Parvatibai Chowgule College of Arts and Science
Autonomous

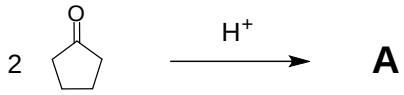
B.Sc. Semester End Examination, January/February 2022

Semester: III
Subject: Chemistry
Title: Name reactions and synthetic methodologies (Elective)
Duration: 2.0 Hours Maximum Marks: 45

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q. 1.A) Answer <u>ANY TWO</u> of the following:

i) Predict the major product **A** for the following reaction and give its stepwise mechanism. **3**



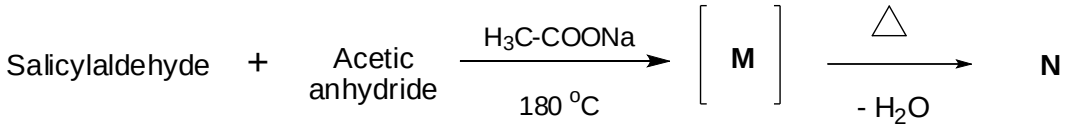
ii) Predict the major product for the following reactions: **3**

p) Reaction of diethyl heptanedioate with sodium ethoxide followed by addition of acidified water

q) Reaction of cyclohexanone with diethyl malonate in presence of piperidine on heating

r) Base catalysed reaction of acetone

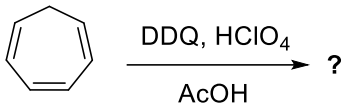
iii) The following reaction forms product **M** which on heating further cyclises to give product **N**. Give the correct structures of both the products **M** and **N** and write the name reaction involved. **3**



B) Answer <u>ANY ONE</u> of the following:

i) What is homogeneous hydrogenation? What are its advantages over heterogeneous hydrogenation? **3**

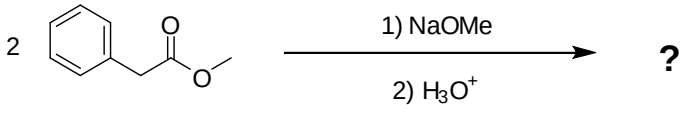
ii) Give any two applications of DDQ in the preparation of steroids and predict the product in the following reaction. **3**

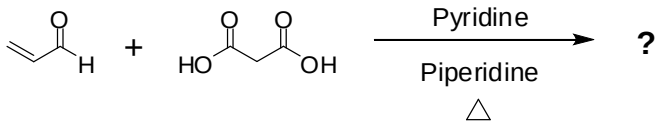


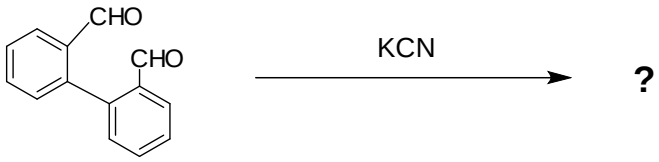
Q. 2. Answer <u>ANY TWO</u> of the following:

a) i) Predict the major product for the following reactions. **3**

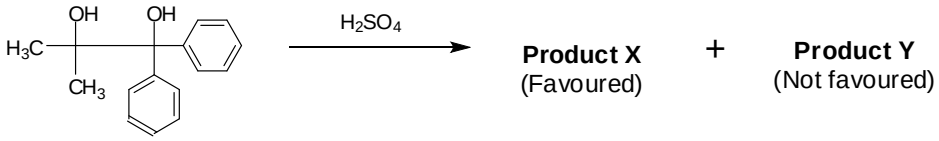
i)



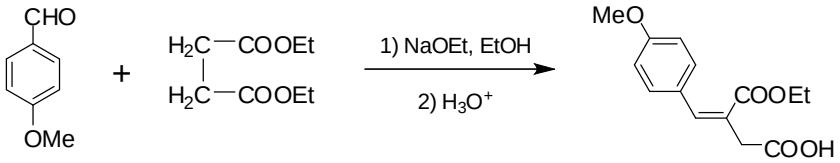
j) 

k) 

ii) The substrate in the following reaction on treatment with strong acid, gives a mixture of favoured product **X** and minor product **Y**. Identify the correct structure of products **X** and **Y**. Also, explain the reason for the favoured formation of product **X** over product **Y**. **3**

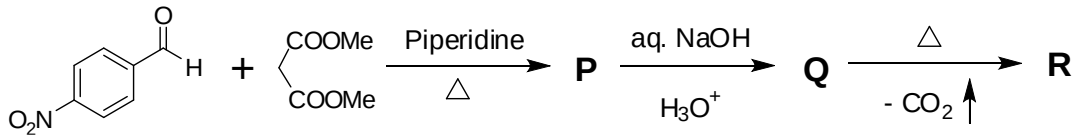


b) i) Give the stepwise mechanism for the following reaction and identify the name reaction involved. **3**

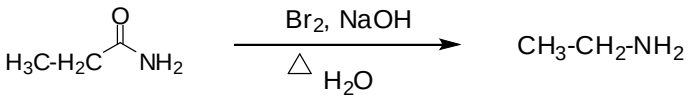


ii) Give suitable reagent(s) used for the following conversions: **3**
l) Propanamide to ethylamine
m) Cyclohexanone oxime to caprolactum
n) Acetylazide to methylamine

c) i) Complete the following reaction sequence with an appropriate structure of compounds **P**, **Q** and **R**. **3**

