# UNIVERSITY OF SWAZILAND
# FIRST SEMESTER FINAL EXAMINATION 2011

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| **TITLE OF PAPER** | : | Methods of Organic Synthesis |
| **COURSE NUMBER** | : | C602 |
| **TIME** | : | Three Hours |
| **INSTRUCTIONS** | : | Answer any **FOUR Questions**. Each Question carries 25 Marks. |

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This Paper contains five (5) pages.

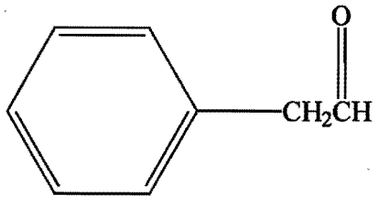
***You must not open this paper until the Chief Invigilator so has granted permission to do.***

**Question 1**

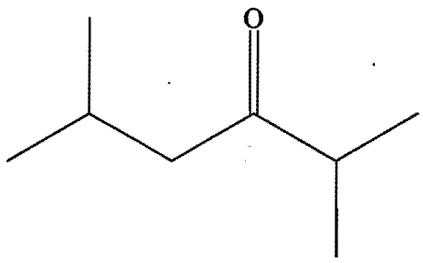
(a) Give a summary of the main reasons for carrying out the laboratory synthesis of an organic compound. (13 marks)

(b) What alkyne would you start with to prepare each of the following compounds by a hydroboration oxidation reaction?

(i)




(ii)



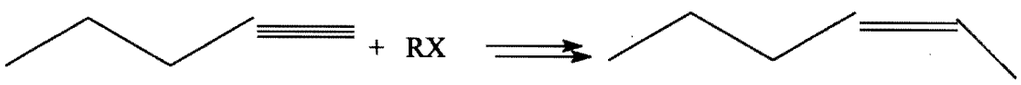

Write the sequence of reactions for the preparation of each compound.

(12 marks)

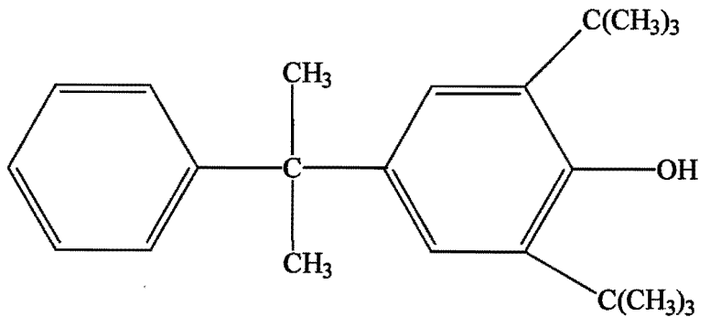
**Question 2**

(a) Suggest a synthesis route for cis-2-hexene from 1-pentyne and an alkyl halide.

(12 marks)




(b) The compound MON – 0585 is a non toxic, biodegradable larvicide that is highly selective against mosquito larvae. Synthesize MON-0585 using either benzene or phenol. (13 marks)




MON-0585

**Question 3**

Using suitable examples, explain the reactions named vide infra and show the importance of each reaction in synthesis of organic molecules.

(i) Expoxidation reaction

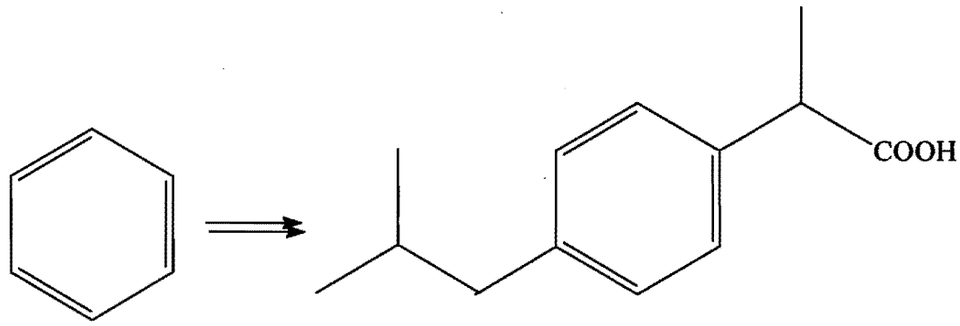
(ii) Robinson Annulation reaction

(iii) Wittig Reaction

(25 marks)

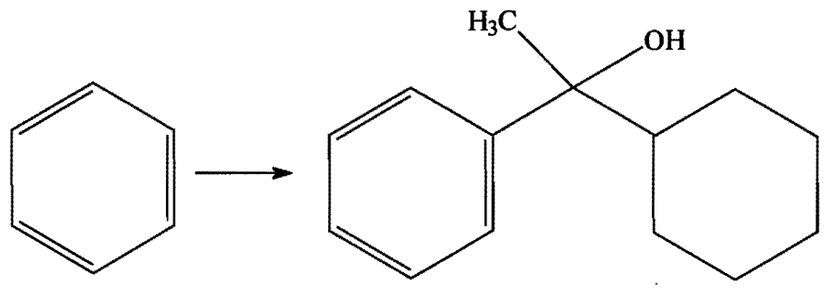
**Question 4**

(a) Show how you might prepare the anti-inflammatory agent ibuprofen starting from benzene and other suitable reagents. (25 marks)



