

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE, NIGERIA
 DEPARTMENT OF CHEMISTRY, FACULTY OF SCIENCE
 2010/2011 RAIN SEMESTER EXAMINATION
 CHM 314 ALICYCLIC, BI-FUNCTIONAL AND TERPENOID CHEMISTRY

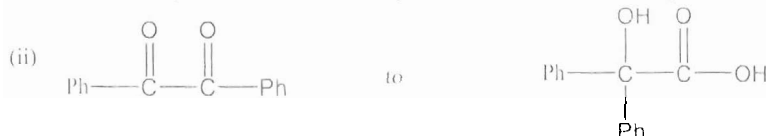
TIME: 2 HOUR

Instruction: Attempt all Questions. Answer sections A and B in separate booklets

SECTION A

1a. Give equations to show the reaction mechanism for the following conversions:

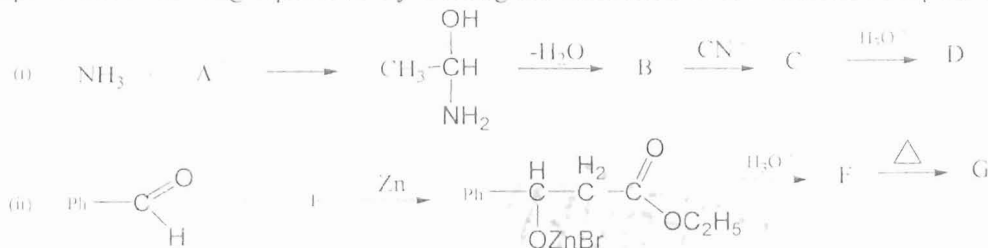
(i) 2,3-dimethylbutan-2,3-diol (pinacol) to 3,3-dimethylbutan-2-one (pinacolone)



b. $\text{Ph}-\text{CHO} + \text{Y} \xrightarrow{\text{OH}^-} \text{Ph}-\text{CH}(\text{OH})-\text{CH}(\text{OH})-\text{CHO}$ (Cinnamaldehyde).

(i) What is Y? (ii) Give the mechanism for this reaction.

2a. Complete the following equations by writing the structures of the lettered compounds:



b. Illustrate mechanistically, the Gabriel malonic ester synthesis of a named α -amino acid

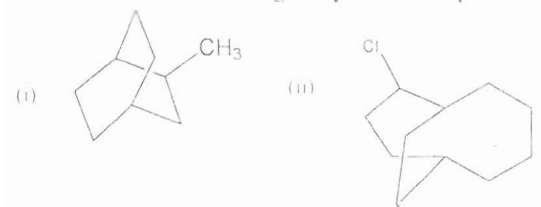
3a. Draw the energy profile diagram for the various conformers of cyclohexane, hence arrange the conformers in order of increasing stability.

b. Draw the structure of the preferred conformer for each of the following compounds:

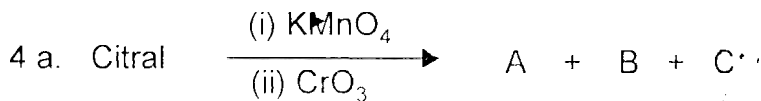
(i) 4-hydroxycyclohexanone and (ii) trans-1,2-dimethylcyclohexane

c. Cyclopropane is the most unstable of cycloalkanes. Justify this statement

d. Name the following bicyclic compounds

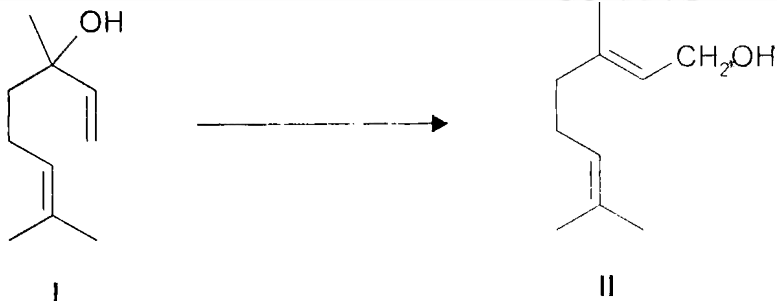


SECTION B



- (i) Provide the structure and names of compounds A to C.
 (ii) Draw the structure of Citral.

b. Write down the mechanism for the following conversion:



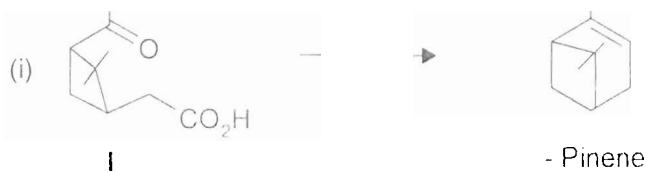
- (i) What are the names of compounds I and II in question (b).

c. Starting from α -terpineol, explain with chemical equation only how you would obtain carvone.



- (ii) Number all the carbons in carvone.
 (iii) Using a suitable chemical equation, show that one of the double bonds in carvone is in position 8.

5a. Use chemical equations only to explain the following conversions:



(ii) Camphor to Bornane using Wolff-Kishner reduction.

b. Write down the structures of the following terpenoids:

- (i) bisabolane (ii) elemene (iii) humulene and (iv) germacrane.

c. Provide the structures of the following compounds represented by alphabets (D - F)

