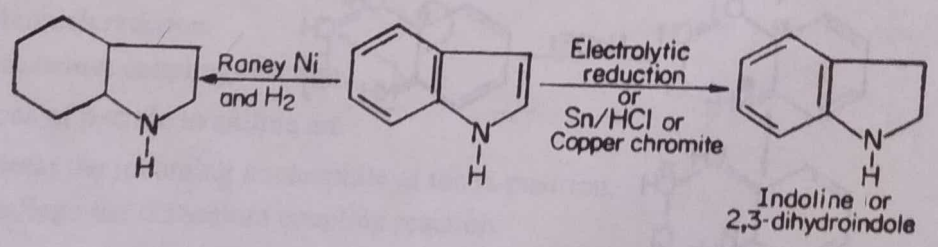
19.5.3 Structure, reactivity and orientation [See p. 812 (sec. 17.4.4e)]

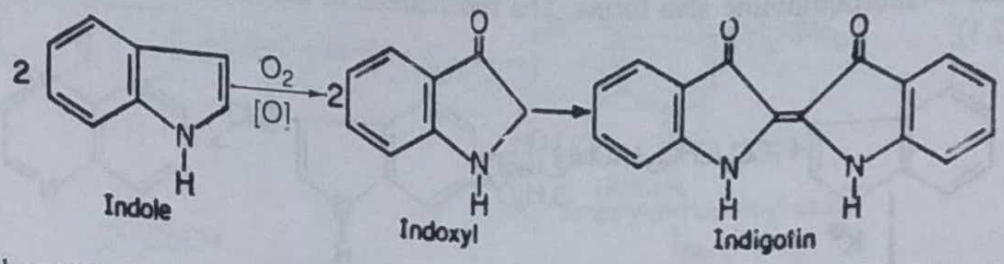
19.5.4 Chemical properties

Since indole contains a pyrrole ring, it possesses many of the properties of pyrrole. It is an aromati compound. Its two rings are flat and it contains ten delocalised πe's encompassing both the rings Therefore, it exhibits aromatic character. It undergoes electrophilic substitution reactions usually at 3 position.

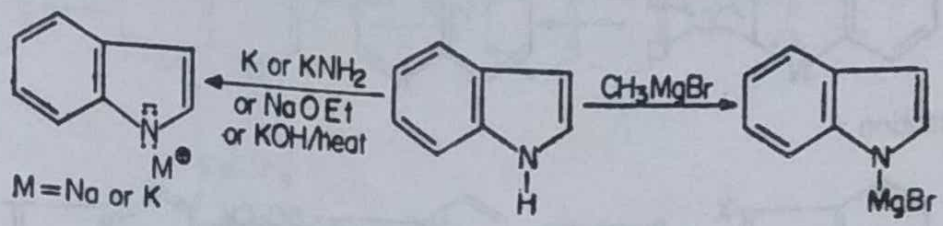
(a) Reduction :



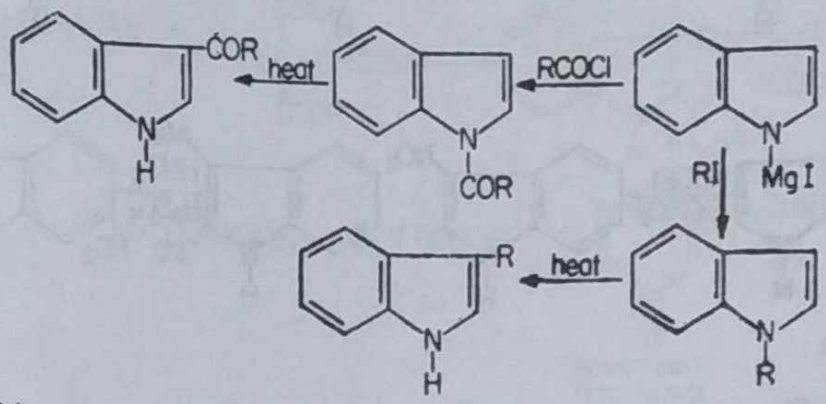
(b) Oxidation :



(c) Acid character :

