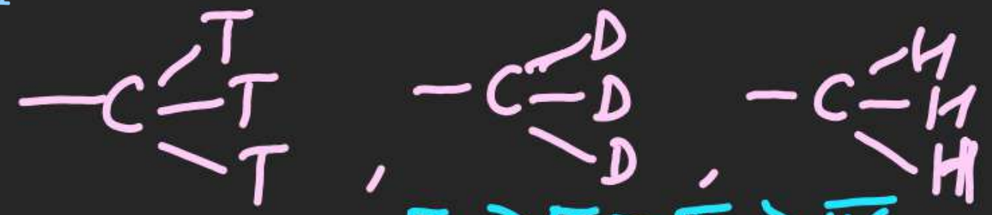
(iv)  (+I effect)

I > II > III > IV

(v) 

(I > II > III > IV)

(vi) $-CH_2-CH_3$ , $-CH_3$ , $-H$ (+I effect)

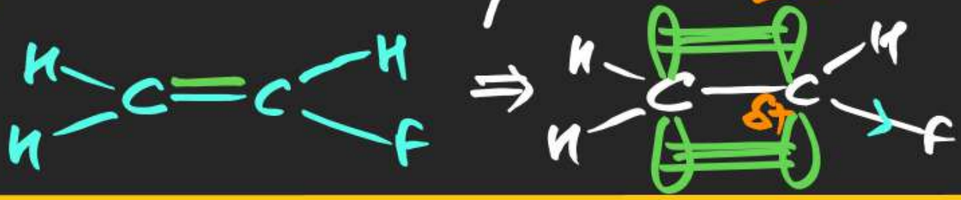
I > II > III

(vii) $-CH_2-CH_2-CH_3$ , $-CH_2-CH_3$ , $-CH_3$

I > II > III

Ex :- Explain why I effect is applicable only on σ eg.

