



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2011/2012
INSTITUTIONAL BASED PROGRAMME (AUGUST SESSION)
EXAMINATION FOR THE DEGREE OF MASTER OF SCIENCE
SCH 504: MODERN SYNTHETIC ORGANIC CHEMISTRY

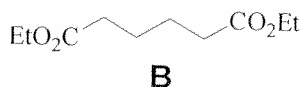
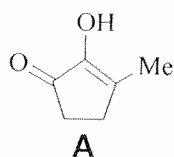
DATE: Tuesday 3rd January 2012

TIME: 9.00a.m – 12.00p.m

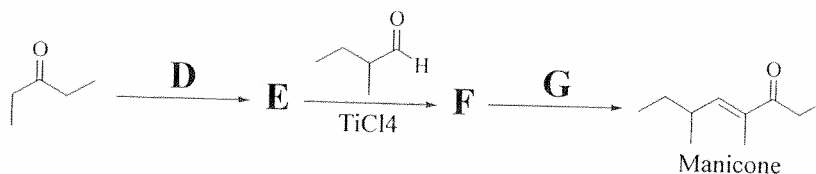
INSTRUCTIONS

Answer **ALL** questions.

1. Outline a synthetic pathway for the synthesis of a flavouring compound, corylone (**A**) from hexanedioic acid diethyl ester (**B**). (7 marks)

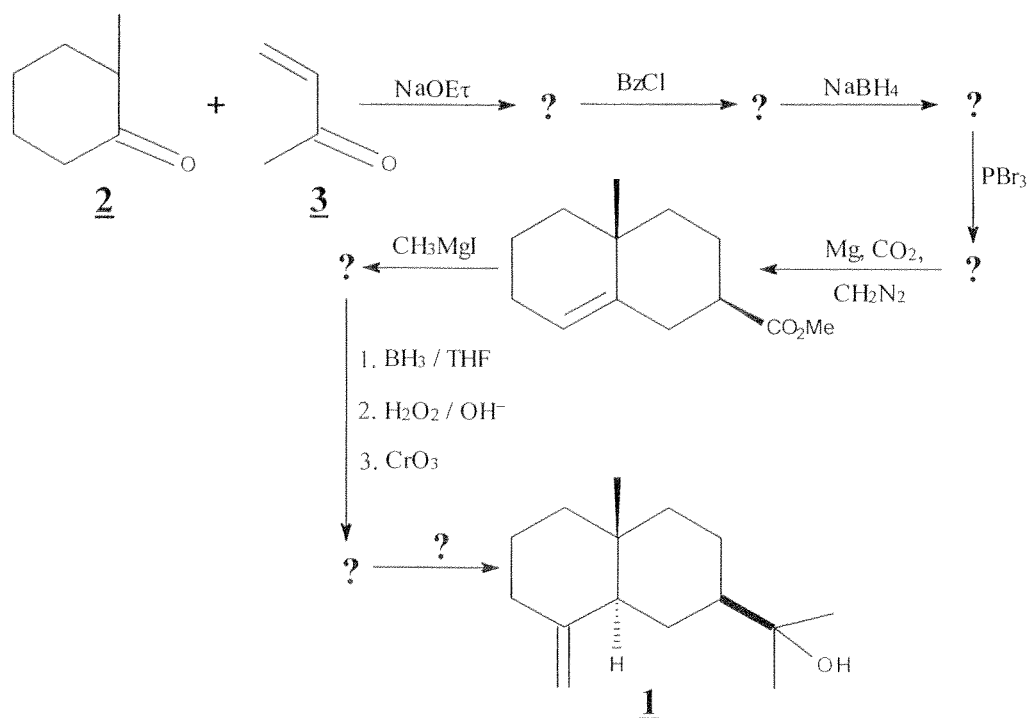


2. An enone, manicone could be synthesized from pentan-3-one and 2-methylbutanal as shown using the following pathway:



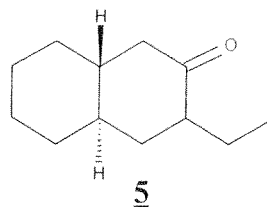
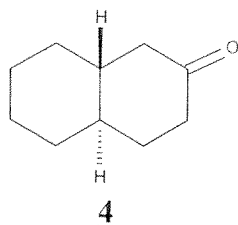
Deduce the structures of the missing intermediate compounds and the reagents (**D-G**). (6 marks)

3. β -Eudesmol (**1**), a novel sesquiterpene alcohol could be synthesized from 2-methylcyclohexanone (**2**) and but-3-en-2-one (**3**) using the following pathway:



