Nishant Jindal

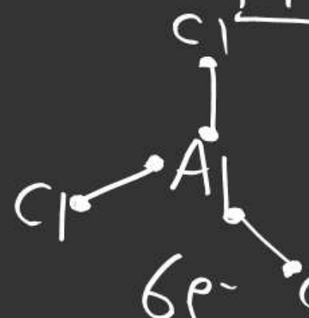
CHEMICAL BONDING

Bridge bonding (Multicentre)

bridge bond $\begin{cases} \longrightarrow 3C-4e^- \text{ bond} \\ \longrightarrow 3C-2e^- \text{ bond} \end{cases}$

$AlCl_3$

$Al = 3s^2 3p^1$



sp^2

Planar.

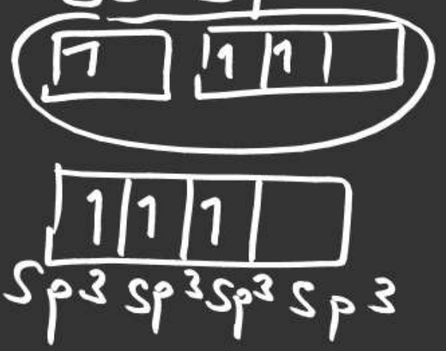
$6e^-$ Cl octet incomplete

L.A

Hypo Val.

Al_2Cl_6

$Al = 3s^2 3p^1$



sp^3 sp^3 sp^3 sp^3

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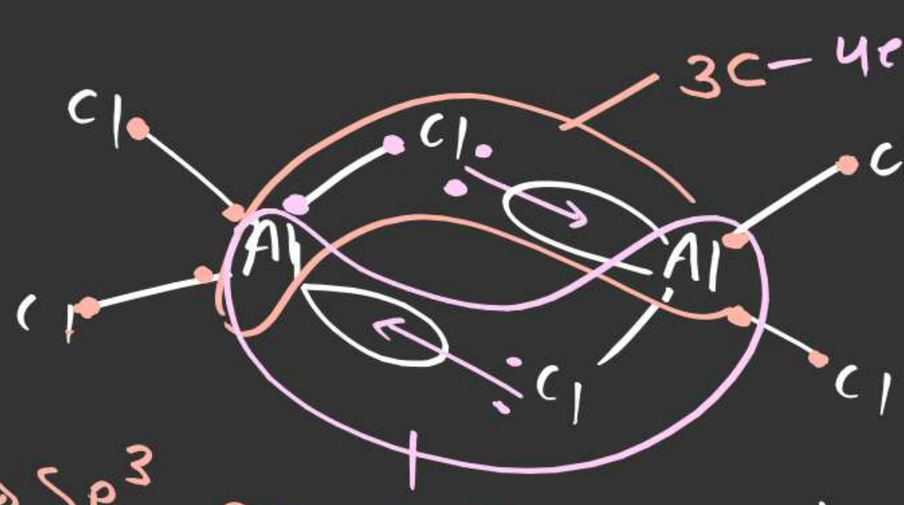
A—B



sp^3
tetrahedral
nonplanar

two = 3c-4e⁻ bond

2c- 2e⁻ bond = four

Octet Complete

Overlapping → $sp^3 - 3p - sp3$

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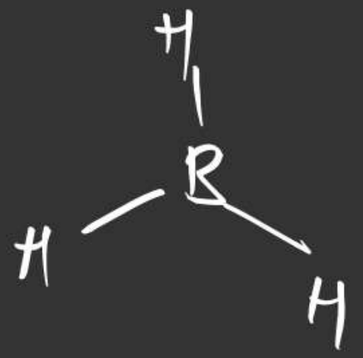
BH_3