+I ⇒ En ↑ ⇒ % S orbital ↑




⇒

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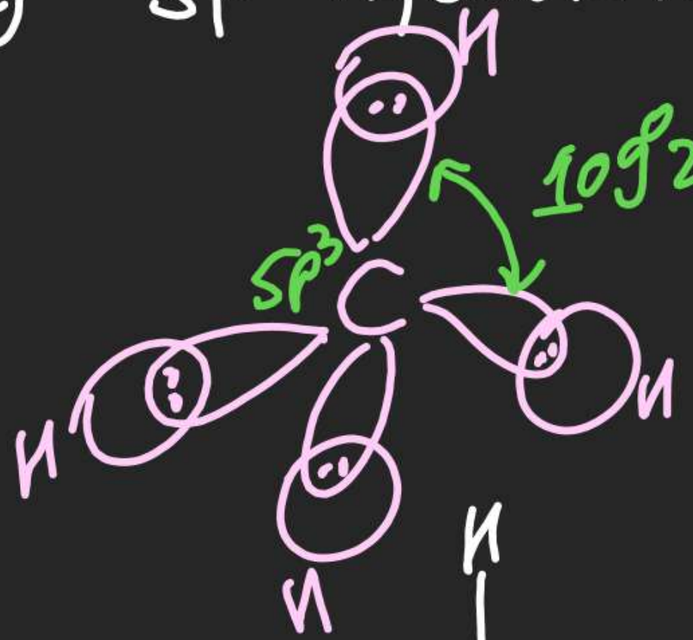
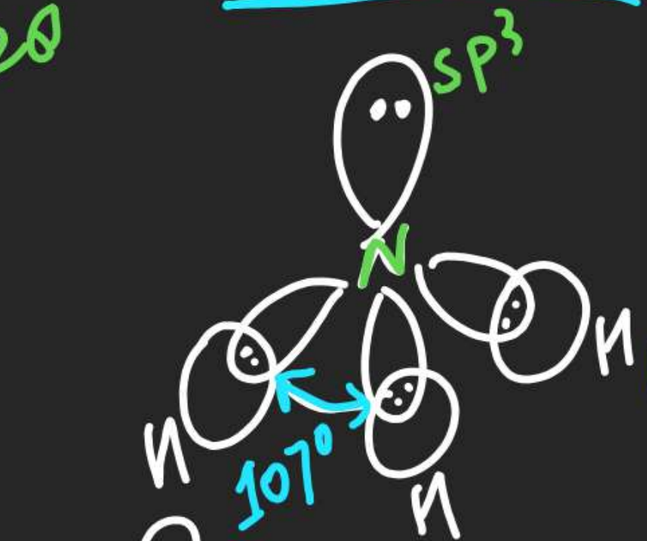
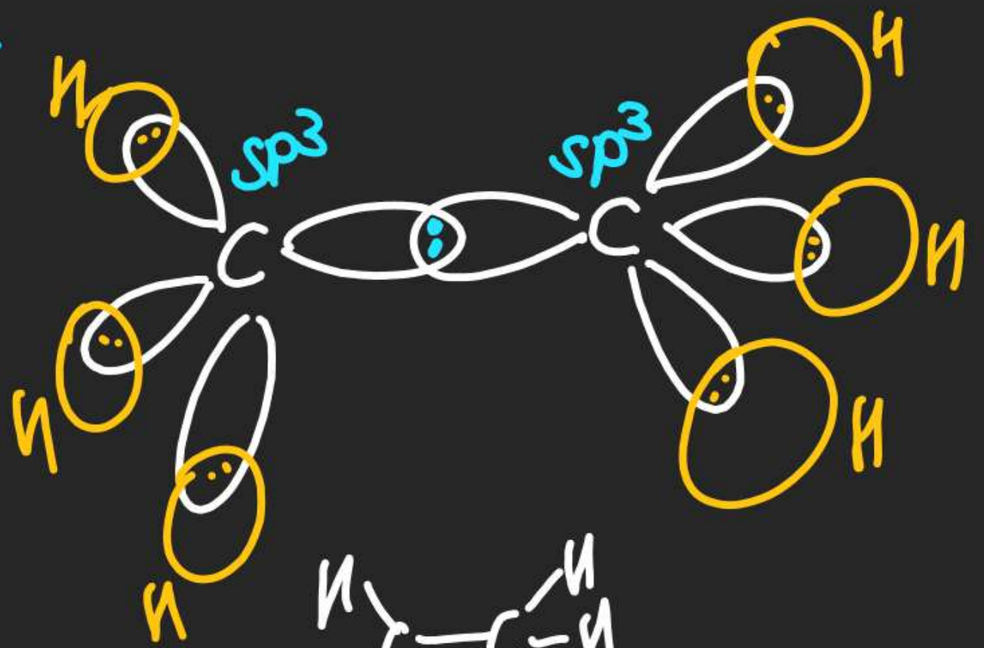
(#) $sp^3$ hybridisation ⇒ Atom must have 4 hybridised orbital

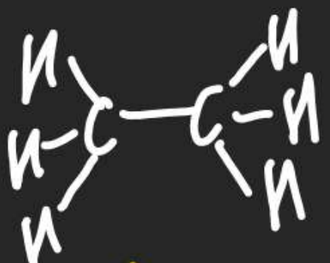
⇒ 4 σ Bond

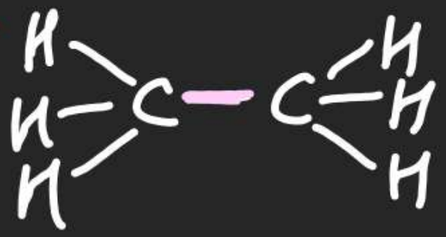
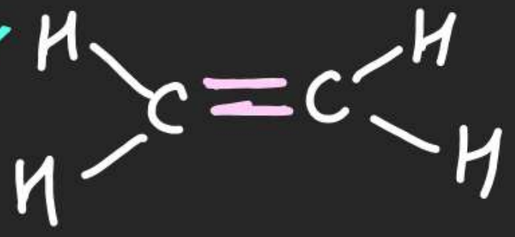




