c) What do you mean by denature and renature of DNA ? Define melting temperature (T_m) and how can it be measured ? Discuss the effect of (i) ionic strength of the medium and (ii) base composition on the T_m. 1+1+2

Ex/CHEM/H/32/XVI/A/77/2018

FINAL B. SC. EXAMINATION, 2018

(2nd Semester)

CHEMISTRY (HONOURS)

PAPER - XVI

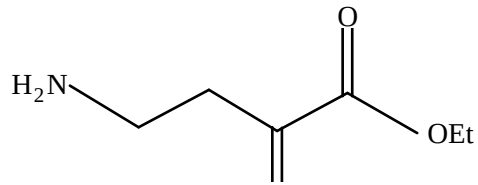
ORGANIC CHEMISTRY

Time : Two hours Full Marks : 50

Use a separate answerscript for each group.

GROUP - A

1. a) Predict and classify (according to Baldwin) the two probable modes of cyclisation in the following amine A. Identify the disfavoured process with proper justification. 3

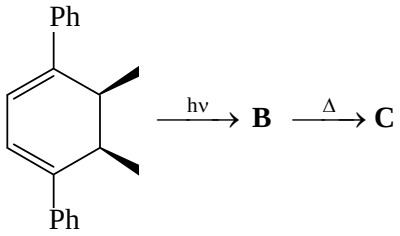


A

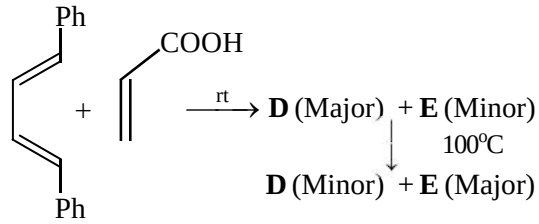
b) *meso*-3, 4-Dimethyl-1, 5 - hexadiene on heating produces a mixture of isomeric 2, 6 - octadiene containing 99.7% of *cis*-*trans* isomer and 0.3% of *trans*-*trans* isomer. Explain the observation. $2\frac{1}{2}$

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. $3+2\frac{1}{2}$

i)

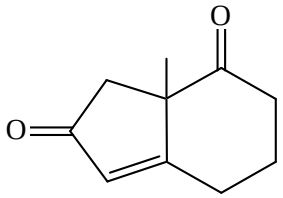


ii)



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

i)



(from a cyclic starting material)

v) Complete the following synthetic sequence with structures of **J** to **L**

D-glyceraldehyde $\xrightarrow[H+]{\text{Acetone}}$ **J** $\xrightarrow{CH_2=CHMgCl}$ **K** $\xrightarrow{O_3}$ **L**

vi) What is anomeric effect ? Explain with suitable example .

b) Carry out the following conversion ***(any one)*** 2×1

i) D-Erythrose to the next higher aldose.

ii) D-Mannose to the next lower aldose.

7. a) Answer the following questions.

i) What is coordination polymerization ? Briefly discuss the mechanism of Ziegler-Natta catalysed polymerization. $1\frac{1}{2}$

ii) What do you mean by polydispersity index ? Briefly discuss its physical significance. $1\frac{1}{2}$

b) Write the name of monomer of the following polymers **(any two)** 1

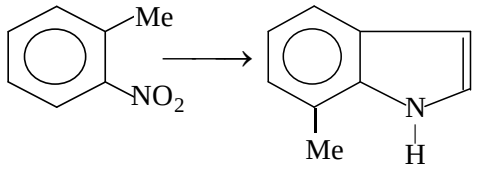
i) Teflon

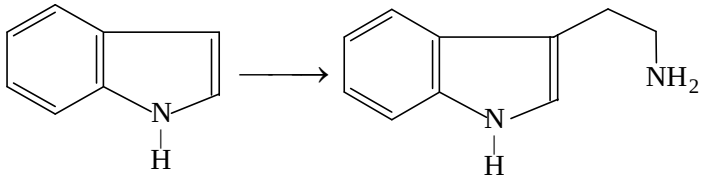
ii) Buna-N-Rubber

iii) Viscosreyon

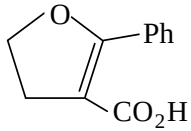
c) Quinoline on treatment with (con. HNO_3/con. H_2SO_4/ 0^oC) produces 5-nitro-and 8-nitro-quinolines in the ratio 1 : 1, whereas on reaction with (con. $HNO_3/Ac_2O/0^oC$) generates small amount of 3-nitroquinoline as the main product. Account for the formation of product/(s) in each case.

