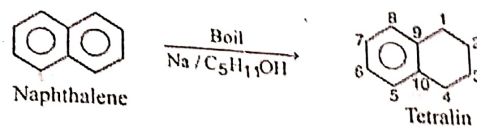


Q.39. Starting from naphthalene, how would you obtain the following?

(a) Tetralin (b) Decalin (c) Benzene.

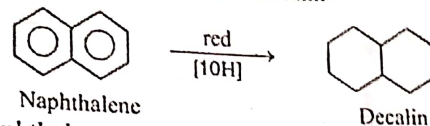
Ans. : (a) Naphthalene, on reduction with sodium and isopentanol gives

tetralin—

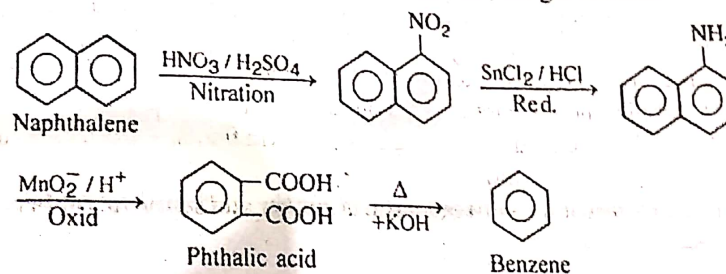


(1, 2, 3, 4-Tetra hydronaphthalene)

(b) Naphthalene, on catalytic reduction undergoes complete hydrogenation of both rings to form decalin—



(c) Naphthalene, on nitration gives 1-nitronaphthalene which on reduction gives 1-aminonaphthalene. On oxidation, 1-aminonaphthalene gives phthalic acid and when it is heated with soda lime, we get benzene—



Q.40. How has the structure of naphthalene been settled?

Or, Discuss the structure of naphthalene.

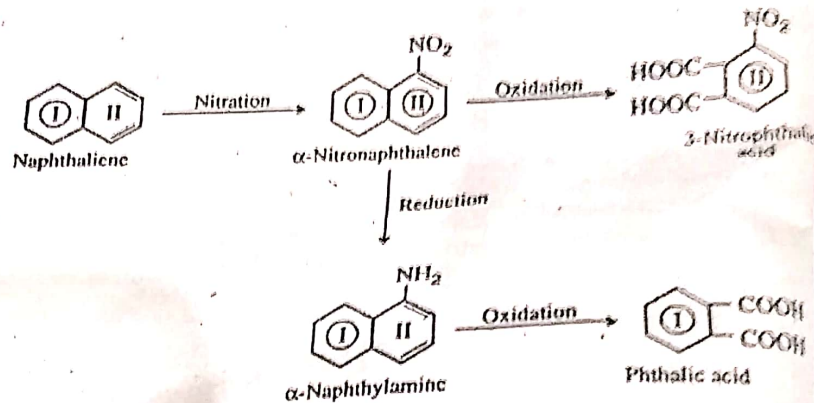
Ans. : Structure of naphthalene :

1. From the elemental analysis and the molecular weight determination, the molecular formula of naphthalene comes C_{10}H_8 .

2. It shows close resemblances with benzene in its chemical properties

- (a) It undergoes chlorination and sulphonation.
- (b) Its amino-derivative can be diazotised and coupled.
- (c) Its hydroxy derivative shows true phenolic character.
- (d) It has unusual stability.

3. Degradation : Naphthalene yields on nitration, nitronaphthalene which on oxidation gives 3-nitrophthalic acid. But, if nitronaphthalene is first reduced and then oxidized, we get only phthalic acid. Therefore naphthalene has two benzene rings fused together in ortho position. Because during oxidation of nitronaphthalene, the ring-I not containing $-NO_2$ group is destroyed to give 3-nitrophthalic acid and an amino group attached to the nucleus renders the latter extremely sensitive to oxidation. So, during oxidation of amino-naphthalene, the ring-II containing $-NH_2$ group is destroyed to give phthalic acid.



4. This structure of naphthalene is further confirmed by the following Howorth's synthesis