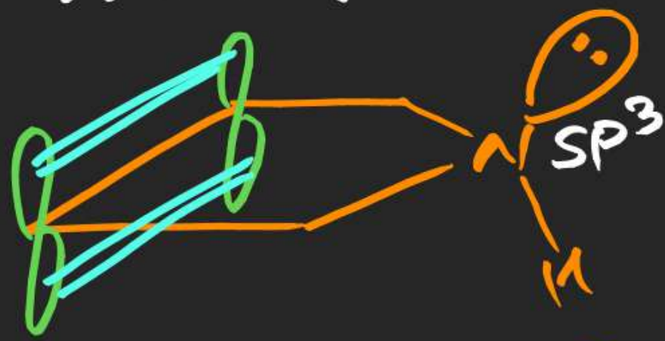



| | | BO(C–H) | BO(C–C) |
|---|---|---|---|
| (1) ✓ |  | 1 | 1 |
| (2) ✓ |  | 1 | 2 |
| (3) ✓ | $H-C\equiv C-H$ | 1 | 3 |
| (4) | (Quit + Draw) | $BO_{C-H} \in (0,1)$ | $BO_{C-C} \in (1,2)$ or $BO_{C-C} \in (2,3)$ |

**Note:** If Singly Bonded lone pair atom contains "p" orbital on adjacent atom then that lone pair atom is "$sp^2$" hybridised & its one lone pair must be present in "p" orbital.

(10)

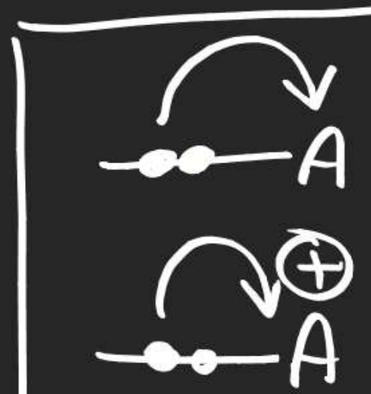

Localised lone pair




(11)


Delocalised lone pair


∴ ,



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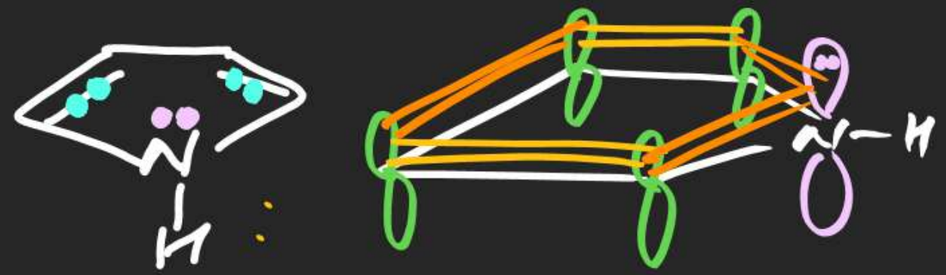
(13)



Delocalised lone pair of N

Total $\pi e^- s$ = Total "p" $e^- s$ = 6

(14)

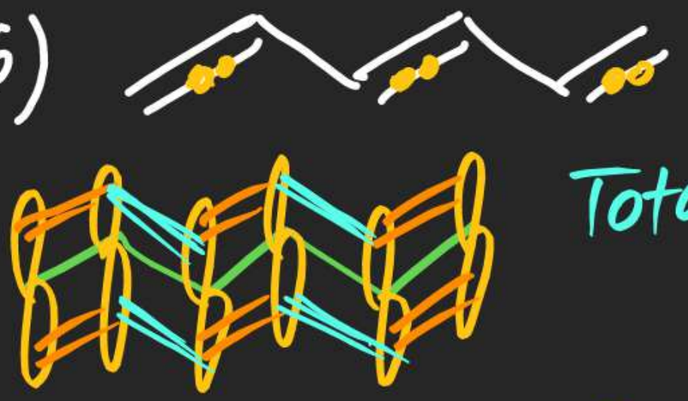

localised lone pair

Total $\pi e^- s$ = Total "p" $e^- s$ = 4

(15)