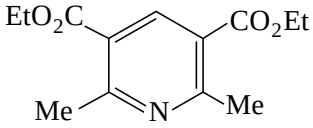
3. Carry out the following transformations : $\frac{1}{2}\times2$

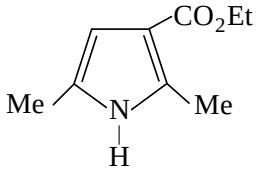
a) 

b) 

4. Depicting the retrosynthetic analysis, outline suitable synthesis of the following compounds ***(any two)*** : 2×2

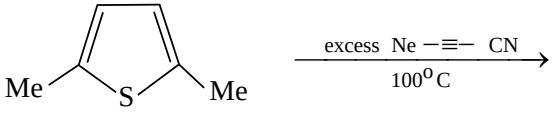
a) 

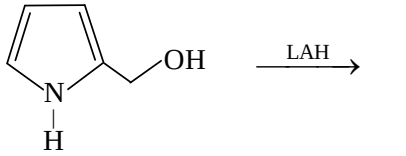
b) 

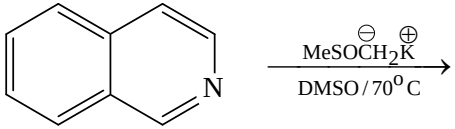
c) 

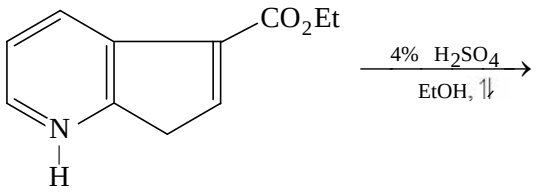
5. Predict the product/(s) with suitable mechanistic pathway ***(any four)*** : $1\frac{1}{2}\times4$

a) 

b) 

c) 

d) 

e) 

GROUP - C

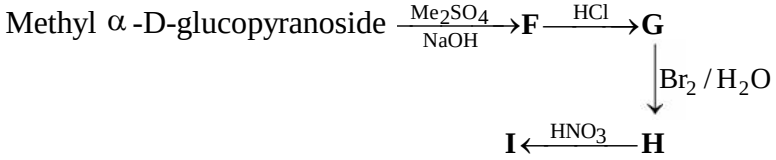
6. a) Answer ***any four*** from the following questions. $1\frac{1}{2} \times 4$

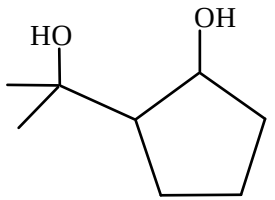
i) Aldopentoses are converted to furfural when treated with acid - explain mechanistically.

ii) How would you prove chemically that fructose has a keto group at C_2 position ?

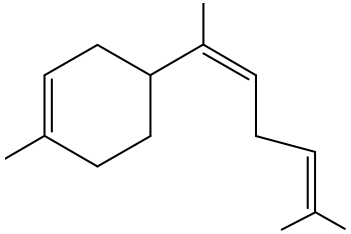
iii) Why does osazone formation stop at C_2 and does not go beyond that when glucose is subjected to osazone formation ?

iv) Write the structures of all the products (**F** to **I**) with proper stereochemistry in the following synthetic sequence.



ii) 

(from an acyclic starting material)

iii) 
(from starting material containing not more than five carbon atoms)

GROUP - B

2. Answer ***any two*** questions. 2×2

a) Compare or contrast qualitatively the features of dipole moment in pyrrole, furan and thiophene with proper reason.

b) With a suitable type of reaction and from the outcome in each case discuss on the relative aromaticity of pyrrole, furan and thiophene.