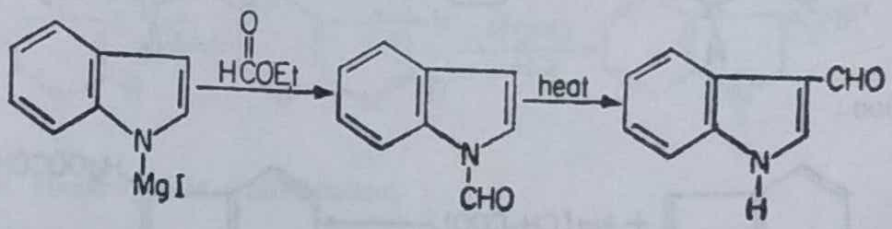


(d) Alkylation and acylation :

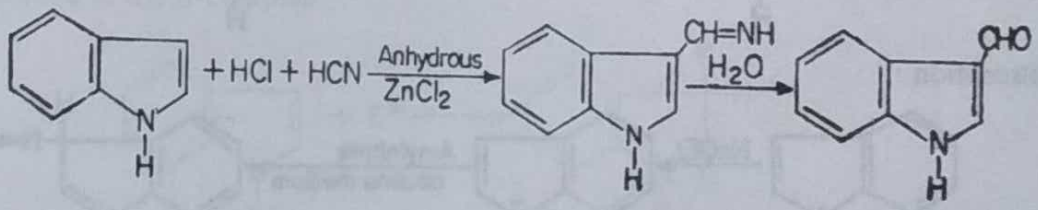


(e) Formylation :

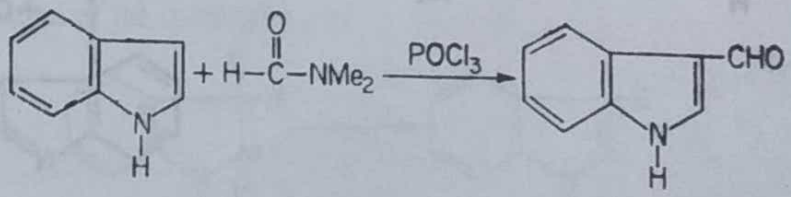
(i) By ethyl formate :



(ii) By the Gattermann reaction :

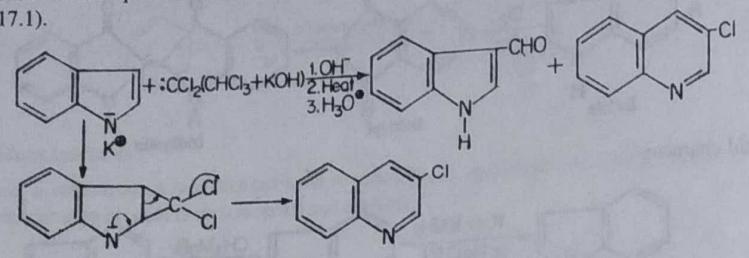


(iii) By the Vilsmeier-Haak reaction :

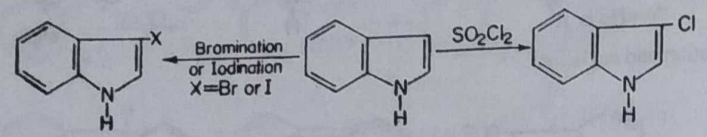


(iv) By the Reimer-Tiemann reaction :

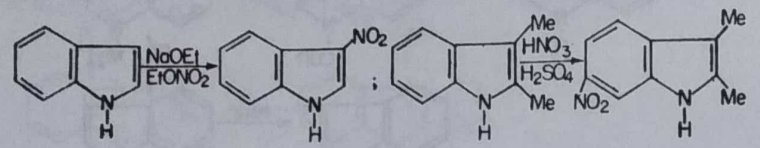
In this case 3-chloroquinoline also forms. The mechanism of the reaction is as shown in the case of pyrrole (19.17.1).