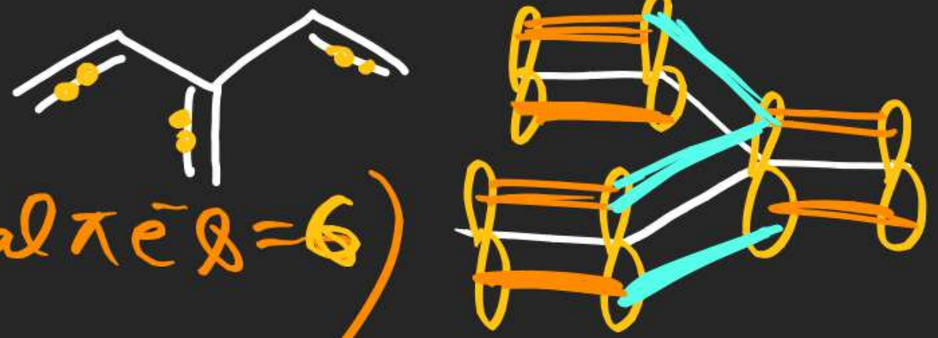
Total $\pi e^- s$ = 4

(16)



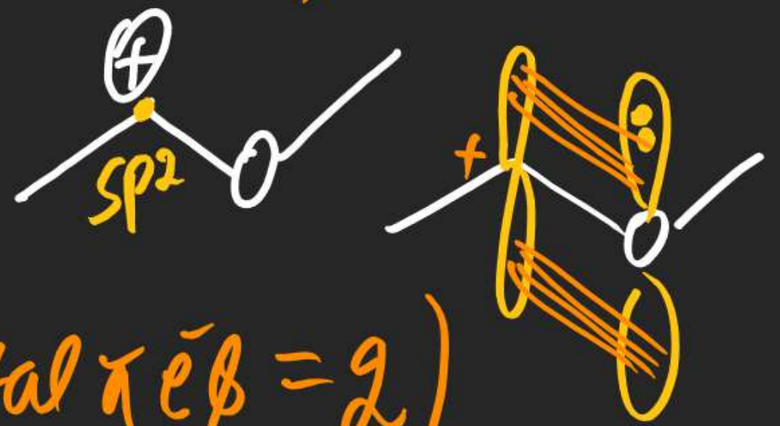
Total $\pi e^- s$ = 6

(17)



(Total $\pi e^- s$ = 6)

(18)




(Total $\pi e^- s$ = 2)