$B = 1s^2 2s^2 2p^1$



sp^2

Planar

$6e^-$

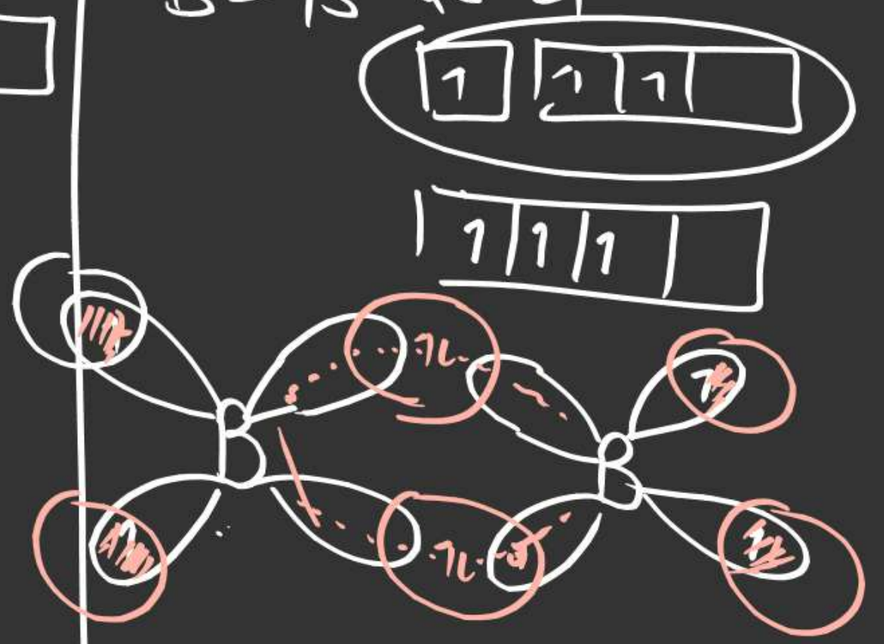
Hypoval.

