

M. Sc. (CHEMISTRY) EXAMINATION, 2023

(4th Semester)

PAPER: XV-O**[ORGANIC CHEMISTRY SPECIAL]**

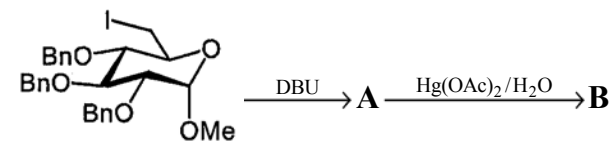
Time : Two Hours

Full Marks : 40

(20 marks for each unit)

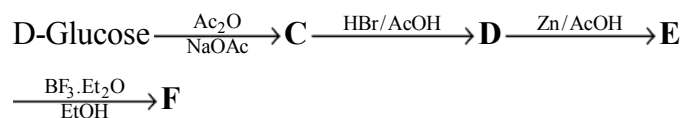
Use a separate answer script for each unit.**Unit: O-4151**Attempt **any five** from the following questions. 5×4

1. a) Discuss how the protecting group at the C2 of a pyranoside influences the stereochemical outcome of the glycosylation reaction. 2
- b) Discuss the pre-activation-based iterative strategy for assembling of monosaccharides to form an oligosaccharide with a suitable example. 2
2. Propose a synthetic scheme with reagents and conditions for the following conversions (multistep): 2+2
 - i) D-Glucose \longrightarrow D-Xylose
 - ii) D-Glucose \longrightarrow β -D-Glcp-(1 \rightarrow 6)-D-Glcp
3. Predict the structures **A-F**. Discuss the mechanism for the conversion from **A** to **B**. 3+1

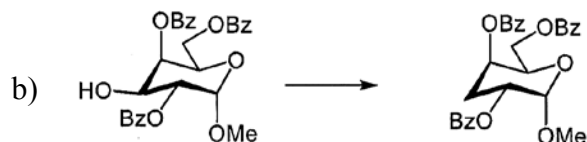
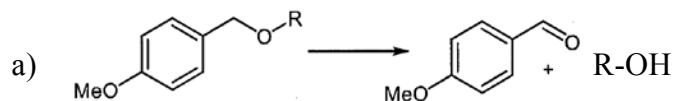


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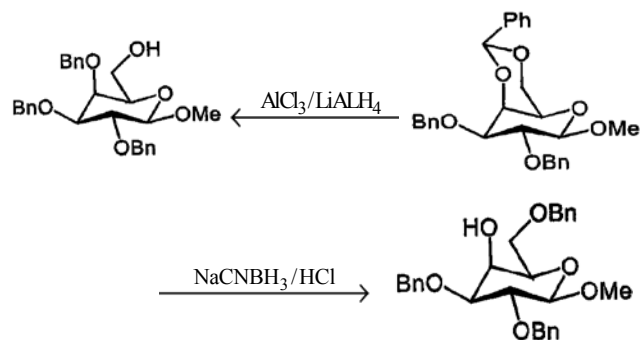
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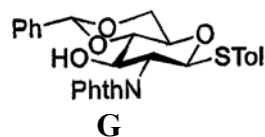
4. Suggest reagents/conditions for the following conversions with a mechanistic explanation. 2×2



5. a) How would you explain the following observations? 2



- b) Propose a scheme for the synthesis of the following donor, **G** starting from D-glucosamine and other suitable reagents mentioning the reaction conditions. 2



[5]

OR

Describe the synthetic route to 5-fluorouracil from ethyl 2-fluoroacetate. 1½

- e) Give an example of a prodrug which is used to prolong the drug activity. Define metabolic blocker with a suitable example. 1+1

[4]

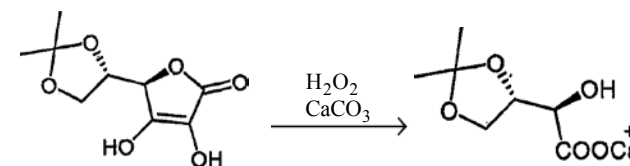
- b) Show mechanistically how ingested pyridoxine is converted in the liver to pyridoxamine phosphate and 4-pyridoxic acid? Show any two mechanistic pathways how pyridoxal phosphate participates in amino acid metabolism. $\frac{1}{2} + 1\frac{1}{2} + 2$

OR

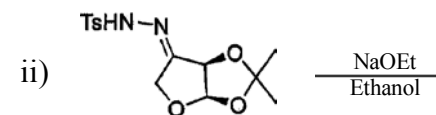
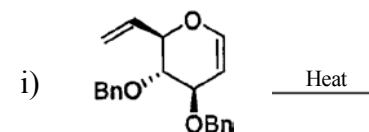
- i) Draw the chemical structure of active coenzyme of vitamin B1. Mechanistically describe how vitamin B₁ catalyzes the conversion of pyruvic acid to acetaldehyde. 2
- ii) Draw the chemical structure of a vitamin which contains a sugar-alcohol unit. What are the active co-enzymes of that vitamin? Draw the chemical structures of those coenzymes. 2
- c) Show schematically (with ring numbering) how 7-dehydrocholesterol is converted into calcitriol. 2
8. a) Why ampicillin is acid resistant? Mention a way to overcome its poor solubility issue. 1+1
- b) Elaborate the reactions of glutathione with drug molecules in Phase-II metabolism process. $1\frac{1}{2}$
- c) Describe how enzyme inhibitors and receptors work. $1\frac{1}{2} + 1\frac{1}{2}$
- d) Describe the synthetic scheme of ketoprofen from 3-methylbenzophenone. $1\frac{1}{2}$

[3]

6. a) Give a mechanistic explanation for the following reaction. 2



- b) Write the expected product with a mechanism for the following reactions. (*any one*) 2



Unit: O-4152

Answer the following questions.

7. a) Vitamin E has the capacity to protect the mitochondrial system from irreversible inhibition by lipid peroxidation atom. Justify the statement with mechanistic details and draw the chemical structure of most biologically active form of vitamin E. Show mechanistically the final fate of that active form after breaking the chain of peroxide. $2 + \frac{1}{2} + 1\frac{1}{2}$

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