

Ex/CHEM/H/32/XVI/A/77/2018(SS)

FINAL B. SC. EXAMINATION, 2018

(2nd Semester, Special Supplementary)

CHEMISTRY (HONOURS)

PAPER - XVI

ORGANIC CHEMISTRY

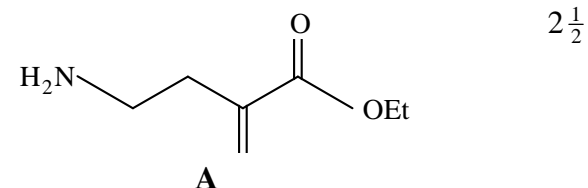
Time : Two hours

Full Marks : 50

Use a separate answerscript for each group.

GROUP - A

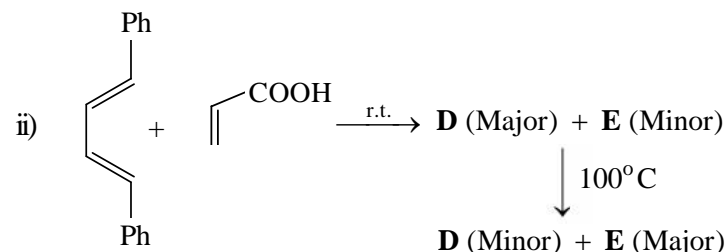
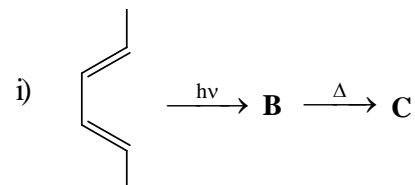
1. a) Predict and classify (according to Baldwin) the two probable modes of cyclisation in the following amine **A**. Identify the disfavoured process with proper justification.



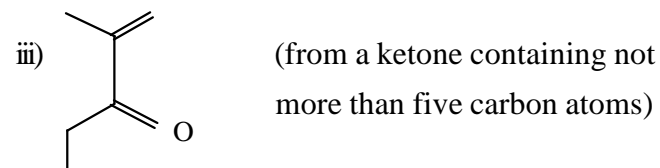
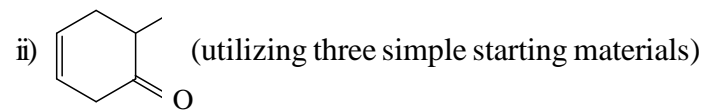
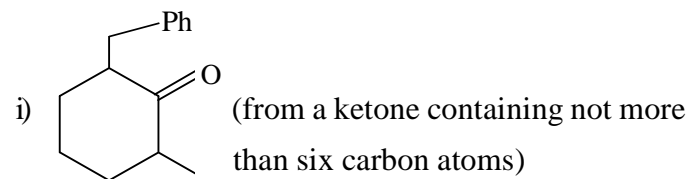
- b) (*2E, 4Z, 6R*)-2-Deutero-6-methyl-2, 4-octadiene on heating produces a mixture of two isomeric optically active acyclic conjugated dienes. Explain the observation.
- $2\frac{1}{2}$
- c) Identify the products *B, C, D* and *E* of the following reactions with proper mechanistic and stereochemical interpretations on the basis of FMO theory. $2\frac{1}{2}+2\frac{1}{2}$

[Turn over

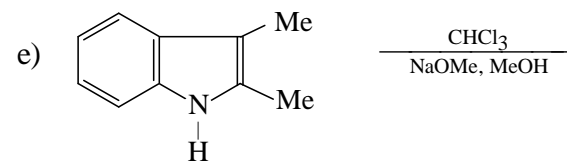
[2]



d) Carry out the retrosynthetic analyses and hence suggest syntheses of the following compounds from readily available starting materials. $2\frac{1}{2} + 2\frac{1}{2} + 1 + 1$



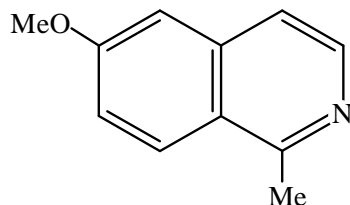
[5]

**GROUP - C**

- Write the structure of expected major product in chair form for the following reactions. $1\frac{1}{2} \times 2$
 - D-Glucose $\xrightarrow{\text{Br}_2/\text{H}_2\text{O}}$
 - D-Glucose $\xrightarrow{\text{MeOH}/\text{HCl}}$
- How would you prove that structure of D-glucose contains six carbons in a straight chain? $2\frac{1}{2}$
- Explain mechanistically why D-glucose and D-mannose give same product when treated with excess phenylhydrazine. $2\frac{1}{2}$
- How would you convert D-aldopentose to D-aldohexose? $2\frac{1}{2}$
 - What do you mean by addition polymerization? Illustrate with suitable example. 2
 - Give one example of natural and synthetic rubber with their monomeric units. $1\frac{1}{2}$
- What is the complementary nucleotide of adenine deoxyribonucleotide in DNA double helix? Give explanation in favour of your answer. 2

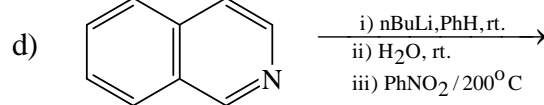
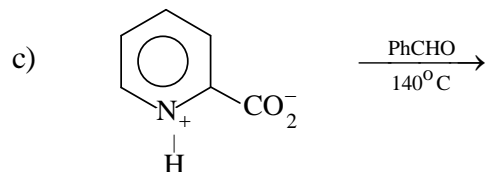
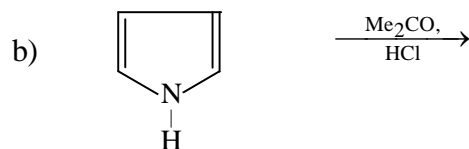
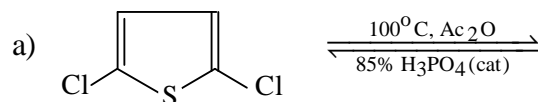
[4]

- b) Depict a retrosynthetic pathway of the following compound:



1

4. a) Predict the product(s) and write the mechanistic pathway of the following reactions (*any four*):

1 $\frac{1}{2}$ \times 4

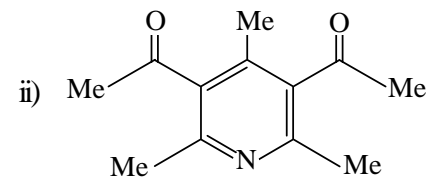
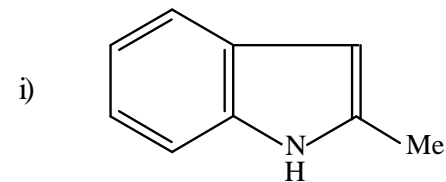
(mechanism is not necessary, only show the intermediates and find product)

[3]

- iv) (from a starting material containing not more than six carbon atoms)

GROUP - B

2. a) Convert pyrrole to pyrrole-2-carboxaldehyde, and depict the mechanistic pathway for this transformation. 2
 b) Outline the transformation of furan to 2-nitrofuran, and depict the corresponding mechanism. 2
 c) Transform pyridine to 4-nitropyridine. 1 $\frac{1}{2}$
3. a) Carry out the synthesis of the following compounds from commercially available simple starting materials. 1 $\frac{1}{2}$ \times 3



- iii) Quinoline (using glycerol as one of the starting materials).

[Turn over