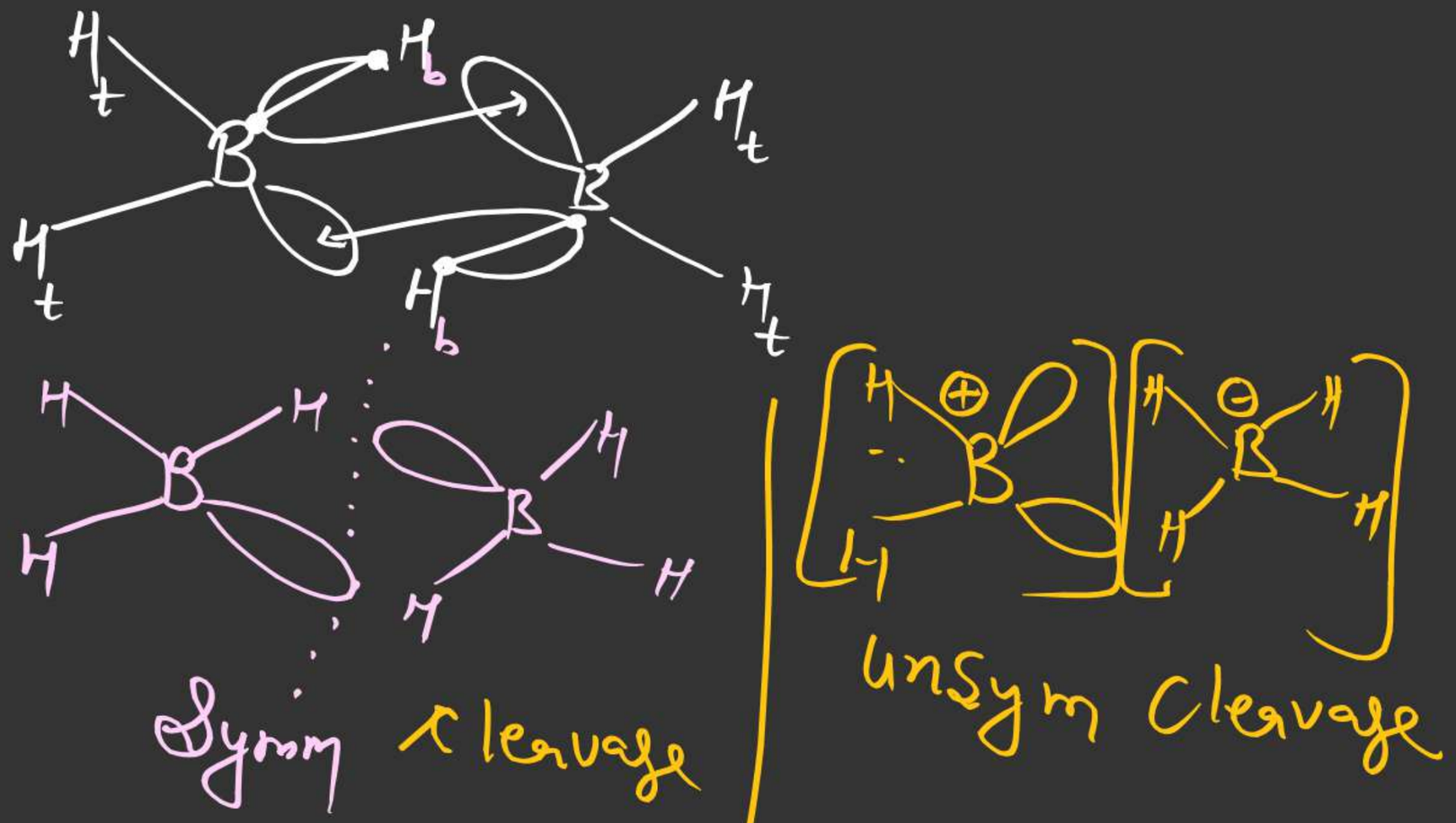
L.A

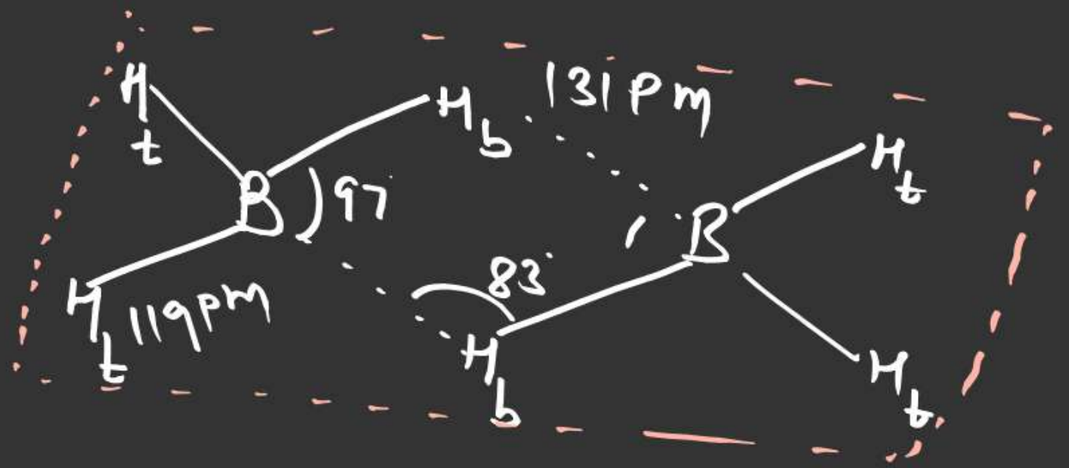
e^- def.

B_2H_6 [Diborane]

$B = 1s^2 2s^2 2p^1$

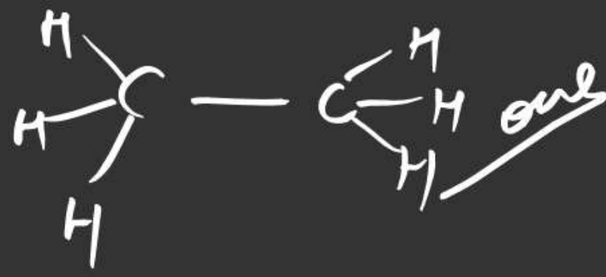






Maximum atom in one plane = 6 (for which two Boron and 4 terminal Hydrogen)

