



**NATIONAL OPEN UNIVERSITY OF NIGERIA PLOT 91, CADASTRAL ZONE,
NNAMDI AZIKIWE EXPRESSWAY, JABI – ABUJA
FACULTY OF SCIENCES
DEPARTMENT OF CHEMISTRY
2025_1 EXAMINATION**

COURSE CODE: CHM 416

COURSE TITLE: ORGANIC SYNTHESIS

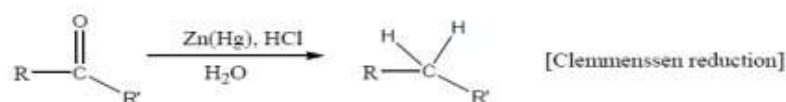
COURSE UNIT: 2

INSTRUCTION: Answer question one (1) and any other two questions

Time: 2 Hours

QUESTION 1

- 1a) With the aid of chemical equation only, how can you prepare perbenzoic acid **(5 marks)**
b) What are the structures and names of products of the ozonolysis of hept-3-ene? **(10 marks)**
c) Show a detailed mechanism of Clemmensen reduction below **(10 marks)**



- d) With the aid of equation only, show Castro-Steven coupling reaction **(5 marks)**

QUESTION 2

- a) b) Explain the following terms:
- i. Hydroxylation **(3.5 marks)**
 - ii. Epoxidation of alkenes **(3.5 marks)**
- b) List four metals commonly used in reduction reaction **(8 marks)**
c) What is Perkin Reaction? **(5 marks)**

QUESTION 3

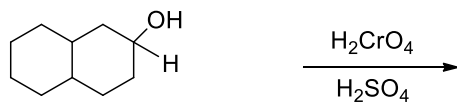
- a) List five (5) reagents that are common oxidizing agents **(10 marks)**
b) Give the product(s) of the reaction below;



- c) Give the equation for the conversion of an alkene to an epoxide by a peroxyacid **(5 marks)**

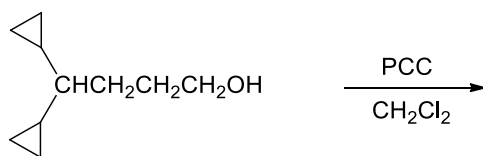
QUESTION 4

- 4a) Copy and complete the reaction below



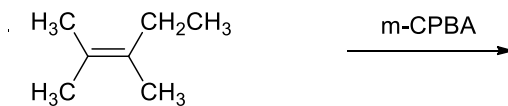
(7.5 marks)

b) Write the product(s) of the reaction below



(5 marks)

c) Complete the reaction below



(7.5 marks)

QUESTION 5

5a) Using equation only, show the synthesis of pyridinium chlorochromate

(10 marks)

b) Itemize four (4) reagents that are common oxidizing agents

(4 marks)

c) Based on the reduction efficiency, distinguish between LiAlH_4 and NaBH_4

(6 marks)