

[6]

GROUP - C

4. a) Carry out the following transformations : (*any three*)
2×3
- i) D- glucose to D-arabinose
 - ii) D- glucose to D-erythrose
 - iii) D-glucose to D-fructose
 - iv) aldopentose to furfural
- b) Draw the most stable conformation of 2, 3, 4-tri-O-acetyl-β-D -xylopyranosyl chloride. Give explanation in favour of your answer. 2
5. a) Explain why DNA is called genetic material. What are the nitrogenous bases present in DNA molecule? 2
- b) How are the nitrogenous bases arranged in a double stranded DNA? Answer with justifications. 2
6. a) Define weight average and number average molecular weight of polymer? Which one is higher? 2
- b) What do you mean by polydispersity index? Discuss its physical significance. 2

Ex/CHEM/H/32/XVI/A/77/2019

FINAL B. SC. EXAMINATION, 2019

(2nd Semester)

CHEMISTRY (HONOURS)

PAPER - XVI

ORGANIC CHEMISTRY

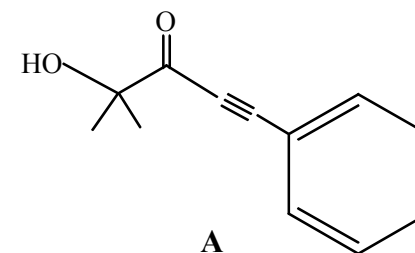
Time : Two hours

Full Marks : 50

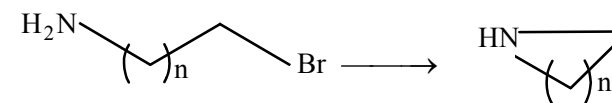
Use a separate answerscript for each group.

GROUP - A

1. a) Predict and classify (according to Baldwin) the probable mode of cyclisation of the following compound **A** under basic condition. Explain your answer. 2



- b) For the following reaction, cyclisation is faster when n=1 compared to the reaction when n=2. Justify. 2

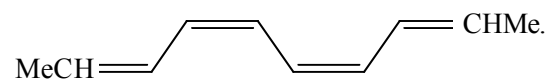


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[2]

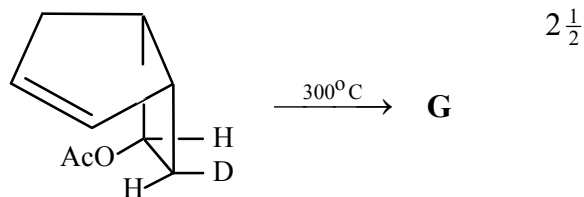
c) A mixture of (*E*) - and (*Z*) - but - 2 - ene on photochemical irradiation gives a mixture of isomeric saturated products having molecular formula C_8H_{16} . Identify them explaining their formation. $2\frac{1}{2}$

d) **B**, **C** and **D** are the three diastereomers of



At $-10^{\circ}C$, **B** gives **E** whereas at $9^{\circ}C$, **C** gives **F**. Both **E** and **F** are cyclic compounds having conjugated triene system. **D**, the third isomer, does not react at such low temperature. Explain the observation identifying **B**, **C**, **D**, **E** and **F**. $2\frac{1}{2}$

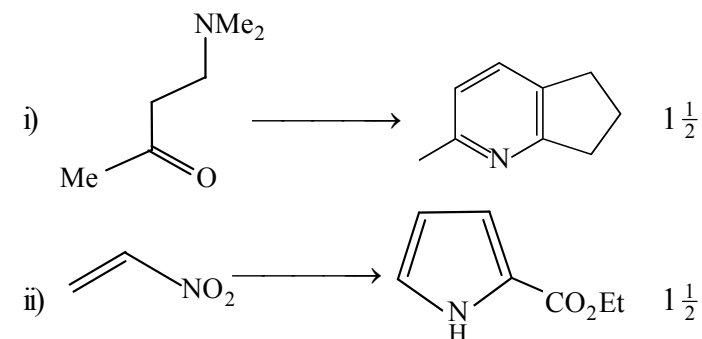
e) Identify the product **G** of the following reaction with proper mechanistic and stereochemical interpretations on the basis of FMO theory. Further, use FMO theory to comment on possibility of any other product formation. $2\frac{1}{2}$