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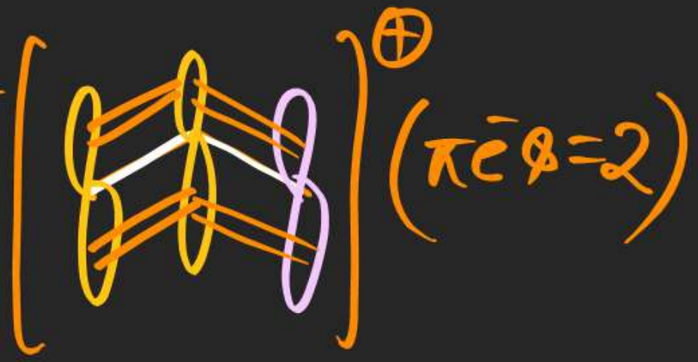
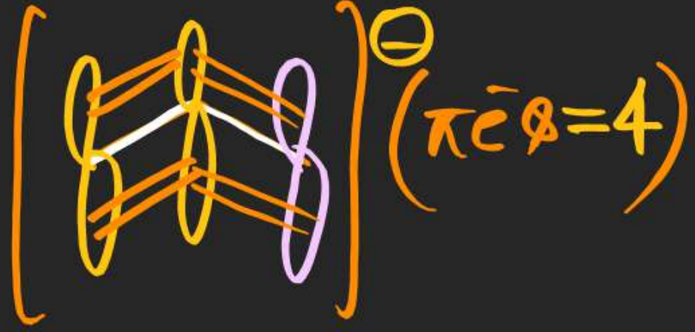
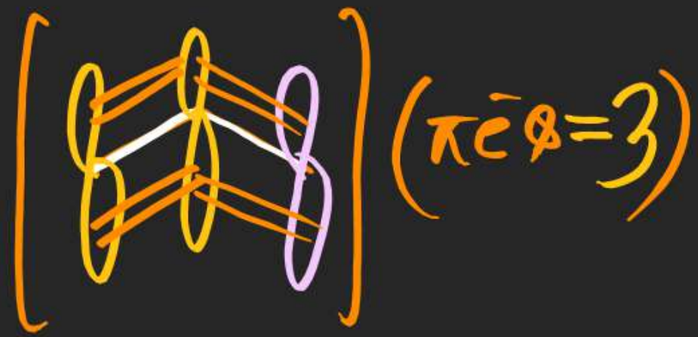
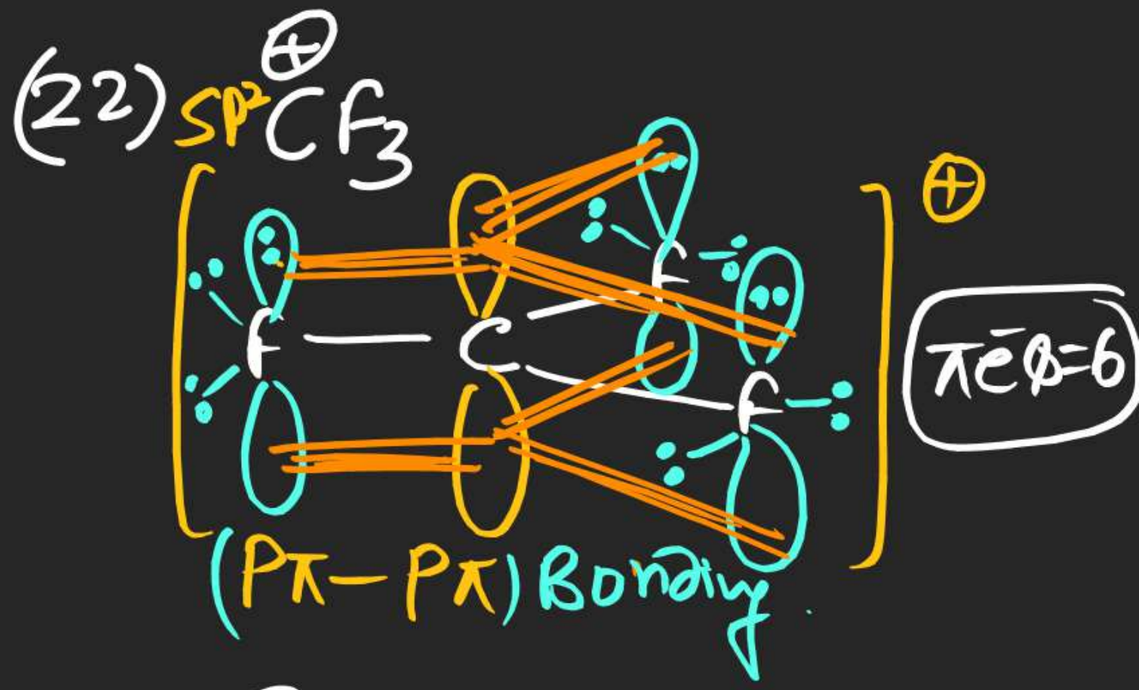
(19) 

