Bond Strength, Catenation Atomicity

Course on Chemical Bonding for Class XI 2023

Vishal joshi • Lesson 6 • Aug 22, 2021

V.B.T :→ (Valence bond theory)

→ Covalent bond formation through overlapping

overlapping area ↑ Covalent bond strength ↑

Q4 Which of the following overlapping is correct

(1)

(2)

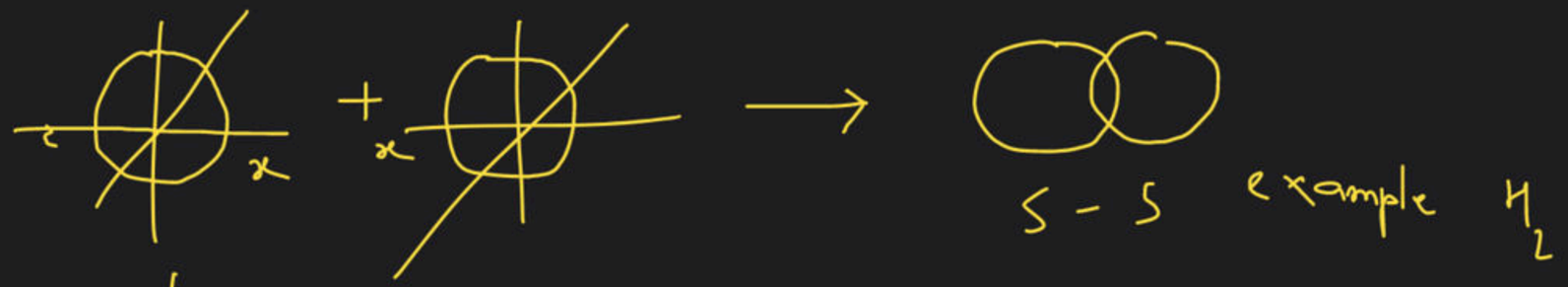
(3)

(4) none

type of overlapping
- axial [Head to Head]
- sideways [Collateral]

① axial overlapping [σ bond]

internuclear axis (z)