$\mu = 0$, non polar

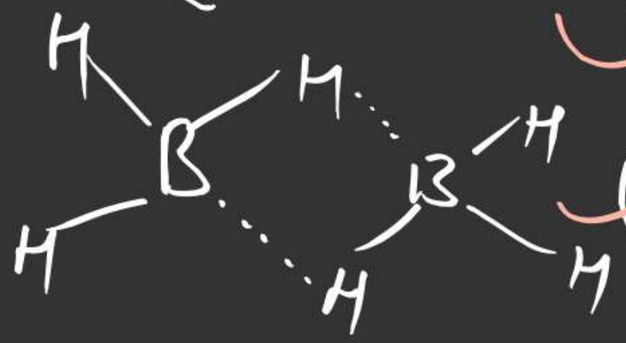


Select the correct statements about B_2H_6

$2\times5+6$
16

C_2H_4
$6\times2+4$
$12+4$
16

B_2H_6



(1) ~~B_2H_6 is isostructural with C_2H_6~~

(2) B_2H_6 is isoelectronic with C_2H_4

(3) Bridge bonds are stronger and longer than terminal bond

(4) all of these

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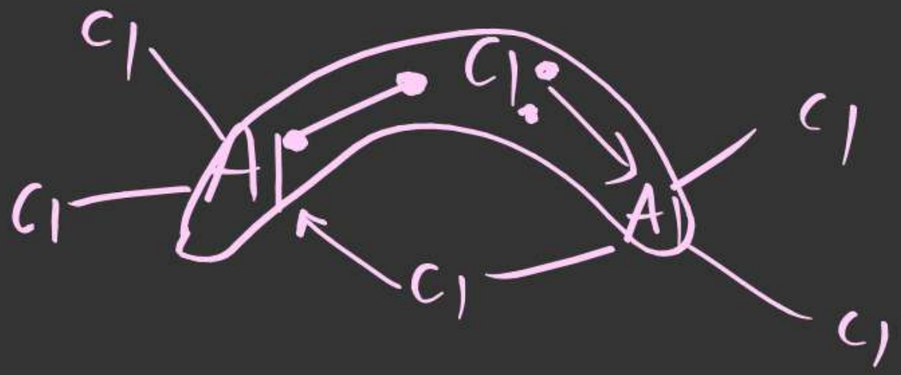

B.L $\propto \frac{1}{\text{Bond strength}}$

A — B

2C-2e⁻ bond

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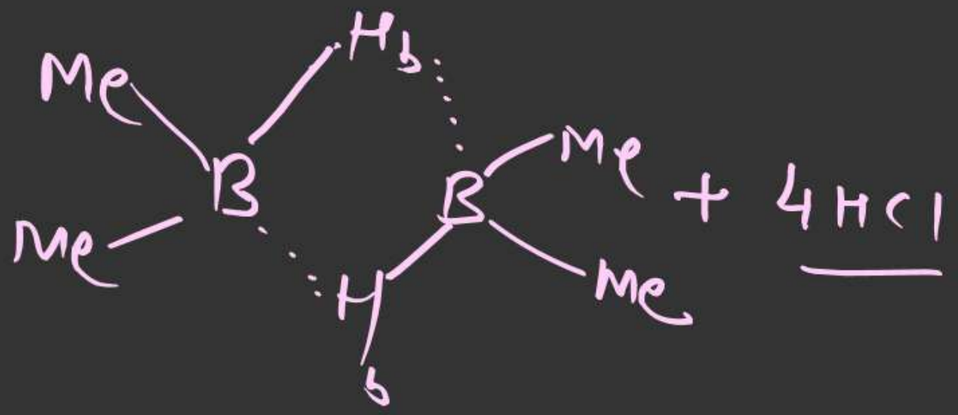
$$B_2H_6 + 4MeCl \longrightarrow$$



$$+ \underline{4HCl}$$

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Nido

B_nH_{n+4}

B_2H_6 – (Diborane)

B_3H_7 (Triborane)

Archano borane

B_nH_{n+6}

B_2H_8 (Di borane-8)

B_3H_9 (+triborane-9)

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$$B_2H_6 + 2X \longrightarrow [X \rightarrow BH_2 \leftarrow X][BH_4]^{\ominus}$$

amine X will be

(1) NH_3 ~~(2) CH_3NH_2~~ ~~(3) $(CH_3)_2NH$~~ (4) $(CH_3)_3N$

Note ⇒ unsymm cleavage occurs those molecule which can form Hydrogen bond

$B_2H_6 + 2X \longrightarrow 2BH_3 \cdot X$

X will

(1) ~~H^-~~ (2) ~~PH_3~~ (3) ~~CO~~ (4) ~~NMe_3~~ (5) ~~THF~~

(tetrahydrofuran)

