M.Sc. Examination, 2018

Semester-I

Chemistry

Course: CH-703

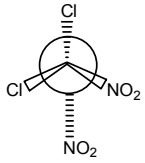
(Organic Chemistry)

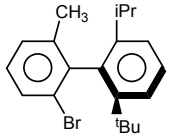
Time: Three Hours **Full Marks: 40**

Questions are of value as indicated in the margin.

Answer ***any four*** questions, taking ***any two*** from ***Question No.1 to 3*** and another ***two*** from ***Question No. 4 to 6***.

1. a) Assign *R*/*S* descriptors to the following molecules: 1+1

i) 

ii) 

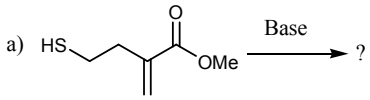
b) Comment on the conformations of cyclohexan-1,4-dione. 2

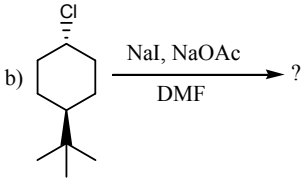
c) Explain the **reverse anomeric effect** with a suitable example. 3

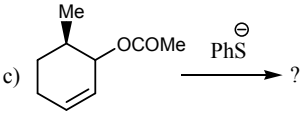
d) *cis*-Decalin exists as non-resolvable dl-pair. Justify. 2

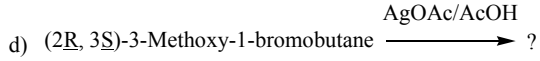
e) Who discovered the plane-polarized light? 1

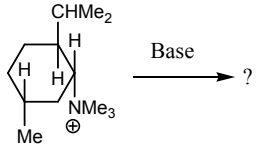
2. Predict the major porduct(s) in each of the following reactions with plausible mechanism (any four): 2.5x4

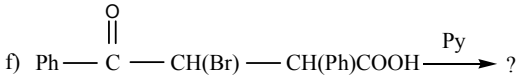
a) 

b) 

c) 

d) 

e) 

f) 

3. a) State the Curtin-Hammett principle. Discuss it qualitatively with a suitable example. 3

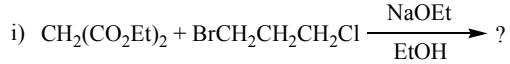
b) *Trans*-4-*tert*-butylcyclohexyl benzoate undergoes saponification reaction 22 times faster than the *cis*-isomer. Explain. 2.5

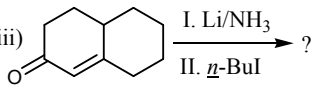
c) (*S*)-1-chloro-1-phenyl ethane produces 98% racemized alcohol in acetone-water (80:20), while 80% racemized alcohol is produced in pure water. Offer your justification for the fact. 2.5

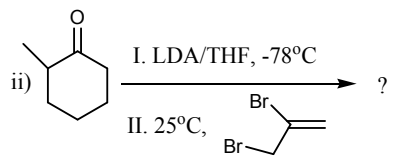
d) Define stereoselective reaction with one example. 2

4. a) Discuss critically on the regioselective and stereoselective aspects for the generation of enolates from ketones and/or esters. 4

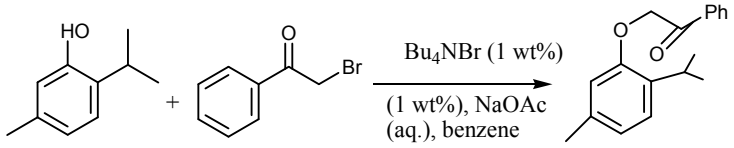
b) Predict the major product for each of the following reactions (give plausible mechanism in each case): 2x3

i) 

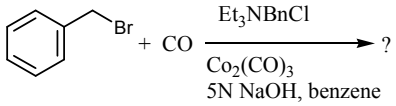
iii) 

ii) 

5. a) What do you mean to say 'phase-transfer' catalysis? Offer one example of such catalysis. 2+1
   b) Outline 'Starks Extraction Mechanism' in phase-transfer catalysis. 3
   c) Show the mechanistic pathway for the following organic transformation: 4



6. a) "In enolates formed by proton abstraction from α,β-unsaturated ketones, the most preferred site for both protonation and alkyletion is the α-carbon" – do you agree with this statement? Justify your answer with proper example(s). 3
   b) Predict the product in the following chemical transformation, and offer plausible mechanism for the same: 4



   c) Offer an example of self-catalytic organic transformations. 3

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