Ans Which of the following overlapping is s-s

(1) H_2 (2) H-Cl (3) Cl-Cl (4) all

$H = 1s^1$ | ↑

$H = 1s^1$ | 1

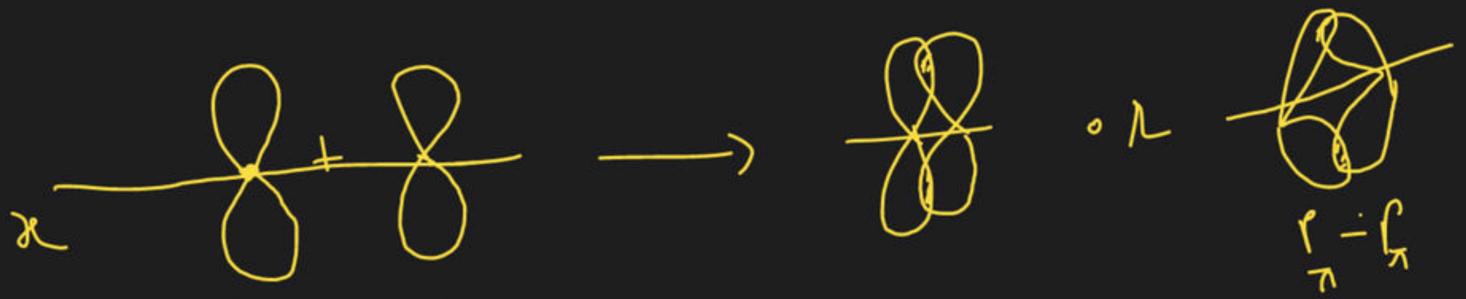
$H = 1s^1$

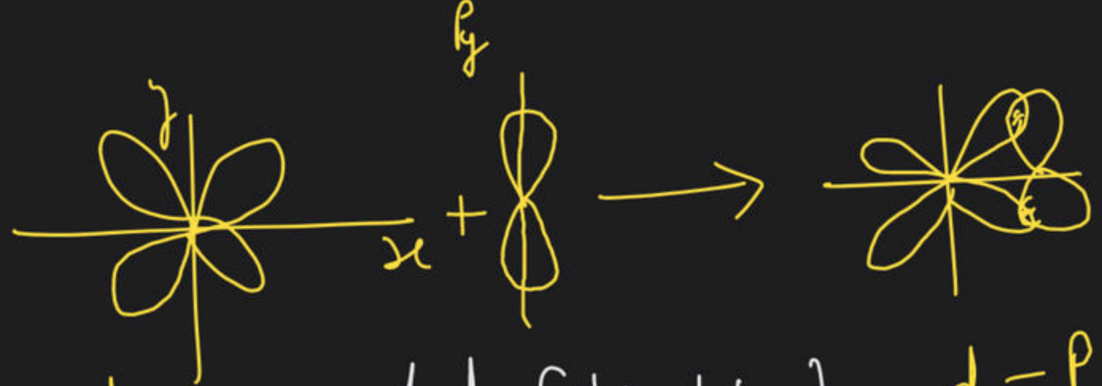
$Cl = 1s^2 2s^2 2p^6 3s^2 3p^5$

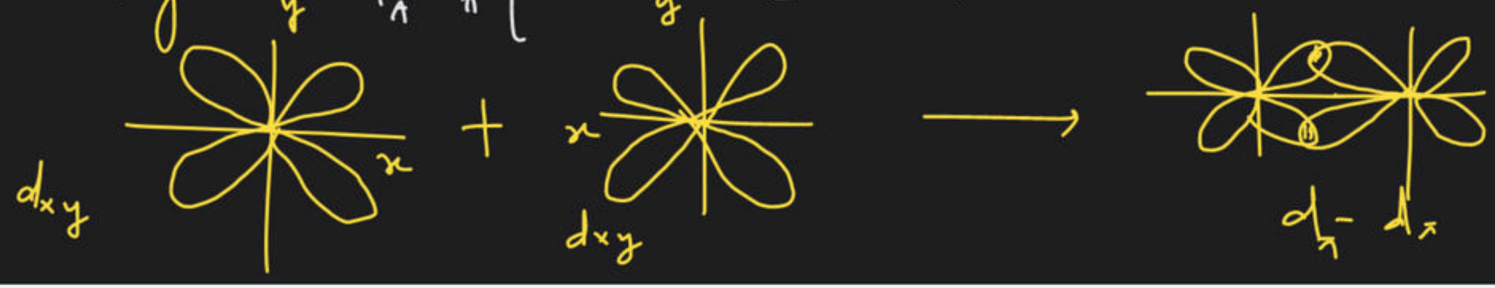
| ↑↓ | ↑↓ | ↑ |

Sideways (π bond)

