



MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

UNIVERSITY EXAMINATIONS 2021/2022 ACADEMIC YEAR

SECOND YEAR SEMESTER I MAIN EXAMINATION

FOR THE DEGREE OF

BACHELOR OF INDUSTRIAL CHEMISTRY

COURSE CODE: ~~SCI 261~~ *SCI 261*

COURSE TITLE: **CHEMISTRY OF FUNCTIONAL GROUPS**

DATE: FRIDAY, 26TH APRIL 2022

TIME: 3.00PM - 5.00PM

INSTRUCTIONS

- *Answer ALL Questions as directed.*

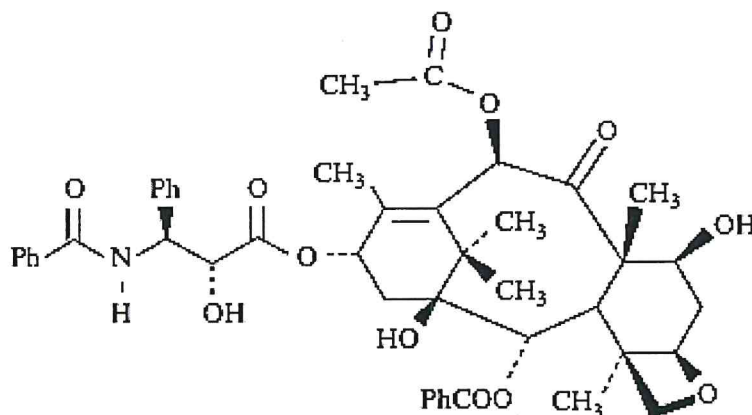
MMUST observes ZERO tolerance to examination cheating

This paper consists of 3 printed pages. Please turn over. →

QUESTION 1

(25 marks)

- (a) In your own words, illustratively, define the term “Functional Group (FG)” as used in Chemistry. [3]
 (b) You are given an important organic molecule with the chemical structure shown below. Study the structure carefully and answer the following questions.



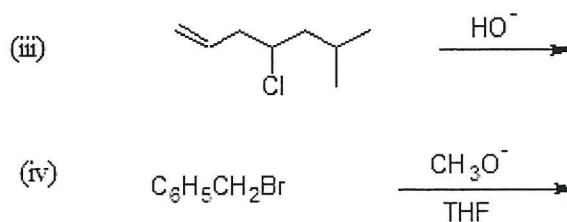
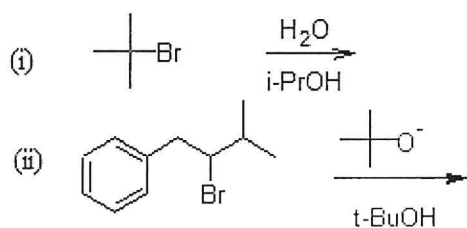
Taxol, isolated from the bark of the Pacific yew

- (i) Identify all the functional groups in the molecule (*Each type of FG to be reflected once only*) [10]
 (ii) Of the FGs in (i) above, based on structure only, which one is of the highest priority? [2]
 (iii) How many *sp*² hybridized and tertiary carbons are found in the molecule? [2]
 (iv) Name five (5) types of reactions this molecule may undergo? [5]
 (v) Speculate and cite the possible function(s) of the above molecule based purely on the chemical structure given. [3]

QUESTION 2

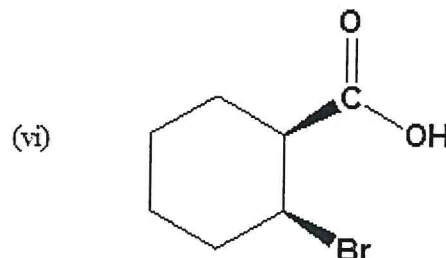
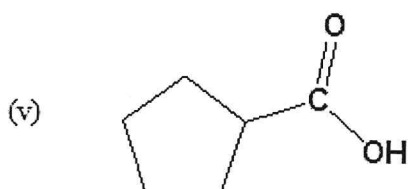
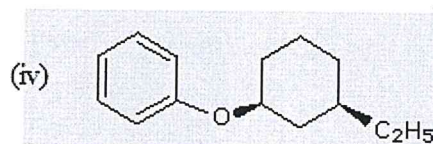
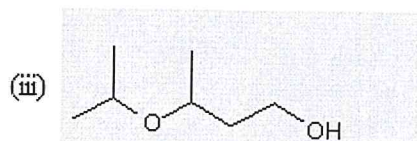
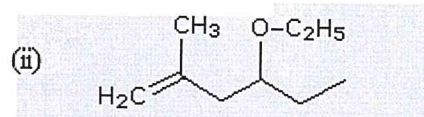
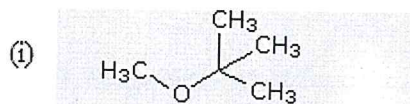
(14 marks)

- (a) Complete the following reactions. [8]



(b) Give IUPAC names of the following molecules.

[6]

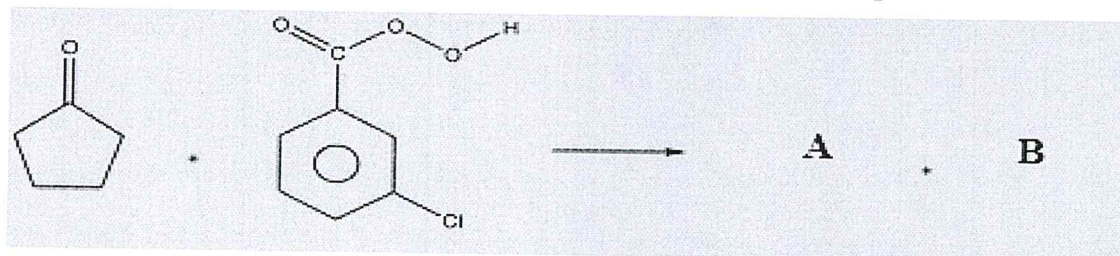


QUESTION 3

(17marks)

(a) Complete the following reaction indicating the chemical structures of product A and B.

[2]



(b) Outline the reaction mechanism of the above reaction.

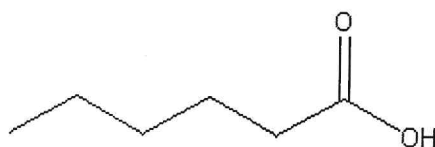
[15]

QUESTION 4

(14 marks)

(a) What is the IUPAC name of the following carboxylic acid?

[1]



(b) Indicate on the structure above α , β , γ , δ and ϵ carbon atoms.

[5]

(c) Explain why melting points and boiling points of carboxylic acids generally increase with increase in number of carbons / molecular mass.

[2]

(d) List six (6) functions of carboxylic acids and their derivatives

[6]