M.Sc. 2nd Semester Examination, 2021

CHEMISTRY

(Organic Chemistry)

Paper : CHEM 202C

Course ID : 21452
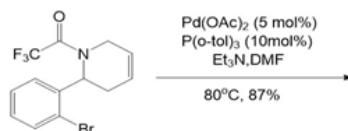
**Time: 2 Hours**   **Full Marks: 40**

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words

as far as possible

1. Answer *any five* of the following questions: $2 \times 5 = 10$

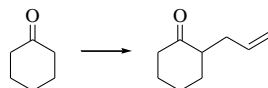(a) Write down the name and structure of Yamaguchi reagent.

(b) Predict the product of the following reaction. What type of reaction is this?

(c) Give the names of the following compounds according to Hantzsch-Widman rules.
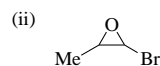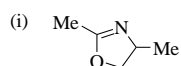
(d) Convert:

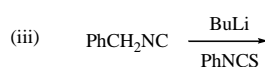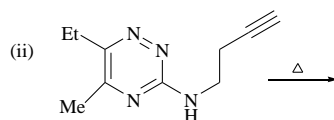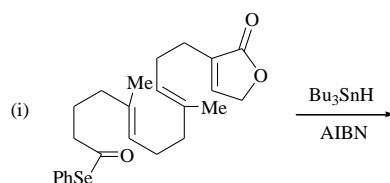(e) Give two important criteria of asymmetric synthesis.

(f) What is "Torquoselectivity"? Cite one suitable example.

(g) Explain why in sigmatropic reaction orbital correlation diagram is not applicable.

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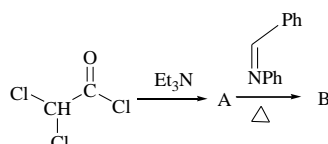
2. Answer *any four* of the following questions: 5×4 = 20
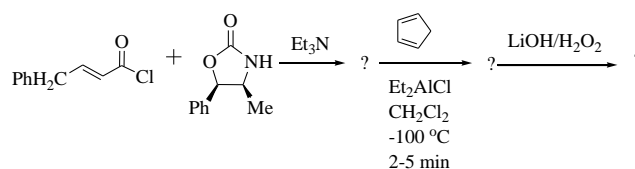
(a) Predict the products with plausible mechanism.

(i)

$\xrightarrow[\text{AIBN}]{\text{Bu}_3\text{SnH}}$

(ii)

$\xrightarrow{\triangle}$

(iii) PhCH$_2$NC $\xrightarrow[\text{PhNCS}]{\text{BuLi}}$

2+1.5+1.5 = 5

(b) Identify the products (A and B) in the following sequence of reactions. Justify your choice.

$\xrightarrow{\text{Et}_3\text{N}}$ A $\xrightarrow{\triangle}$ B
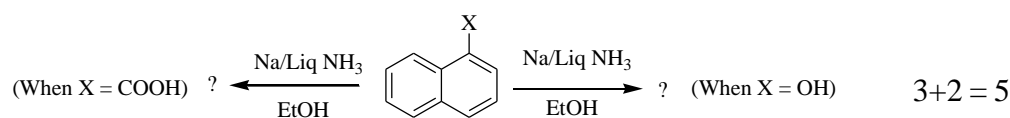
2+3 = 5

(c) (i) What is chiral auxiliary?

(ii) Write down the stereochemistry of products formed in the following sequence of reactions. Explain the selectivity, if any, involved.
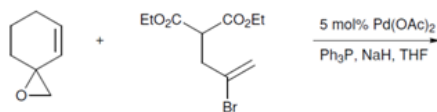

1+(3+1) =5

(d) (i) "Peterson elimination reactions are anti under acidic conditions and syn under basic conditions" - explain with suitable examples.

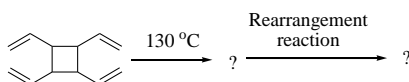(ii) Write down the missing products in following reactions.

(When X = COOH) ? $\xleftarrow[\text{EtOH}]{\text{Na/Liq NH}_3}$

$\xrightarrow[\text{EtOH}]{\text{Na/Liq NH}_3}$? (When X = OH)

3+2 = 5

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e) (i) Predict the product of the following reaction and give a plausible mechanism.
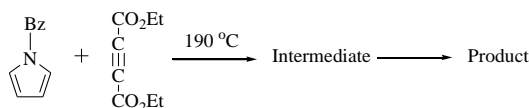

(ii) Complete the following reaction sequence. What type of reaction occurs in the first step?
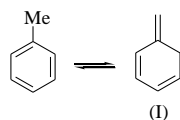

$$(1+2)+2 = 5$$

(f) (i) Predict the intermediate and product in the following reaction sequence. Also show FMO interaction wherever possible.

(ii) Toluene is aromatic while its valence tautomer (I) is not. Explain why it (I) has a longer life than expected although it is not aromatic.
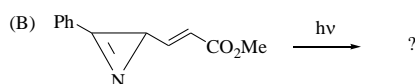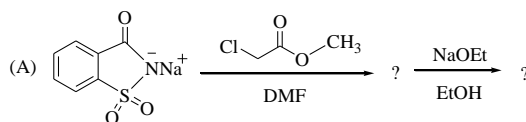

(I)

$$3+2 = 5$$

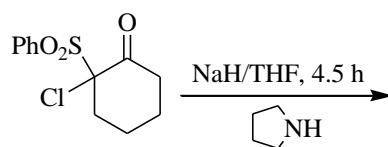3. Answer *any one* of the following questions: $10 \times 1 = 10$

(a) (i) Predict the major organic product formed in each of the following reactions with plausible mechanism.
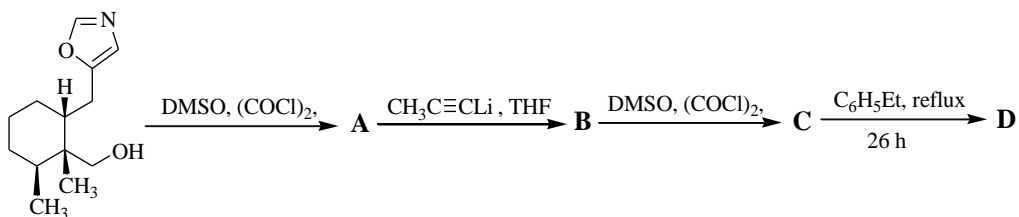

(ii) What is endo rule? Explain with suitable example. $(4+2)+(1+3) = 10$
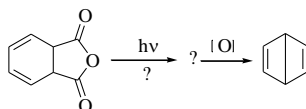
(b) (i) Predict the product and give a plausible mechanism of the following reaction.

(ii) Write down the structures **A-D**.

(iii) Complete the following transformations showing the orbital interaction involved.

(1+2)+4+3 = 10

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