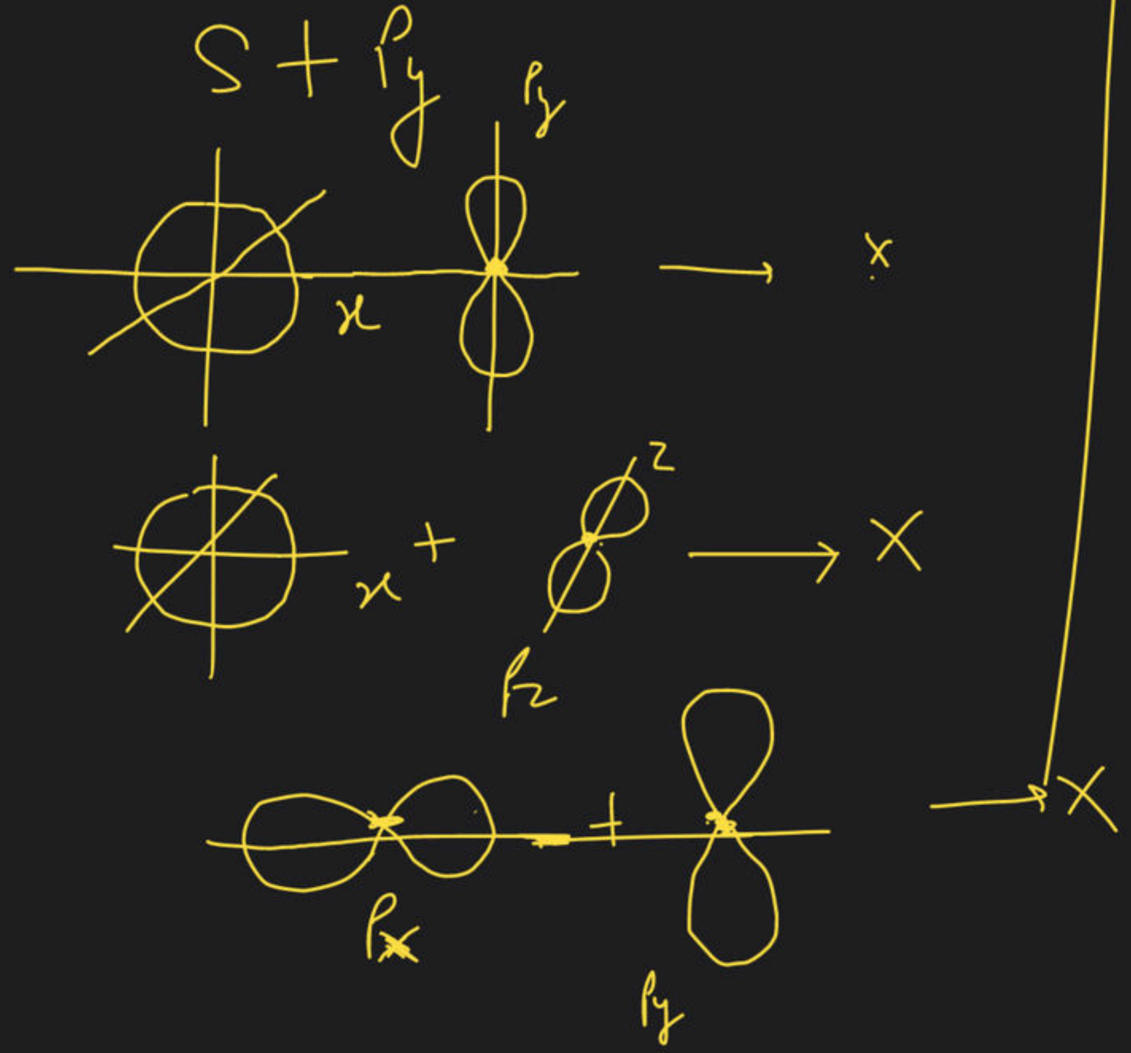
internuclear axis X

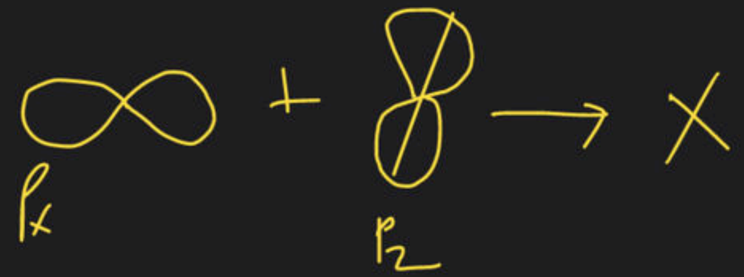






If x is internuclear axis





If Z is internuclear axis

$s + s \longrightarrow \sigma$

$s + p_x \longrightarrow x$

$s + p_y \longrightarrow x$

$s + p_z \longrightarrow \sigma$

$p_x + p_x \longrightarrow \pi$

$p_x + p_y \longrightarrow x$

$p_x + p_z \longrightarrow x$

$p_z + p_z \longrightarrow \sigma$

$p_z + p_x \longrightarrow x$

$p_z + p_y \longrightarrow x$

x

$P_x + P_x = \tau$

$P_y + P_y = \pi$

$P_z + P_z = \pi$

$P_x + P_y$

$P_y + P_z$

$P_z + P_x$

