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PC 13102-N

L-3/2111
CHEMISTRY OF NATURAL PRODUCTS—322
Semester—III

Time Allowed : Three Hours] [Maximum Marks : 55

Note :– The candidates are required to attempt *two* questions each from Section A and B. Section C will be compulsory.

SECTION—A

1. Give one example each of dehydrogenation of organic compounds by mercuric oxide, selenium dioxide, sulphur and zinc and explain reasons for the selective choice in each case. 8

2. (a) Cite evidence to prove that α-pinene contains a cyclobutane ring. 3

   (b) Starting with *trans*-norpinic acid, write down the main points involved in the synthesis of α-pinene. 5

3. Discuss the mechanism of formation of ozonides and their decomposition with dimethyl sulphide. Also predict the products of ozonolysis of *o*-xylene and mesityl oxide. 8

4. What is the utility of von-Braun reaction in alkaloid chemistry ? Illustrate it by taking cocaine and morphine as examples. What modification do you propose to apply this reaction to secondary cyclic amines ? Discuss briefly. 8

SECTION—B

5. Clearly distinguish between the terms Biogenesis and Biosynthesis. Show by a suitable mechanism how is geranyl pyrophosphate converted into borneol and geranylgeranyl pyrophosphate to abietic acid ? 8½

6. (a) Give chemical evidence to support that santorin contains a cross conjugated dienone moiety. 3

   (b) Give an account of analytical methods which led to the elucidation of structure of menthol. Discuss briefly its stereochemistry. 5½

7. Outline a reaction sequence depicting the synthesis of penicillin V laying emphasis on the mechanism of important reactions involved therein. 8½

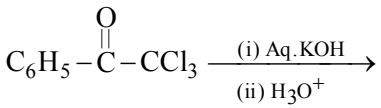
8. (a) Give adequate evidence to prove that lithocholic acid contains one hydroxyl group at position-3 and it a α-oriented. 4½

   (b) How can Barbier-Wieland degradation be used to determine the nature of the side chain in cholesterol ? 4

SECTION—C

9. (i) Predict the product of dehydrogenation of abietic acid by selenium and prove it by a chemical synthesis.

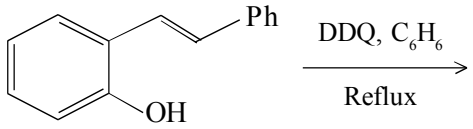
   (ii) Predict the products of the following reaction and mechanism of their formation :



   (iii) Discuss briefly the outlines of the method used for determining the size of ring B in steroids.

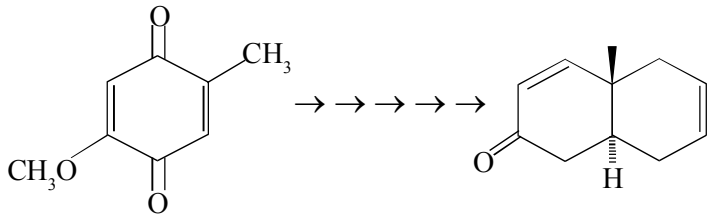
   (iv) Write the $KMnO_4$ oxidation products of α-ionone.

   (v) Write with mechanism the product of the following reaction :



   (vi) Identify the isoprene units in β-carotene. Which carbons are joined by head-to-tail link between isoprene units ?

   (vii) Sketch the following transformation as involved in Woodward synthesis of cholesterol :



   (viii) Explain the formation of santonic acid from santonin on prolonged heating with $Ba(OH)_2$.

   (ix) Comment on the mechanism of Hofmann degradation.

   (x) Sketch the mechanism of prevost reaction.

   (xi) What is Weerman test ? How this reaction has been useful in arriving at the ring size in ascorbic acid ? 11×2=22