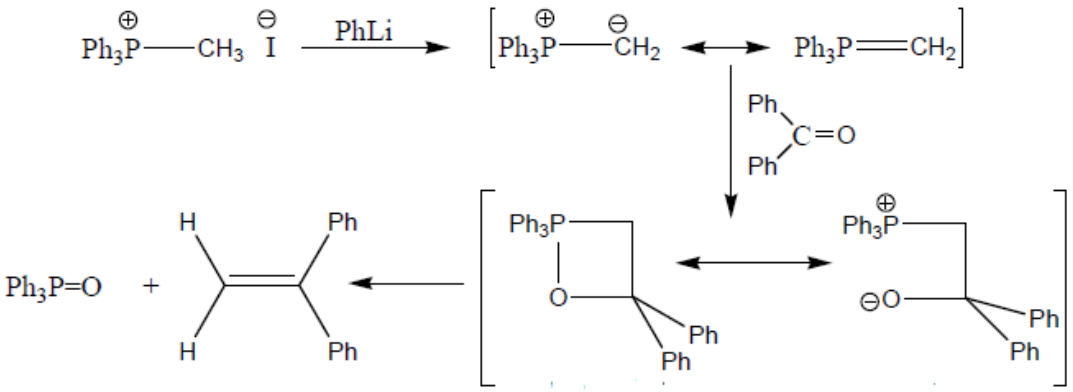
4b)i. What is aldol condensation. (1 mark)

ii What is the product of an aldolcondensation? (2 mark)

iii. Show the mechanism of dehydration of an aldol to give α,β-

unsaturated carbonyl compound in the presence of a base. (7 marks)

5a) Use the below schematic diagram to answer the questions that follows,



i) Give the name of the reaction represented by this mechanism. (2 mark)
ii) How many intermediate does this mechanism have? (1 mark)
iii) Draw and give the names of these intermediates. (4 marks)
iv) Name the intermediate which played important mechanistic role in the past. (2 mark)
v) Name the intermediate supported by NMR studies. (2 mark)
vi) Show the mechanism of the above reaction that supports and reveals one intermediate being of lower energy than the other. (4 marks)