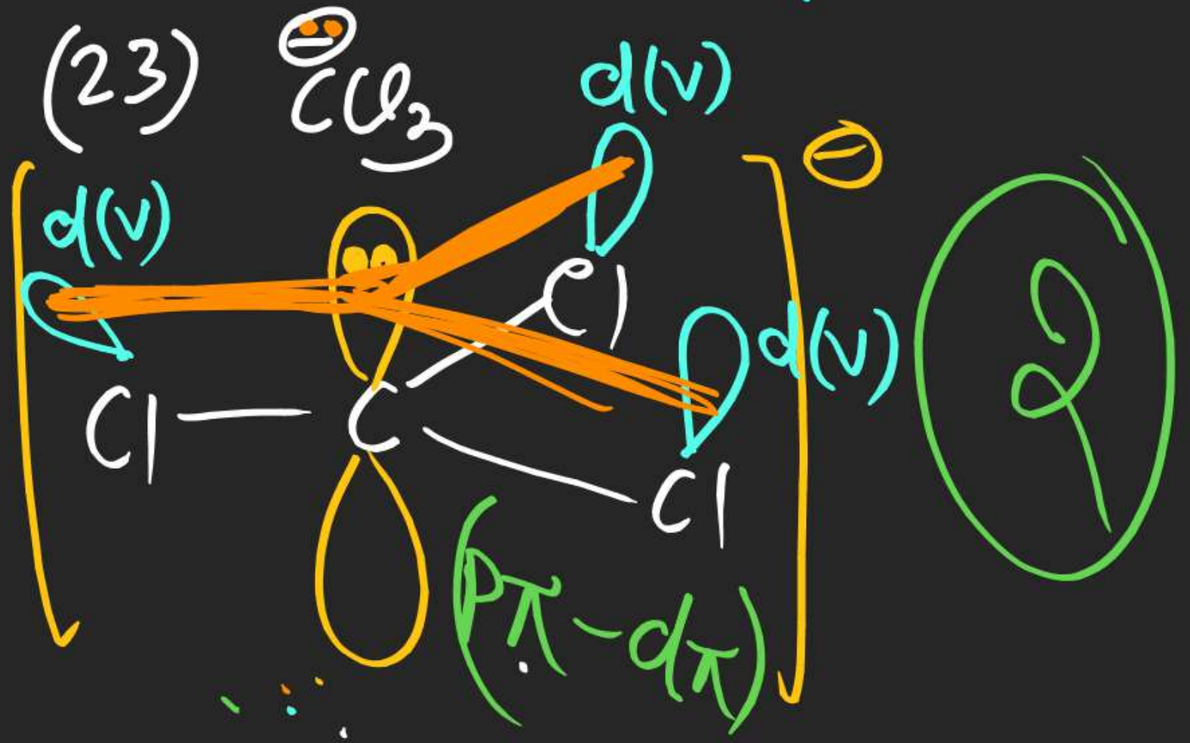


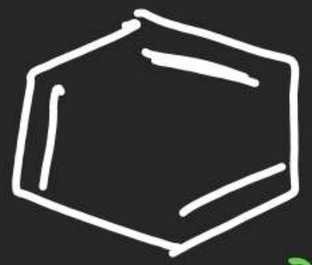

(20) 



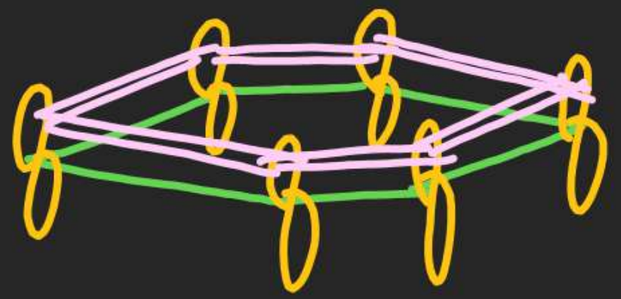

(21) 



(22) 