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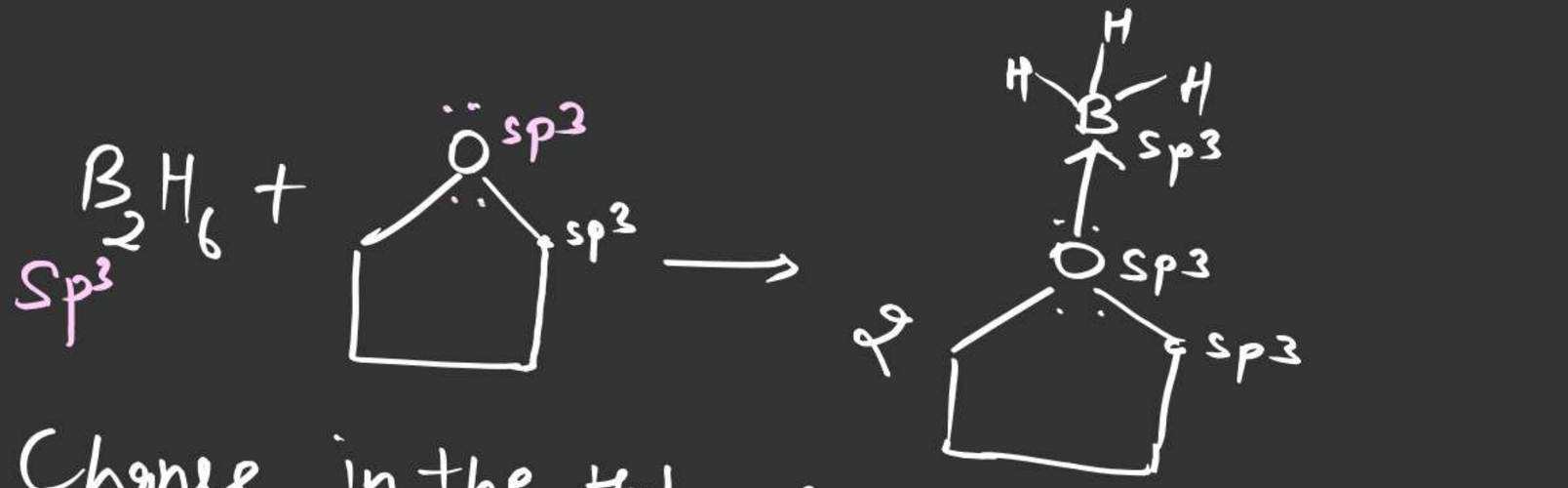

Change in the Hyb. of B O and Carbon

No Change in B, O and Carbon

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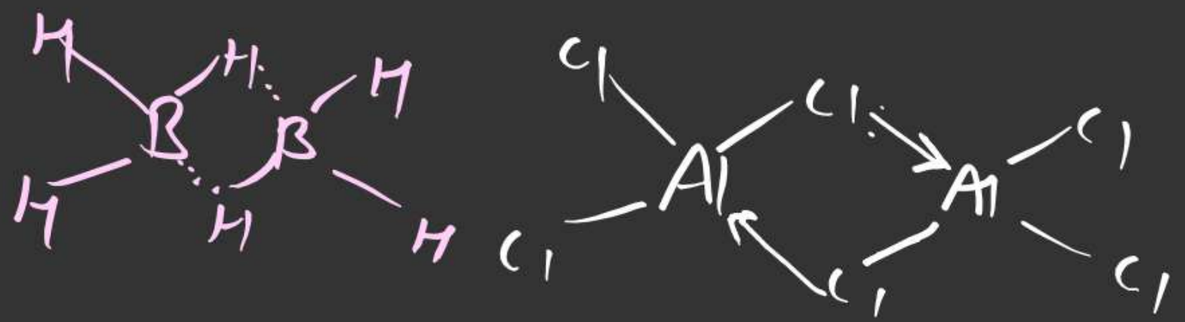
Keypoint

- 3C-4e-bond [When S.A has l.p]
- 3C-2e⁻bond [When S.A has No l.p]



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	3C-2e⁻	3C-4e⁻
dimer $AlCl_3$	×	✓
dimer BH_3	✓	×
dimer BeH_2	✓	×
dimer $BeCl_2$	×	✓
dimer $AlBr_3$	×	✓
dimer $Al(CH_3)_3$	✓	✓
dimer ICl_3	×	✓