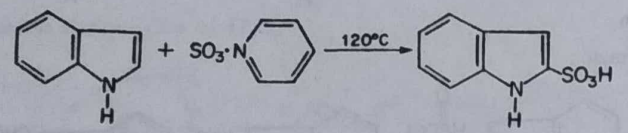
(f) Halogenation :



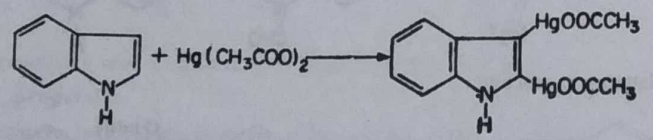
(g) Nitration :



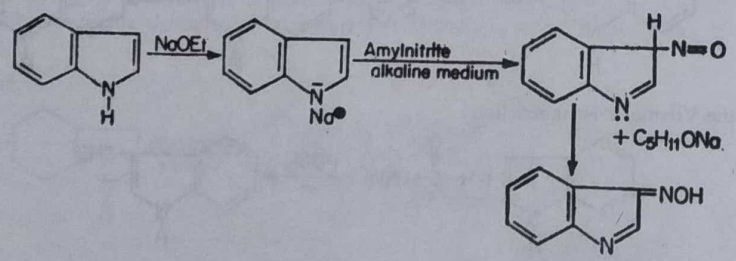
(h) Sulphonation :



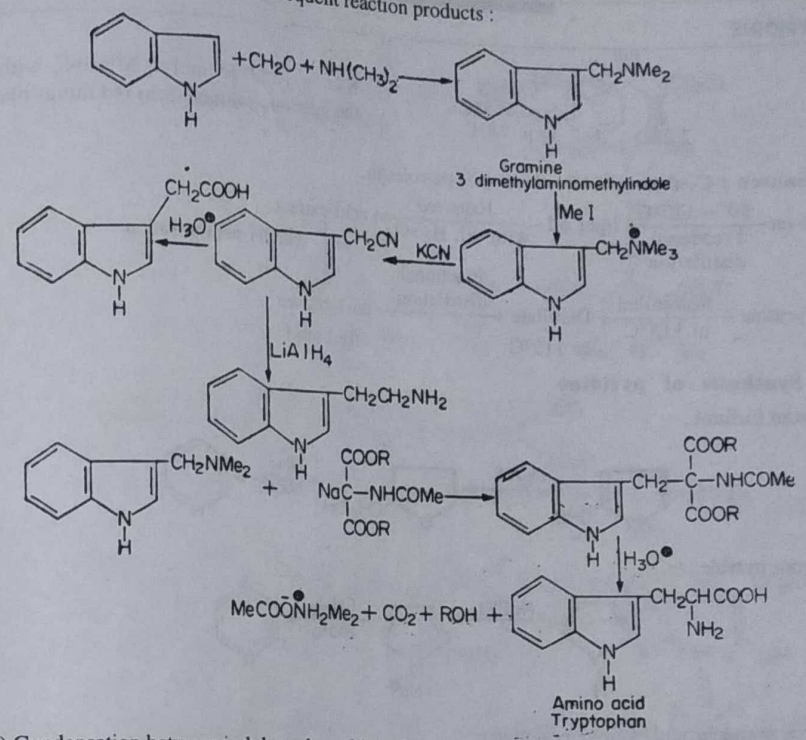
(i) Mercuration :



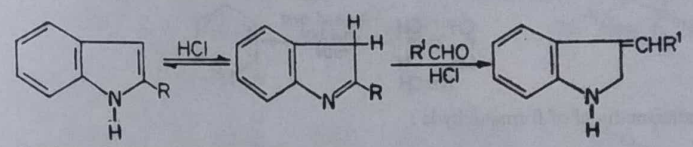
(j) Nitrosation :



(k) The Mannich reaction and subsequent reaction products :



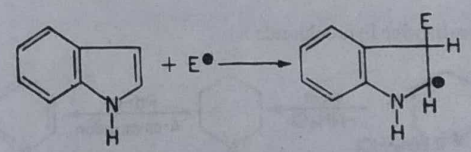
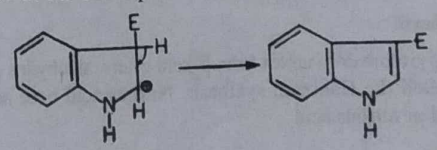
(l) Condensation between indole and an aldehyde :



Mechanism of the electrophilic substitution :

It is a two-stepped process :

Step I : Formation of the σ-complex.



Step II : Aromatisation of the σ-complex :