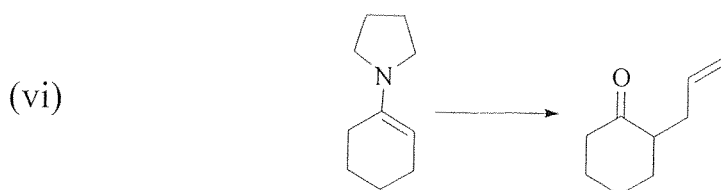
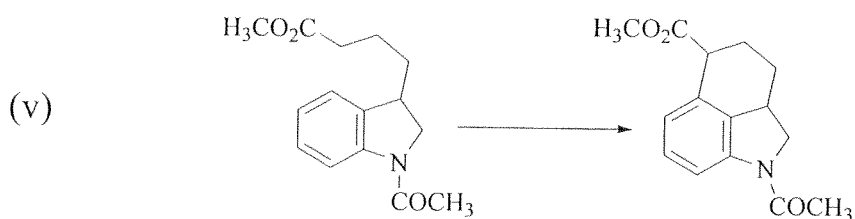
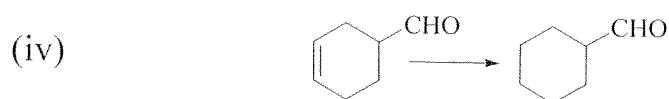
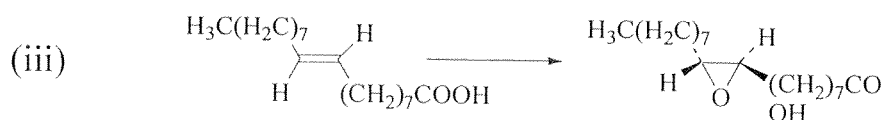
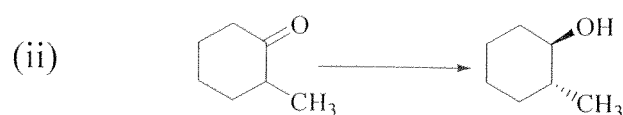
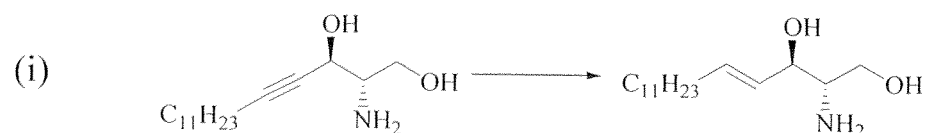
Deduce the structures of the missing intermediate compounds and the reagents. (11 marks)

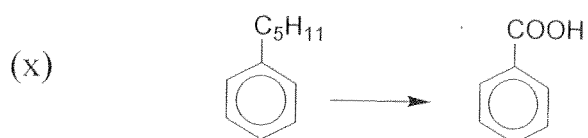
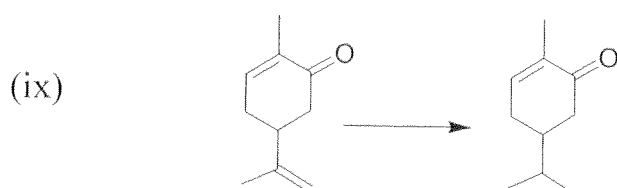
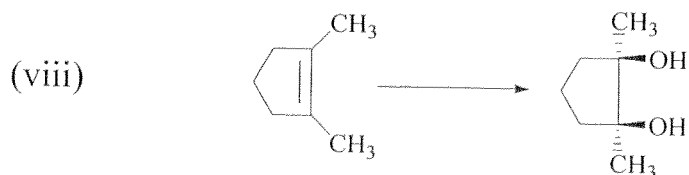
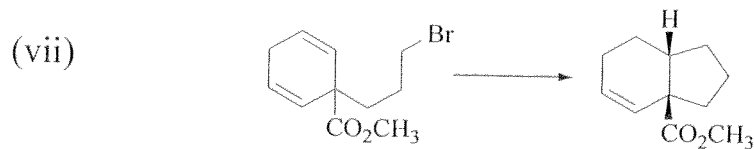
4. Draw structure of each of the following and show using one example the utility in organic synthesis. Comment on selectivity of each when used. (9 Marks)
- (i) DCC (ii) DIBAL (iii) 9-BBN
5. When an organometallic reagent such as LDA is used to alkylate (4aR,8aR)-decalin-2-one (**4**) using chloroethane, the only product obtained is (4aR,8aR)-3-ethyldecalin-2-one (**5**). (9 marks)



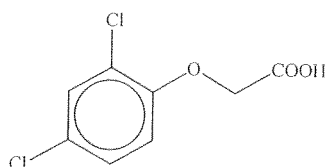
- (a) Draw the structure of the reagent LDA.

- (b) Explain the observations using appropriate equations.
- (c) Give the main advantages of using lithium enolates to alkylate organic compounds with ketone moiety as compared to direct alkylation.
6. Using appropriate protecting groups where necessary, show how the following conversion may be achieved. (15 marks)





7. (a) Suggest a retrosynthetic analysis for an herbicide, **X** suggesting the appropriate disconnections.



X

- (b) Which of the suggested disconnections is best and why?
- (c) Write the synthon(s) and the corresponding reagent(s) for all the suggested disconnections.

(13 marks)