



NATIONAL OPEN UNIVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA
FACULTY OF SCIENCES
DEPARTMENT OF PURE & APPLIED SCIENCES
SEPTEMBER, 2020_1 EXAMINATION QUESTIONS

CHM 416: ORGANIC SYNTHESIS

Instruction: answer question 1 and any other three questions

Credit Unit: 2

Time allowed: 2 hours

QUESTION 1

- a. Write short notes on the following; **[9 marks]**
 - i. Clemmensen Reduction
 - ii. Wolff-Kishner Reaction
 - iii. Coupling Reactions.
- b. List any 4 oxidizing reagents used in organic synthesis and give one application of each **[8 marks]**
- c. With the aid of chemical equation, explain the mechanism of aldol condensation. **[8 marks]**

QUESTION 2

- a. Show the mechanism of aldol condensation of acetophenone **[11 marks]**
- b. List two common reducing agents in organic synthesis **[4 marks]**

QUESTION 3

Predict the major products of the following base-catalyzed aldol condensations with dehydration.

- a. benzophenone (PhCOPh) + propionaldehyde **[7 marks]**
 - b. 2,2-dimethylpropanal + acetophenone **[8 marks]**
4. a. Discuss the two possible intermediate species involved in the mechanism of Wittig reaction **[7 marks]**
- b. Give examples of any FIVE (5) oxidizing agents that you know **[8 marks]**
5. a. Starting from benzaldehyde, show the synthesis of cinnamte using Reformatsky reaction. **[10 marks]**
- b. Draw a scheme for oxidative transformation of methane **[5 marks]**