$0 + \infty \longrightarrow$ ✓

$0 + P_y$

$+ P_z$ ✓

$s - s$

$s - p$

$p - p$ } ←

$p_A - p_\pi$

$d_a - p_\pi$

$d_\pi - d_A$ } π bond

if y is intersect axis :→

$$S + S = \sigma$$

$$S + P_x = X$$

$$S + P_y = \sigma$$

$$S + P_z = X$$

$$P_x + P_y = X$$

$$P_x + P_z = X$$

$$P_x + P_x = \pi$$

$$P_y + P_y = \sigma$$

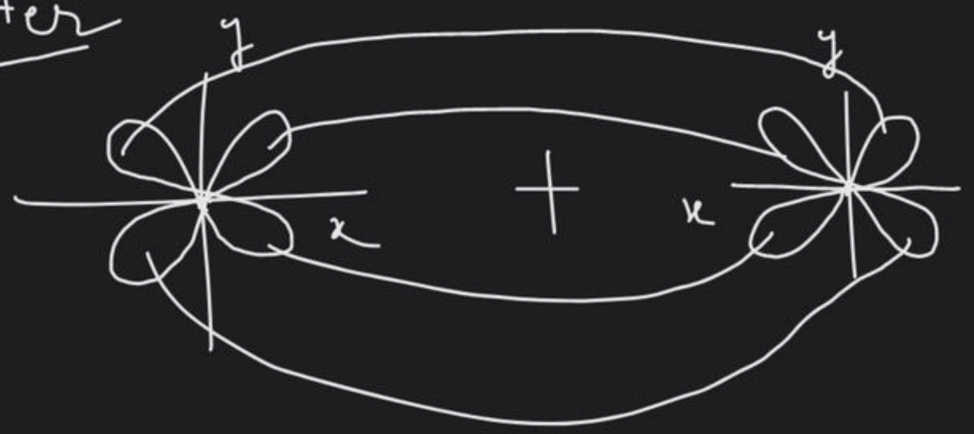
$$P_y + P_z = X$$

$$P_z + P_y = X$$

$$P_z + P_z = \pi$$

δ - Bond :- [four lobe interaction]

if z is inter



Note :- all d-orbitals conform δ Bond but not d_{z^2} because it has two lobe interaction

Question
from Nikshey Ya...

