Birla Institute of Technology & Science, Pilani, Rajasthan - 333 031

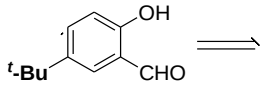
Ist Semester 2016-2017

CHEM F311 ORGANIC CHEMISTRY-III Mid-Term Exam (OPEN BOOK)

Max. Marks: 50 Duration: 90 minutes Date: 06th Oct, 2016

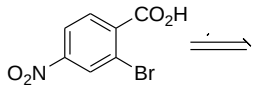
Write your name and ID on the question paper. All questions are compulsory.

Q1. (a) The compound shown below can be prepared from a monosubstituted benzene starting material. Show its retrosynthetic analysis. Also depict how the compound can be synthesized from the said starting material.



(b) For the Target Molecule (TM) shown below, its disconnection starts with a Functional Group Interchange (FGI) at the carboxylic group. This is followed by a two-step disconnection ending at a simple monosubstituted benzene starting material.

(i) Show the FGI followed by the rest of the disconnection. (ii) Also show how you will synthesize the TM from the monosubstituted benzene starting material. [5+2+3]



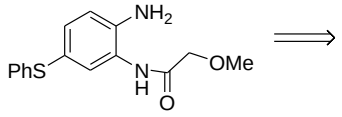
Q2. The compound shown below is used as a medicine against tapeworm infections etc.

(a) In order to disconnect this compound, show what would be the problem if you do the amide disconnection first?

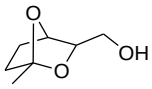
(b) The actual disconnection starts with an FGI. Show which one?

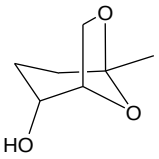
(c) After the FGI, there is a two-step disconnection ending at a disubstituted benzene compound. Show this disconnection.

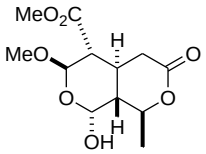
(d) Show the final synthesis starting from the disubstituted benzene compound. [2+2+3+3]



Q3. Identify the 1,1-diX relationships in the following molecules. Then, disconnect them showing the starting materials.

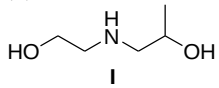
(a) 

(b) 

(c) 

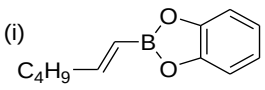
[3+3+4]

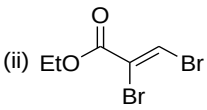
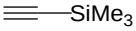
Q4. Consider the following compound **I** which can be disconnected to a simple three-carbon containing hydrocarbon starting material. (a) Show a two-step disconnection leading to the starting material, and (b) its corresponding synthesis. (c) Write the reaction for protection of **I** by MEM protecting group. [4+4+2]

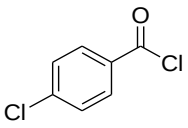
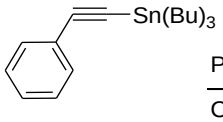


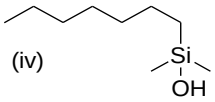
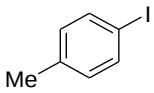
I

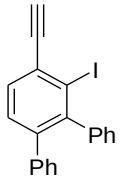
Q5. Write the major product of the following FIVE reactions. Also, name the reactions: [2x5]

(i)  + PhC≡C-Br $\xrightarrow[\text{NaOMe}]{\text{Pd(PPh3)}_4}$

(ii)  +  $\xrightarrow[\text{CuI, Et}_3\text{N}]{\text{Pd(PPh}_3)_2\text{Cl}_2}$

(iii)  +  $\xrightarrow[\text{CuI, Et}_3\text{N}]{\text{Pd[P(Bu}^t)_2]\text{Cl}_2}$

(iv)  +  $\xrightarrow[\text{Bu}_4\text{NF, THF}]{\text{Pd(dba)}_2}$

(v)  $\xrightarrow[\text{CuI, NaOH}]{\text{Pd(PPh}_3)_4}$

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