TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

MSC CHEMISTRY

ACH5105: ADVANCED SYNTHETIC ORGANIC CHEMISTRY

SPECIAL/ SUPPLEMENTARY EXAMINATION

SERIES: SEPTEMBER 2018

TIME: 3HOURS

DATE: Pick DateSep2018

Instructions to Candidates

You should have the following for this examination

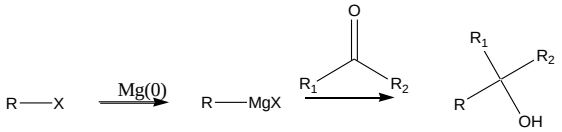
-Answer Booklet, examination pass and student ID

This paper consists of **SIX**Question(s).Attemptany FOUR questions.

Do not write on the question paper.

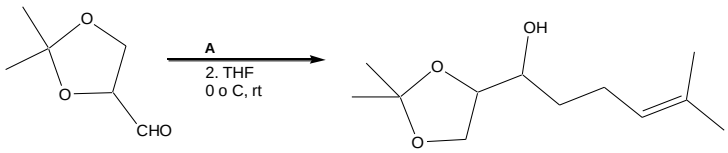
QUESTION ONE

(a) Addition of organo magnesium compounds to electrophiles is an important synthetic procedure in organic synthesis. Explain using arrow pushing mechanism the following transformation.**(20 marks)**

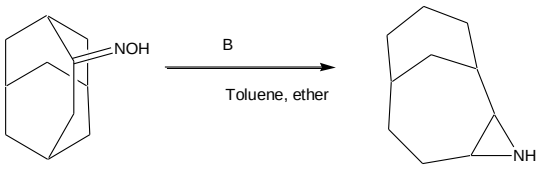


(b) Name the major product or reagents (**A**) and (**B**) in the following reactions;

i.



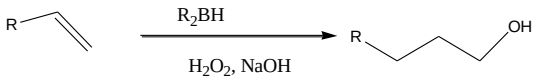
(3 marks)

ii. 

(2 marks)

QUESTION TWO

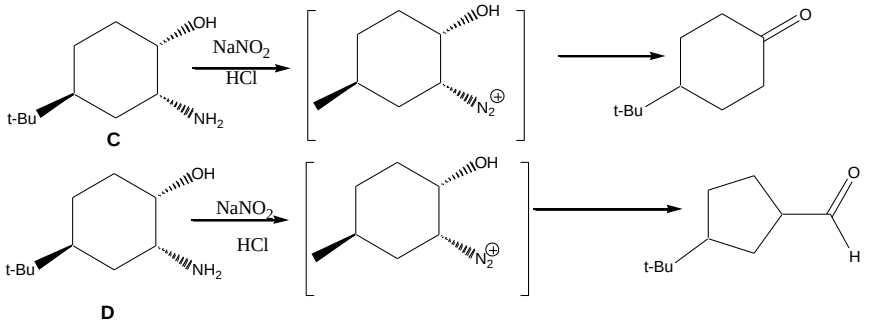
(a) Describe the mechanism of brown hydroboration reactions as an important synthetic procedure;**(10 marks)**



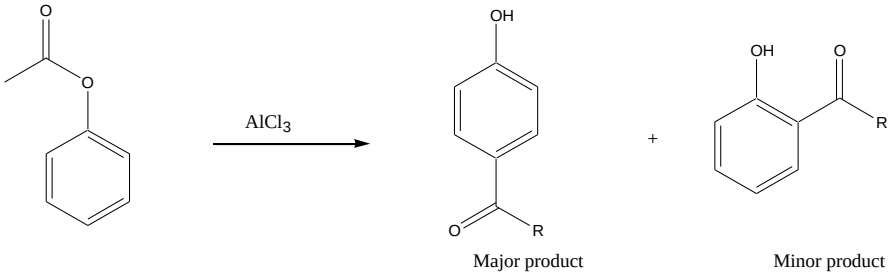
(b) Propose the synthesis of trans, trans 1,5- cyclodecadiene using 1,3 butadiene, iodomethane, and trans-2-butene-1,4-diol as the starting materials.**(15 marks)**

QUESTION THREE

(a) Diastereoisomers C and D provide different diazotization products. Explain using the three dimensional mechanism why only one product is formed. **(10 marks)**

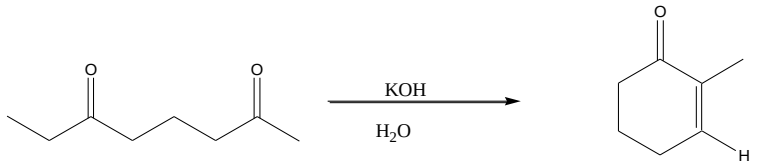


(b) Provide a detailed mechanism for the following synthetic transformation. **(15 marks)**

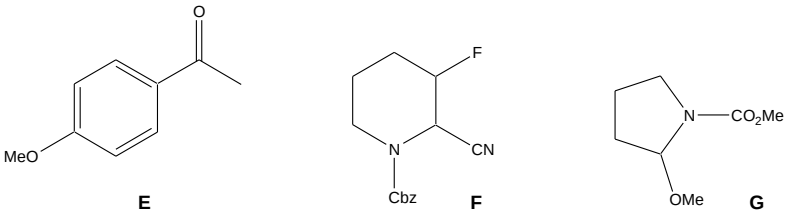


QUESTION FOUR

(a) Showing all important flow of electrons charges and intermediate provide the mechanism for the following transformation. **(13 marks)**

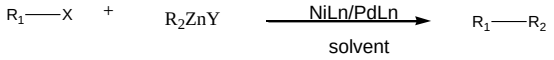


(b) Identify the synthons and reagents resulting from the retrosynthetic analysis of the compounds E, F, and G below **(12 marks)**



QUESTION FIVE

(a) Negishi cross coupling reaction is a classic example of nickel catalyzed or palladium catalyzed coupling reaction of organozinc compounds. Provide the general mechanism for the coupling reaction below; **(20 marks)**



(b) Outline the basic principles of a good synthesis plan giving two different types of synthesis**. (5 marks)**

QUESTION SIX

(a) Discuss the major applications of organic synthesis in drug development**. (5marks)**

(b) Michael addition of cyclohexanones is a useful step for the formation of alpha and beta unsaturated ketones. Provide the reaction mechanism for the transformation of compounds **H** to the final product **J. (20 marks)**