PG – 126

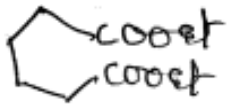
III Semester M.Sc. Degree Examination, December 2014
(2010-11 Scheme) (NS)
CHEMISTRY
C–302 – OC : Organic Synthesis – I

Time : 3 Hours Max. Marks : 80

Instruction : *Answer question no.* ***1*** *and* ***any five*** *of the following.*

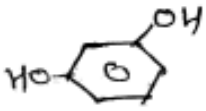
1. Answer **any ten** questions of the following : **(2×10=20)**

a) Predict the product formed in the following reaction with proper mechanism :



$\xrightarrow{NaOEt}$?

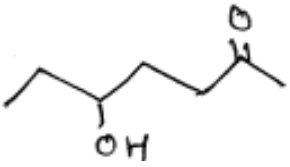
b) Name and write the product for the following :



+ CH_3CN $\xrightarrow[HCl,\ 0^{\circ}C]{ZnCl_2}$? $\xrightarrow{H_2O}$?

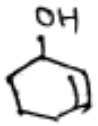
c) What is Fenton's reagent ? Give its synthetic applications.

d) Write the product formed with mechanism of the following :



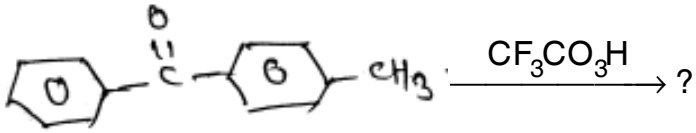
$\xrightarrow{DCC}$?

e) Formulate the product formed with suitable explanation of the following reaction :

? $\xleftarrow[H^+]{CrO_3}$ 

$\xrightarrow[pH > 7]{KMnO_4}$?

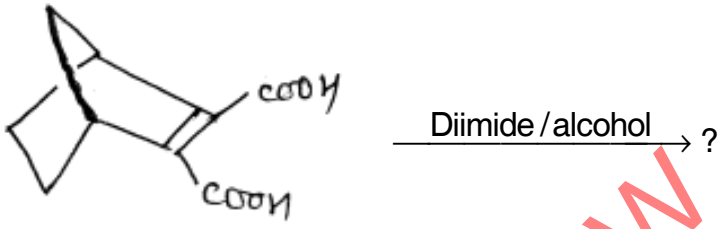
f) Predict the product in the following reaction with proper mechanism :



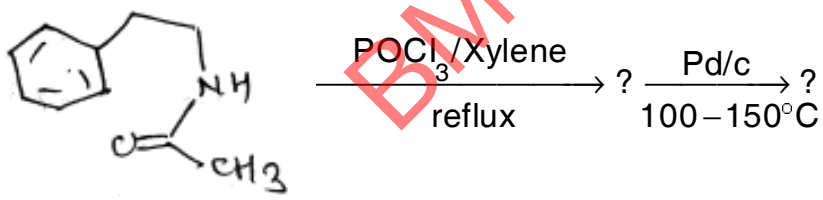
g) Illustrate Birch reduction with example.

h) Give two synthetic applications of Suzuki coupling reaction.

i) With stereo selectivities, predict the product(s) of the following :



j) Name and predict the product for the following reaction :



k) Predict the product and propose the mechanism :

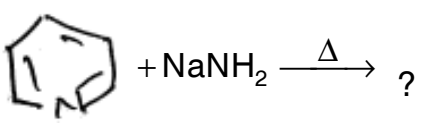
$H_2C = CH - CH_3 \xrightarrow{NBS} ?$

l) What is Darzen's reaction ? Give an example.

2. a) Discuss the mechanism of Hofmann-Loeffler Freytag reaction.

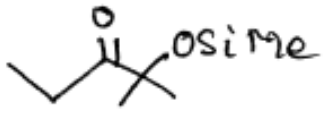
b) What are enamines ? Formulate one method of synthesis and give its synthetic applications.

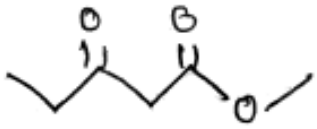
c) Predict the product and propose mechanism to the following : **(4+4+4=12)**



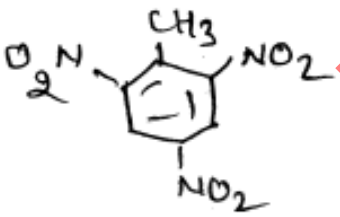
3. a) Discuss the synthetic applications of following reagents :
   i) 1, 3-Dithiane
   ii) Raney-Nickel.

   b) Complete the reactions and write plausible mechanism :

   i)  $\xrightarrow[-78^{\circ}C,\ PhCHO]{LDA,\ THF}$?

   ii)  $\xrightarrow[ClCH_2COOrt]{Baker's\ Yeast}$? **(6+6=12)**

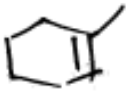
4. a) Complete the following reaction and outline its mechanism :



$\xrightarrow[Reflux]{Pb(OAc)_4\ /AcOH}$?

   b) Discuss Dess-Martin oxidation with suitable example.

   c) Predict the product with possible mechanism to the following reactions :

   i)  $\xrightarrow[H_2O\ /\ THF]{OsO_4\ /NaIO_4}$?

   ii) $Ar - CH_2 - CH_2 - Ar \xrightarrow[170^{\circ}C]{SeO_2}$? **(6+6=12)**

5. a) Bring out the similarities and contrasting features between Wolf-Kishner and Clemmensen reductions with suitable examples.

   b) Explain with suitable examples, how organoboranes are used as reducing agents in organic synthesis.

   c) Discuss McMurry reaction with mechanism. **(6+3+3=12)**

6. a) Describe the mechanism of Hantsch and Biginelli reactions.

   b) Explain the utility of following reactions in organic synthesis :
      i) Deobner-Miller reaction
      ii) Baylis-Hillmann reaction. **(6+6=12)**

7. a) Write an account on synthetic utility of Robinson annulation in organic synthesis.

   b) What is DDQ ? Explain with suitable mechanism, how it is used in the synthesis of organic compounds ?

   c) Discuss the mechanism of Skraup synthesis. **(4+4+4=12)**