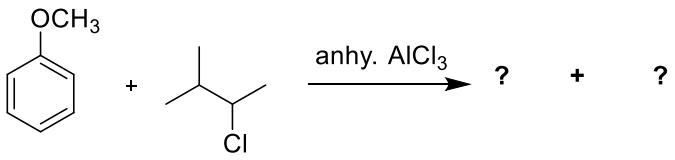


ii) Give the stepwise mechanism for the following reaction and identify the rearrangement involved. **3**



Q. 3. Answer <u>ANY TWO</u> of the following:

a) i) Predict the products in the following reaction and discuss the steps involved the mechanism for the formation of major product. **3**

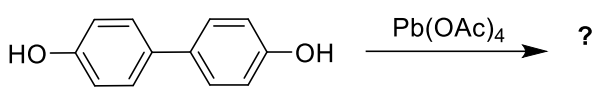


ii) What is hydrogenolysis? Give any two reactions for the same. **3**

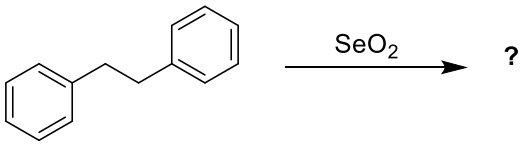
b) i) Discuss the steps involved in the mechanism of Vilsmeier-Haack reaction. **3**

ii) Predict the products formed in the following reactions. **3**

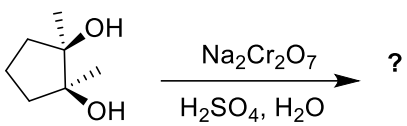
x)



y)



z)



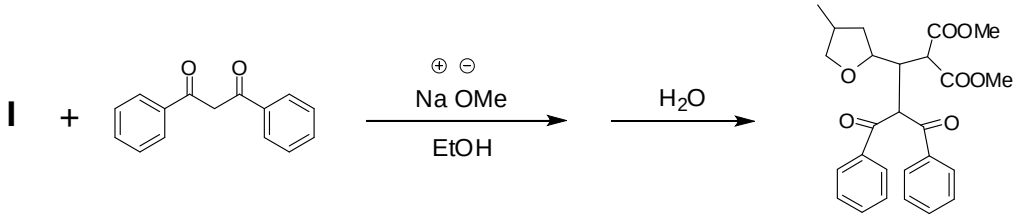
c) i) Give any three applications of Reimer Tiemann reaction. **3**

ii) Oleic acid when reacted with alkaline $KMnO_4$ gives only one product A. Whereas, on treatment with neutral $KMnO_4$ it gives two products B & C. Write the reactions and predict the structures of A, B & C. **3**

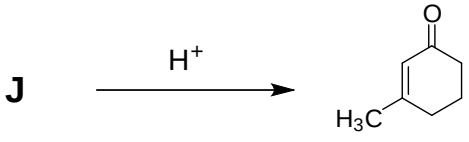
Q. 4. Answer <u>ANY ONE</u> of the following:

a) i) Give structure of suitable substrates **I**, **J**, **K**, **L** and **M** which upon subjecting to the given reaction condition using a suitable name reaction/rearrangement gives the respective product for the following reactions. **5**

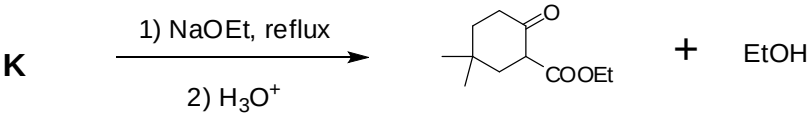
a)



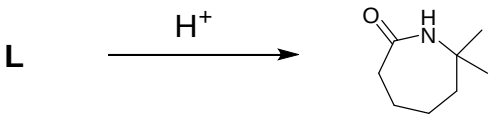
b)

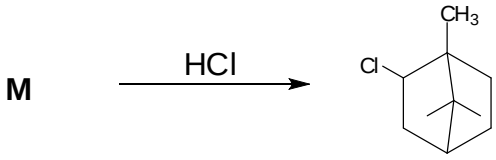


c)



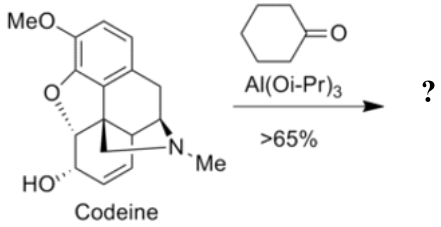
d)



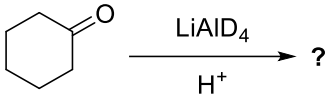


e)

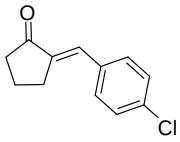
ii) Predict the product and discuss the steps involved in the mechanism of the following reaction. **4**

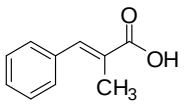


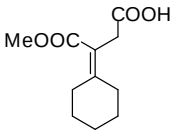
iii) Predict the product and also discuss the steps involved in the mechanism of the following reaction. **3**

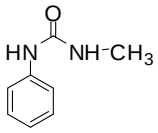


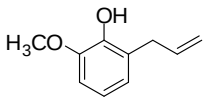
b) i) Write the complete reactions for the preparation of the following compounds using a suitable name reaction. **5**

p) 

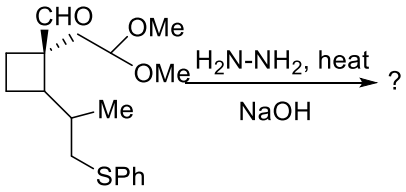
q) 

r) 

s) 

t) 

ii) Predict the product and discuss the steps involved in the mechanism of the following reaction. **4**



iii) The reaction of 1-butanol with PCC gives an aldehyde and does not give carboxylic acid. Write the reaction, predict the product and justify the statement. **3**

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