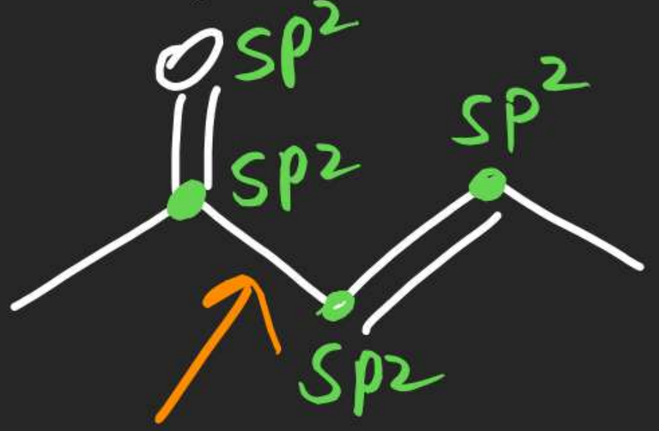

(23) 

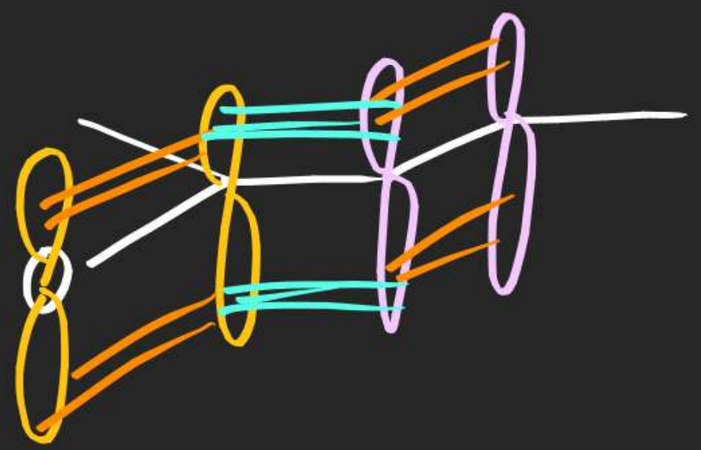
(24) 

BO = 1.5

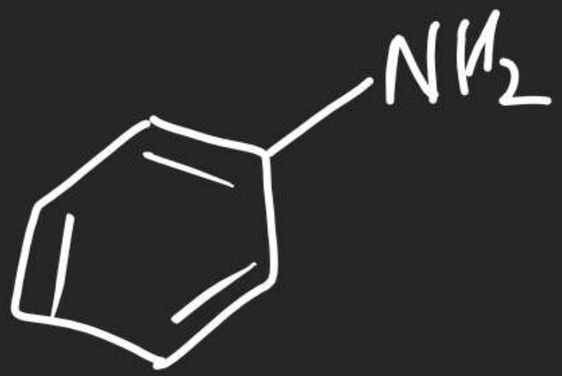


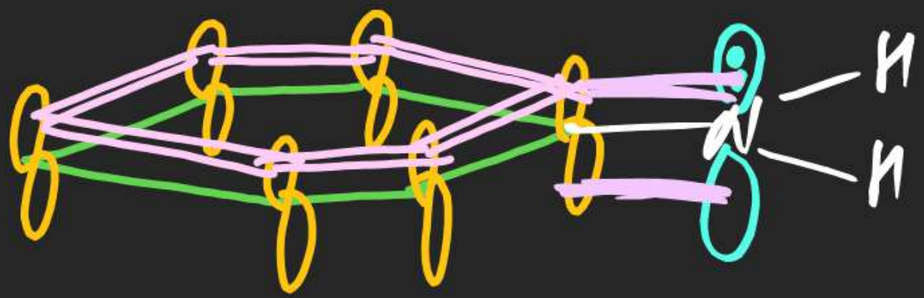
($\pi e^{\ominus} = 6$)

(25) 

($\pi e^{\ominus} = 4$)

(26) 


($\pi e^{\ominus} = 8$)

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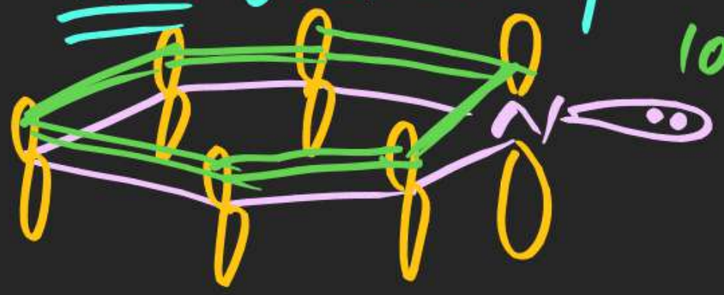
(27)

