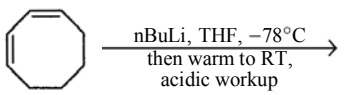
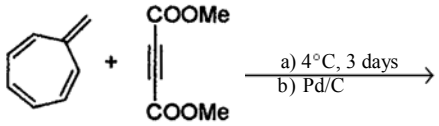
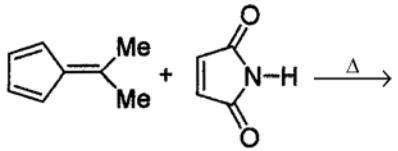
ii) 

iii) 

iv) 

c) What do you mean by "torqueoselectivity"? Explain with an example. 1

5. a) Draw a scheme with reagents and conditions for the conversion of D-glucose to L-gulose. 3

b) Write the structure of nitrogene base-pairing, including hydrogen bonding found in DNA. 2

c) Furfural is the main product when the aqueous solution of an aldopentose is heated with acid – explain mechanistically. 2

d) Write the name and structure of the sugar obtained from the glucose by Ruff degradation. Mention the reagent condition and mechanism in each step. 3

B. Sc. Chemistry (Special Supplementary)
Examination, 2023

(5th Semester, CBCS,

CHEMISTRY (CORE)

Paper: Chem/Th/12

Time : Two Hours Full Marks : 40

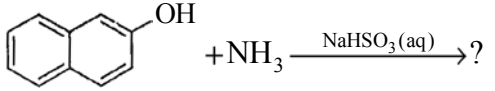
(20 marks for each unit)

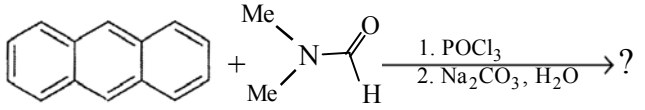
Use a separate answer script for each unit.

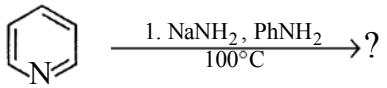
UNIT - 5121-O

1. a) Carry out the following transformation mentioning the reagents used and product formed in each step: Naphthalene → Anthracene $1\frac{1}{2}$

b) Predict the product(s) with plausible mechanism of the following reactions (any ***two***): $1\frac{1}{2}\times 2$

i) 

ii) 

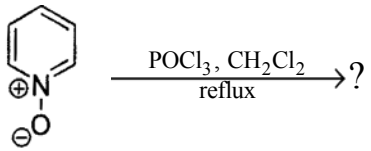
iii) 

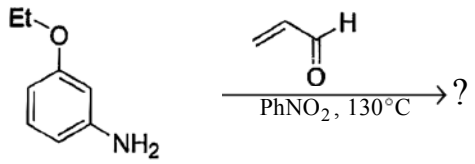
2. a) Answer any ***one*** of the following questions: $1\frac{1}{2}$

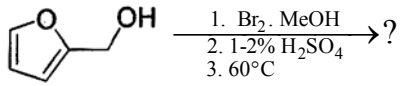
i) Pyrrole undergoes electrophilic attack at C-2 position whereas indole undergoes electrophilic attack at C-3.

ii) Pyridine N-oxide undergoes both electrophilic and nucleophilic attacks at the same positions.

b) Predict the product(s) of the following reactions with plausible mechanism (any ***two***): 2×2

i) 

ii) 

iii) 

3. a) What is the preferential orientation (equatorial or axial) of phenyl group in 1-methyl-1-phenylcyclohexane? Give explanation. $2\frac{1}{2}$

b) Compare with justification the saponification rates of two diastereoisomeric ethyl 4-*tert*-butylcyclo-hexanecarboxylates. $2\frac{1}{2}$

c) Draw and label all the elements of symmetry present in the boat conformation of cyclohexane and thereby propose its point group. 2

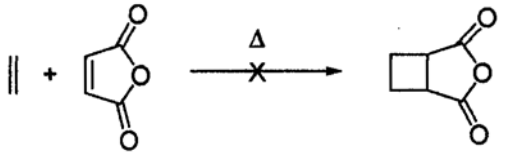
d) Explain the term 'pseudorotation' in connection with 'ring inversion of cyclohexane'. $1\frac{1}{2}$

e) Describe schematically resolution of *racemic* 2-hydroxypropanoic acid *via* formation of diastereomeric salts. Give also the chemical reaction(s) involved. $1\frac{1}{2}$

UNIT - 5122-O

4. a) With the help of FMO analysis, explain the following observations (any ***two***): $1\frac{1}{2}\times 2$

i) Ethylene and maleic anhydride do not give a cyclobutane derivative when heated together



ii) [1,3]-sigmatropic rearrangement occurs suprafacially with inversion of configuration of the migration group.

iii) [4+2]-cycloaddition is photochemically forbidden.

b) Predict the product(s) with proper stereochemistry of the following pericyclic reactions. Explain their formation on the basis of FMO approach with mechanism (any ***three***): 2×3

i)