

(6)

- (c) (i) In non-polar medium α -D-glucopyranose is more stable than β -D-glucopyranose whereas in polar medium it is reverse. Justify. 2
- (ii) Write down the reaction mechanism of formation of osazone for D-fructose. Why does the reaction not proceed beyond the first two carbon atoms? 2+1

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Ex/SC/CHEM/UG/CORE/TH/12/2025

B. SC. CHEMISTRY EXAMINATION, 2025

(5th Semester)

CHEMISTRY (CORE)

PAPER : CORE 12

Time : Two Hours

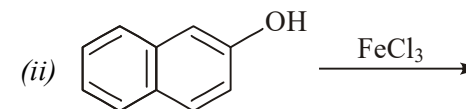
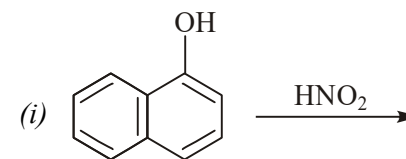
Full Marks : 40

(20 marks for each Unit)

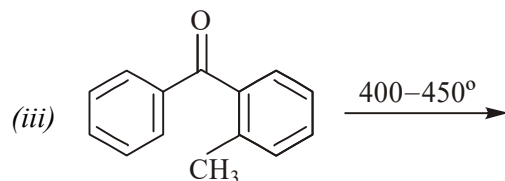
Use a separate Answer Script for each Unit.

UNIT—5121-O

1. (a) Write down the steps for the synthesis of 1-methylphenanthrene by Haworth method. 1
- (b) Predict the product(s) in the following reactions (*any two*): 1×2



(2)

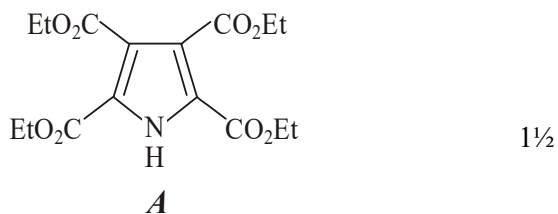


- (c) What is double-bond fixation of naphthalene? Give an example in favour of double-bond fixation. 1

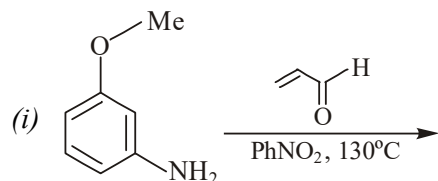
2. (a) What happens when equimolar amount of

$\text{CH}_3-\text{C}(=\text{O})-\text{CH}_2-\text{CH}_3$ and $\text{C}_6\text{H}_5\text{NHNH}_2$ are allowed to react in glacial acetic acid at room temperature? Write the plausible mechanism of the above reaction. 1½

- (b) Delineate the proper retrosynthetic approach for the synthesis of compound **A** and identify the starting materials.



- (c) Predict the product(s) of the following reactions with plausible mechanism (*any two*): 1½×2=3

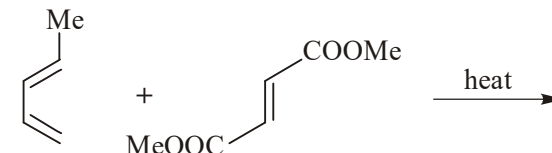


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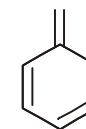
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(5)

- (ii) Write down the major product with correct relative stereochemistry in the following reaction.



- (iii) The following isomer of toluene, although much less stable than its aromatic isomer toluene, is surprisingly long-lived. Explain.



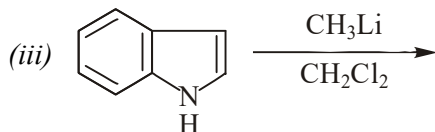
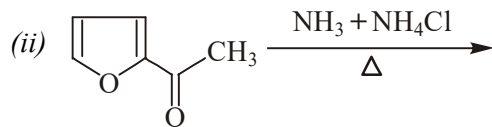
5. Answer *any two* of the following questions :

- (a) (i) How do you calculate the PI of an α -amino acid having acidic, basic and neutral side chain residue? 2
- (ii) Explain Sanger method of N-terminal residue analysis of proteins. 2
- (iii) How would you convert D-glucose to D-arabinose? 1
- (b) (i) Write down two different methodologies of synthesizing α -amino acids by chemical method. 2
- (ii) Explain the mutarotation of D-glucose. 2
- (iii) Write down with structures the nucleobases present in DNA. 1

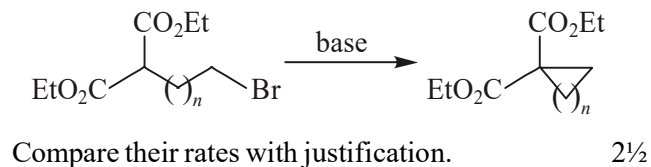
CHEM-952

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(3)



3. (a) Predict the product(s) formed when *cis*-2-aminocyclohexanol in dilute hydrochloric acid is treated with sodium nitrite. Provide suitable mechanistic and stereochemical explanations. $2\frac{1}{2}$
- (b) Draw the boat and twist boat conformations of cyclohexane. Which one between these two is the more stable one? Justify your answer. $2\frac{1}{2}$
- (c) Compare the equilibrium compositions of *cis*-1,3-dimethylcyclohexane to that of *cis*-cyclohexane-1, 3-diol. Draw the chair conformations and explain. $2\frac{1}{2}$
- (d) Classify the following reactions ($n = 3, 4$) according to Baldwin's rules for ring closure and state whether they are favoured or disfavoured.



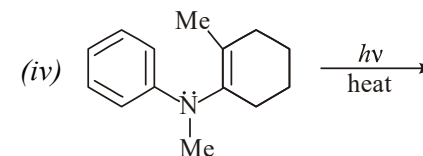
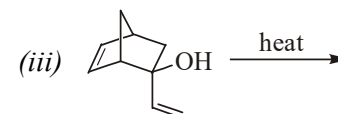
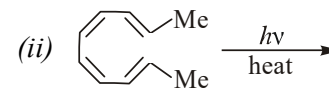
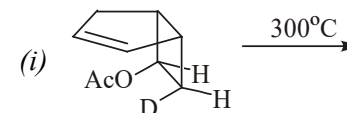
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(4)

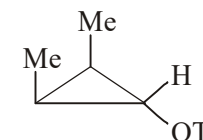
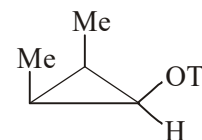
UNIT—5122-O

4. (a) Predict the product(s) with proper stereochemistry of the following reactions and explain with FMO consideration (*any three*) : 2×3



- (b) Answer *any two* of the following questions : 2×2

- (i) Which of the following two compounds undergoes acetolysis at a faster rate in presence of acetic acid at 150°C ? Predict the product and explain your answer.



CHEM-952

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