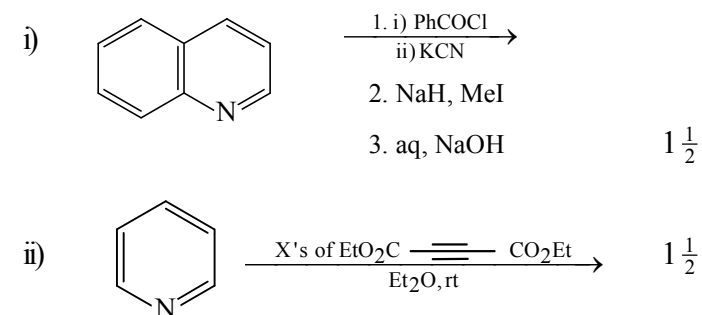
f) Carry out the retrosynthetic analyses and hence suggest syntheses of the following compounds from readily available starting materials. $2\frac{1}{2}+2+1$

[5]

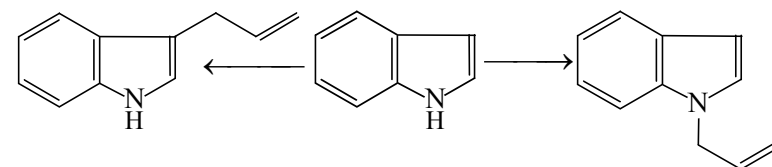
3. a) Carry out the following transformations :



b) Predict the product (s) at each step of the following reactions in (i) and showing mechanism in (ii).



c) Write the reagent (s) in each case of the following conversions : 1

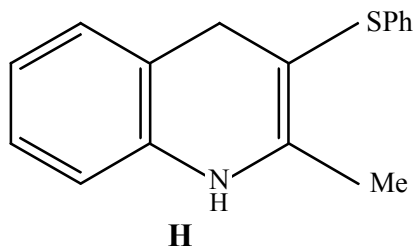


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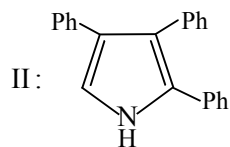
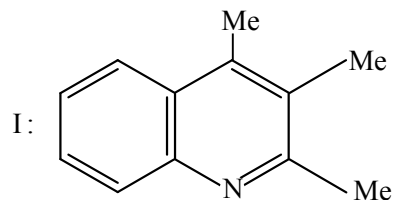
[4]

c) The dipole moments of Me_3N and Me_3NO are 0.65D & 5.02D and those of pyridine and the corresponding N-oxide are 2.22D and 4.25D. Why is the difference of dipole moment much higher in the first case than that in the second case ? 1 $\frac{1}{2}$

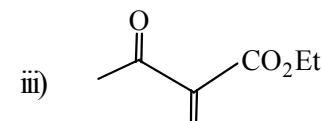
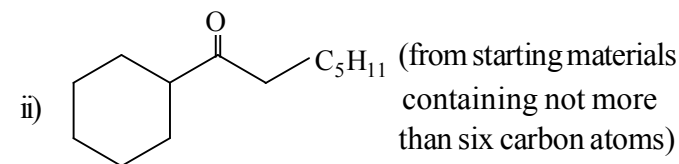
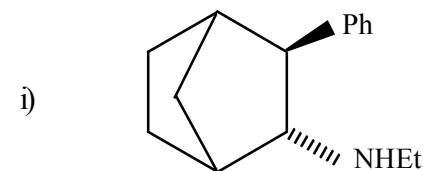
d) Synthesize **H** using Fischer's method. Depict the mechanism of indolization step. Under what condition instead of getting **H**, an isomeric compound is obtained ? Elaborate the pathway of formation of these two isomeric compounds during the synthesis. 3 $\frac{1}{2}$



e) Showing logical bond disconnection (using the sign \approx) depict the corresponding simple starting materials from which syntheses of the following compounds can be made. 2



[3]

**GROUP - B**

2. a) Furan on reaction, with an intermediate generated from 2-bromofluorobenzene and Na-Hg, under kinetically controlled condition initially forms a compound which isomerises on long standing. Draw the two isomeric products and account for such observation. 2
- b) Why pyridine can't be converted to pyridine-3-sulfonic acid but 2,6-di-tert butyl pyridine can be, in reaction in each case with sulfur trioxide ? 1

[Turn over

MeCH