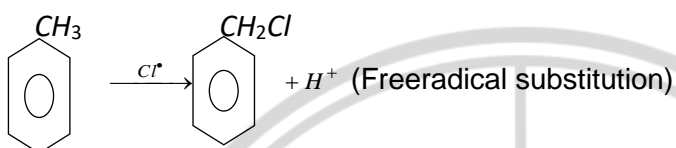


Organic reactions and their mechanism

1. (d) It is SN^2 type of reaction.

2.

3. (c) $Cl_2 \xrightarrow{\text{Light}} 2Cl^\bullet$



4. (b) For an **SN1 reaction**, the reaction intermediate is a **carbocation**.

Structure of a carbocation \rightarrow Planar (sp^2)

- The positively charged carbon is **sp^2 hybridised**
- It has **three bonds** arranged in a **trigonal planar** geometry
- The empty p-orbital is perpendicular to the plane

So the intermediate is **planar**.

5. (a) It is nucleophilic substitution reaction which is in first order.

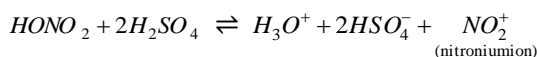
6. (a) Meta-directing

7. (c) Electrophilic substitution reaction

8. (d) To produce electrophile

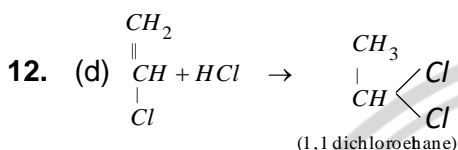
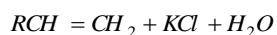
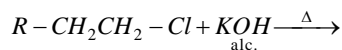
9. (d) All cations are expected to act as Lewis acid since they are electron deficient in nature. However cation such as Na^+ , K^+ etc. (Inert gas configuration) have a very little tendency to accept electrons. Therefore they do not act as Lewis acids in Friedel-Craft's reaction.

10. (d) The process of nitration takes place as below



The electrophile responsible for nitration is NO_2^+ ion.

11. (b) Dehydrohalogenation of an alkyl halide on presence of alcoholic potash is an example of elimination reaction.



It is addition reaction.

Which is according to Markownikoff rule.



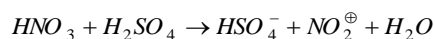
That is called addition reaction.

14. (d) When methane gas is treated with chlorine in the presence of sunlight, one hydrogen of methane replaced by the chlorine atom and forms methyl chloride. The mechanism involved in this reaction is free radical mechanism. So it is an example of free radical substitution reaction.

15. (c) Due to OH^- attack it is nucleophilic substitution.

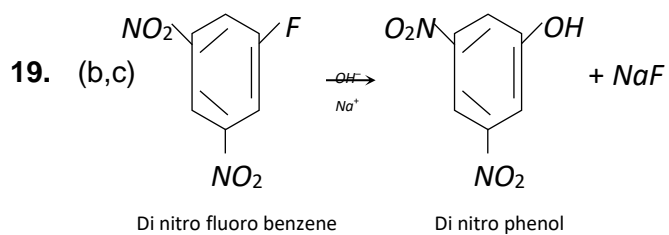
16. (a) Electron deficient species (in complete octet) acts as an electrophile i.e. BCl_3 .

17. (a) NO_2^{\oplus} is produced when conc. HNO_3 reacts with conc. H_2SO_4 .



18. (d) Phenol will undergo electrophilic substitution more readily than benzene.





20. (a) $AlCl_3$ is lewis acid *i.e.*, electron deficient compound. So it is electrophile.

