

**B.Sc. 5<sup>th</sup> Semester (Honours) Examination, 2020 (CBCS)**

**Subject: Chemistry**

**Paper: CC-12**

**Organic Chemistry-V**

**Time: Two Hours**

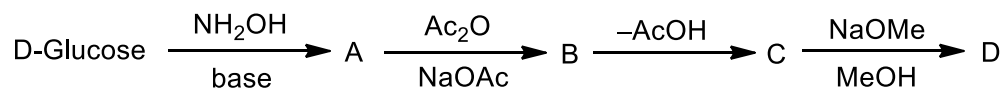
**Full Marks: 40**

*Candidates are required to give answers in their own words as far as practicable*

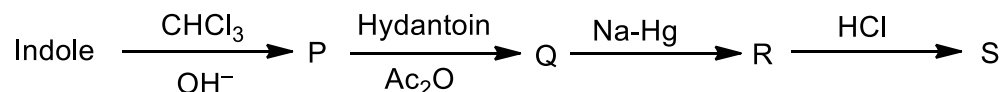
Answer *any eight* questions from the following:

5 × 8 = 40

1. Draw the C-3 epimer of D-glucose and identify compounds **A** to **D** in the following reaction sequence:

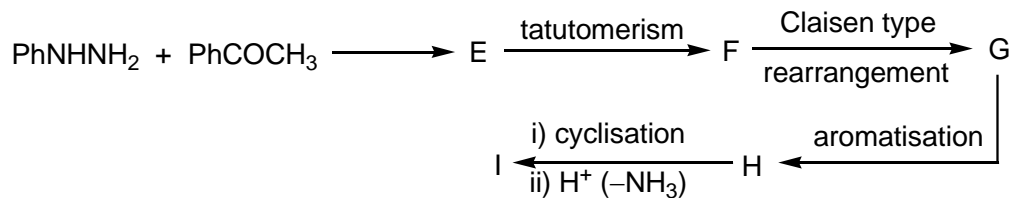


2. Draw the structure of *Boc* derivative of glycine and Identify **P**, **Q**, **R** & **S** in the following reaction sequence:



3. Write the structural difference between 'nucleoside' and 'nucleotide'. Suggest a scheme for the synthesis of Gly-Ala using DCC prompted peptide synthesis and provide mechanism for the DCC coupling reaction.
4. On the basis of FMO interaction, explain the feasibility of [4+2] cycloaddition and [3,3] sigmatropic rearrangement under thermal condition.
5. Describe the synthesis of  $\alpha$ -terpineol from methylvinylketone (MVK) utilizing *Diels-Alder* reaction. D-(-)-Ephedrine is a weaker base than L-(+)- $\Psi$ -ephedrine—explain.
6. An aldopentose **X** can be oxidized with dilute  $\text{HNO}_3$  to an optically active aldaric acid. A Killiani-Fisher synthesis starting with **X** yields two new aldoses – **Y** and **Z**. Aldose **Y** can be oxidized with  $\text{HNO}_3$  to an optically inactive aldaric acid, but aldose **Z** is oxidised to an optically active aldaric acid. Assuming the D configuration, identify the structures of **X**, **Y** and **Z**.
7. In terms of relative stabilities of the intermediates, explain the orientation of electrophilic substitutions with pyrrole and thiophen. How pyrrole be converted to 3-chloropyridine?

8. The Fischer indole synthesis starts with an aryl hydrazone and utilizes Bronsted or Lewis acid ( $\text{ZnCl}_2$ ). Provide the structural formula of **E** to **I** involved in the following synthesis of an indole derivative (**I**):



9. Identify the final product showing all the steps involved when piperidine is subjected to undergo consecutive Hoffmann-exhaustive methylation.

Which of the following would undergo solvolysis in 80% ethanol at a faster rate and why?



10. How naphthalene can be converted to 1-methylphenanthrene using *Haworth* synthesis? Write down the products when anthraquinone is reduced by (i)  $\text{Sn}/\text{HCl}$  in acetic acid and (ii)  $\text{Zn}$ -dust in aqueous  $\text{NaOH}$  solution.

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