sir aapke liye

and all liabilities with regards to the content

if z is internuclear axis

$d_{xy} + d_{xy} = \delta$

$d_{xy} + d_{yz} = X$

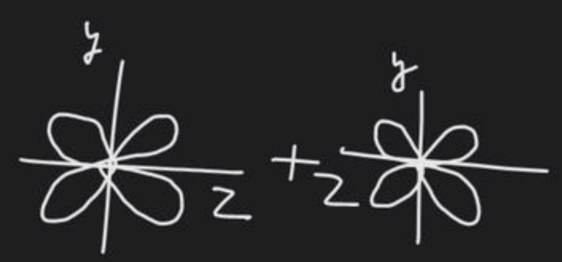
$d_{yz} + d_{zy} = \uparrow$

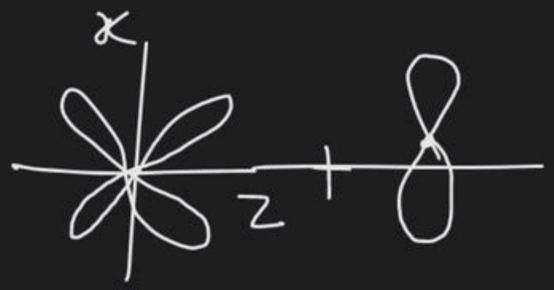
$d_{yz} + d_{zx} = X$

$s + d_{xy} = X$

$d_{xz} + p_z = \pi$