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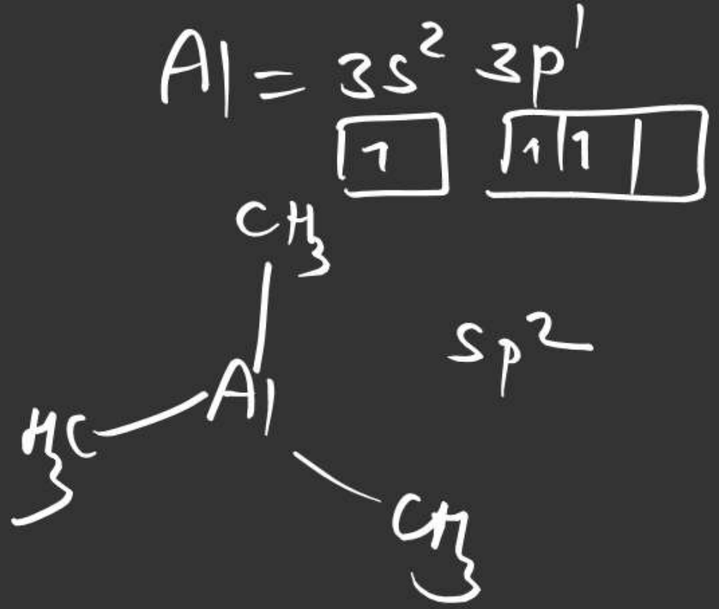
$Al(CH_3)_3$

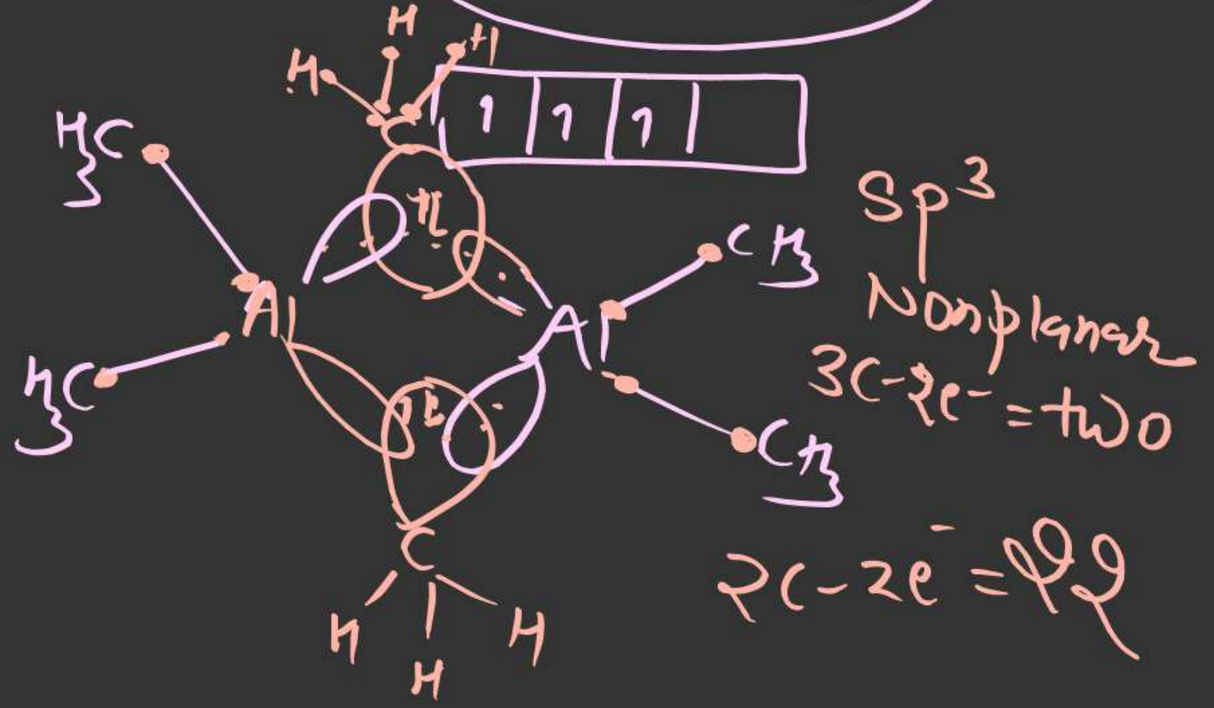
$Al = 3s^2\ 3p^1$



sp^2

$Al_2(CH_3)_6$

$Al = 3s^2\ 3p^1$



sp^3

Nonplanar

$3C\text{-}2e^- = two$

$2C\text{-}2e^- = 4$

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banana bond