R.S


R.H orbital diagram

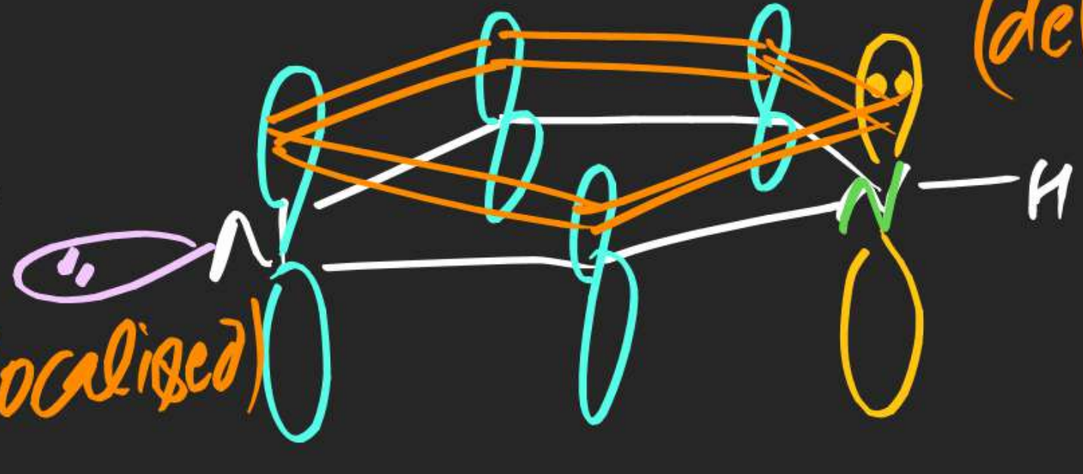


localized

($\pi e^{\ominus} = 6$)

(28)

RS


(localized)

(delocalized)

$\pi e^{\ominus} = 6$

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# Resonance :-

⇒ When all Properties of a Compound Cannot be shown By Single Representation, Two or more than two Representations are required then that Compound is known to have Resonance phenomenon

(Real Structure) **A** Resonance Hybrid

Hypothetical Str. $A_1$ $A_2$ $A_3$ $A_4$ $A_5$ $A_6$ } Resonating Str. or Contributing Str. or Cannonical Str.

⇒ All these Representations Required are known as Resonating / Contributing / Cannonical Str.

⇒ A Str. having all properties explained By All RS

is known as Resonance Hybrid.

⇒ Resonating str. are Hypothetical

⇒ Resonance Hybrid is Real

⇒ Resonating str. Contributes in Resonance Hybrid in Proportion of their stability

Higher the stability of RS ⇒ higher the Contribution

⇒ RS which Contribute most in Resonance Hybrid is known as most Contributing R-Str.

# (#) Condition of Resonance :-

(*) Compounds having at least 3 || P orbital on adjacent atom.

Note 2 || P a P-d orbitals in case of ions & multiple Bond.

Compound must be

(*) Planer ($sp/sp^2$)

(*) Conjugated

⇒ Compound may have following Type of Conjugation

(i) π-Bond — π-Bond

Ex: $CH_2=CH-CH=CH_2$

(ii) π-Bond — lone pair

Ex: $H_2C=CH-\ddot{O}-CH_3$

(iii) π-Bond — (+) charge

$H_2C=CH-\overset{\oplus}{C}H-$

(iv) π-Bond — (−) charge

$H_2C=CH-\overset{\ominus}{C}H-$

(v) π-Bond — Free Radical

$H_2C=CH-\dot{C}H-$

(vi) —

$H_2C=CH-C\equiv CH$

(vii) (+) — (lone pair)

(viii) (−) — (d orbital)