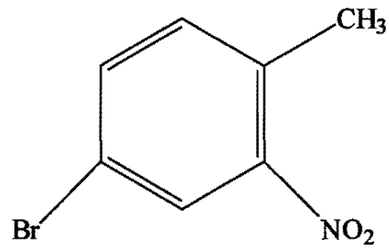

**Question 5**

(a) Outline the synthetic steps necessary to carry out the conversation below. You may use any organic or inorganic reagents you need. Show the structures of all intermediate compounds that would probably be isolated during the course of your synthesis, and show all necessary reagents.



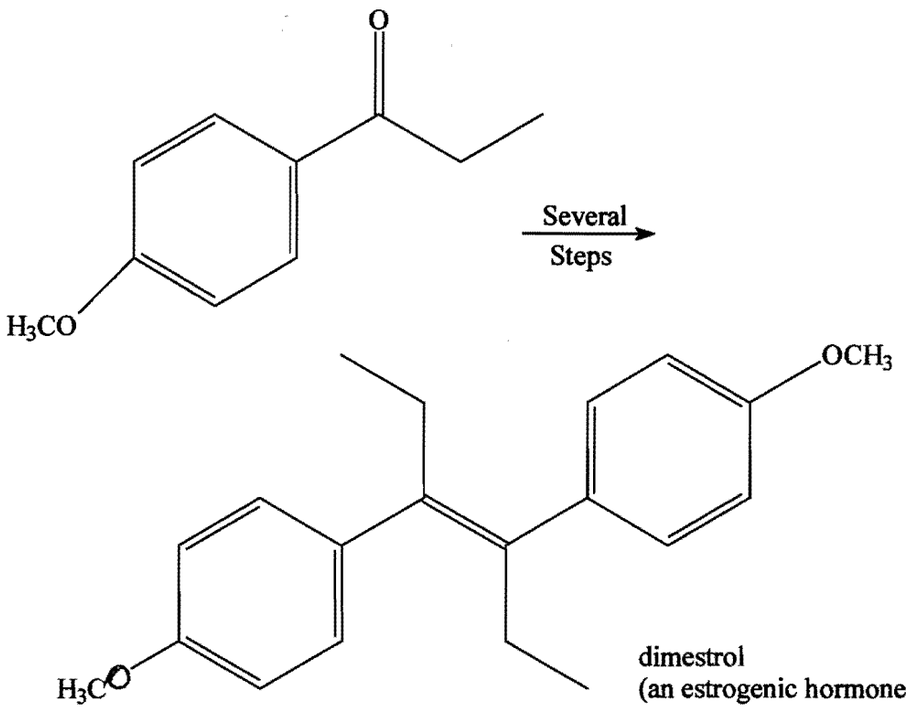

(8 marks)

(b) Outline a synthesis route from benzene to 4-bromo-2-nitrotoluene. Show the major reagents for each step. (8 marks)




4-Bromo-2-nitrotoluene

(c) Propose a synthesis of Dimestrol starting from p-methoxypropiophenone as the only source of carbon.

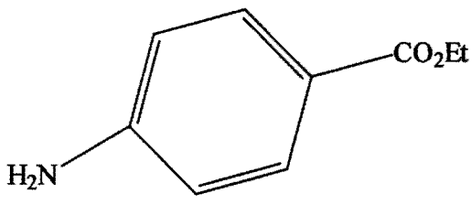



dimestrol
(an estrogenic hormone

(9 marks)

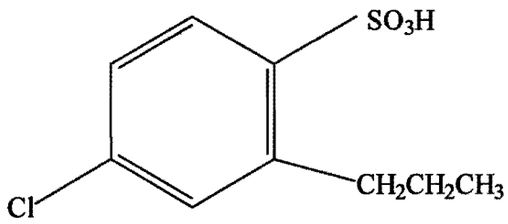
**Question 6**

(a) Ethyl-4-aminobenzoate (Benzocaine) is a local anaesthetic with a range of applications. Outline a laboratory synthesis route to benzocaine from benzene. (8 marks)




Benzocaine

(b) Describe an efficient synthesis of 4-chloro-2-propyl-benzenesulphonic acid. Show all the reagents for each step of the route. (8 marks)




4-chloro-2-propylbenzenesulphinic acid

(c) Show how you would accomplish the following transformation. More than one step may be required. Show all reagents and all intermediate structures. (9 marks)