$d_{xz} + p_x = \pi$



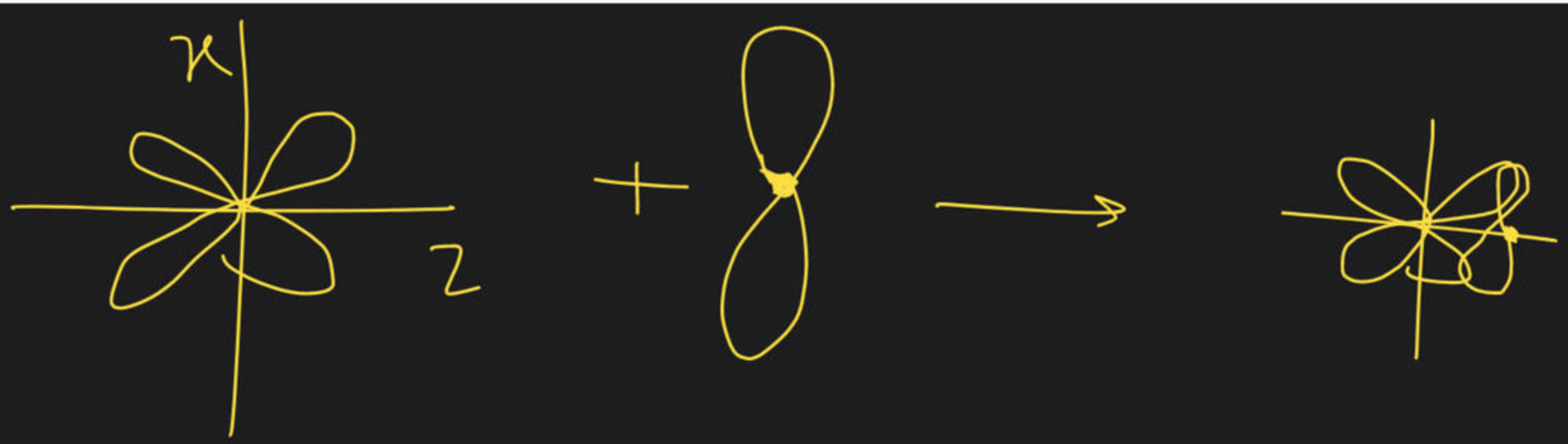


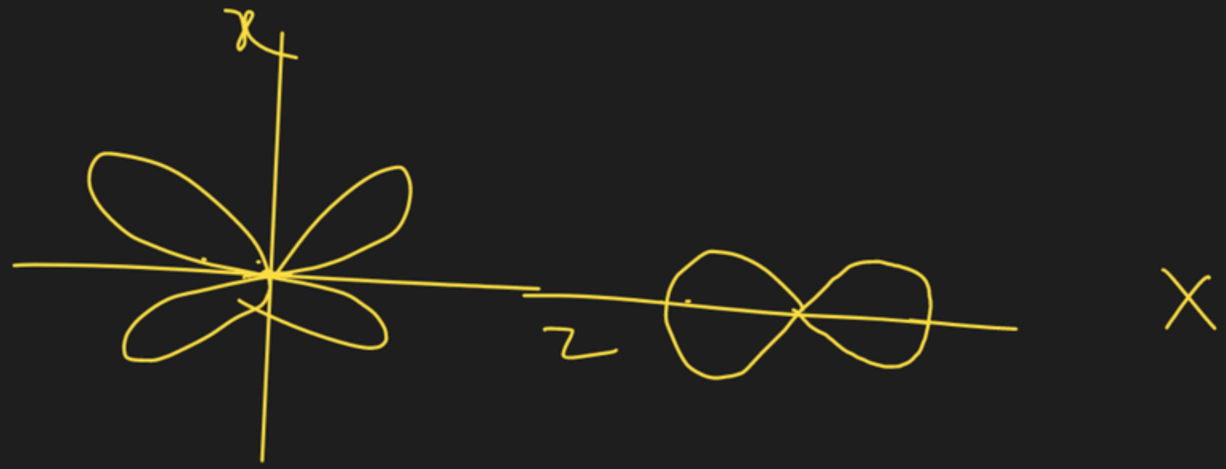
Quadpole

ϕ bond

B.S

1s - 1s 's

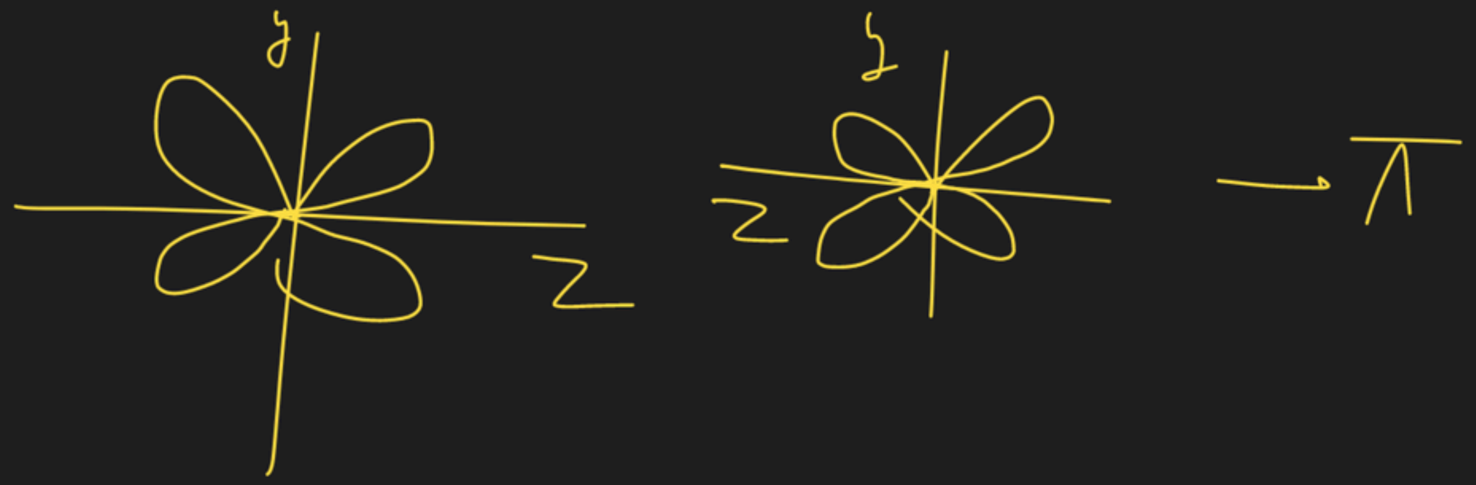

x
z

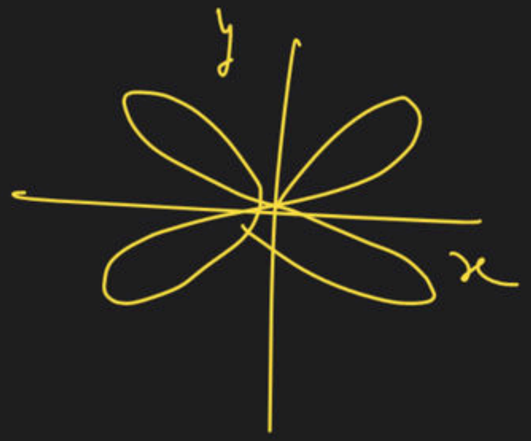

Y
Z
X

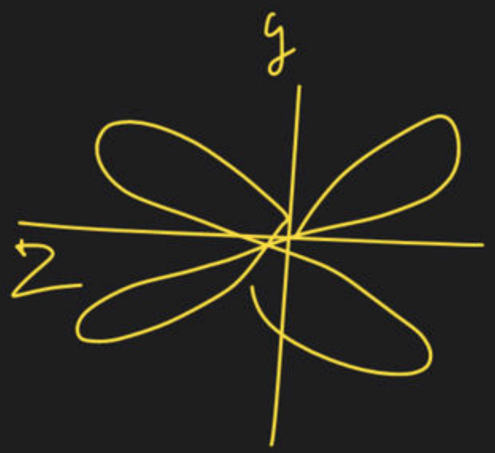
z

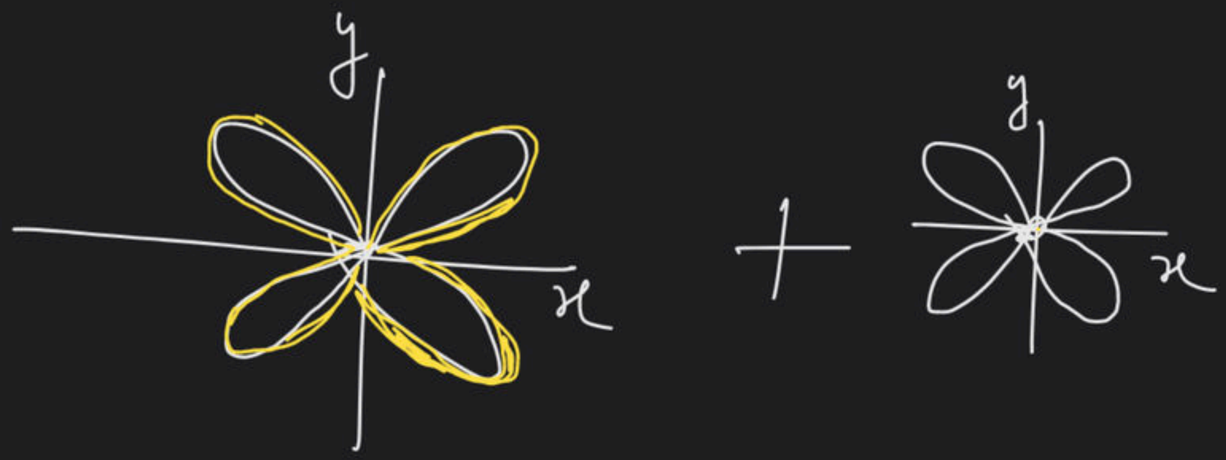
+

y
x


y
z
y
z

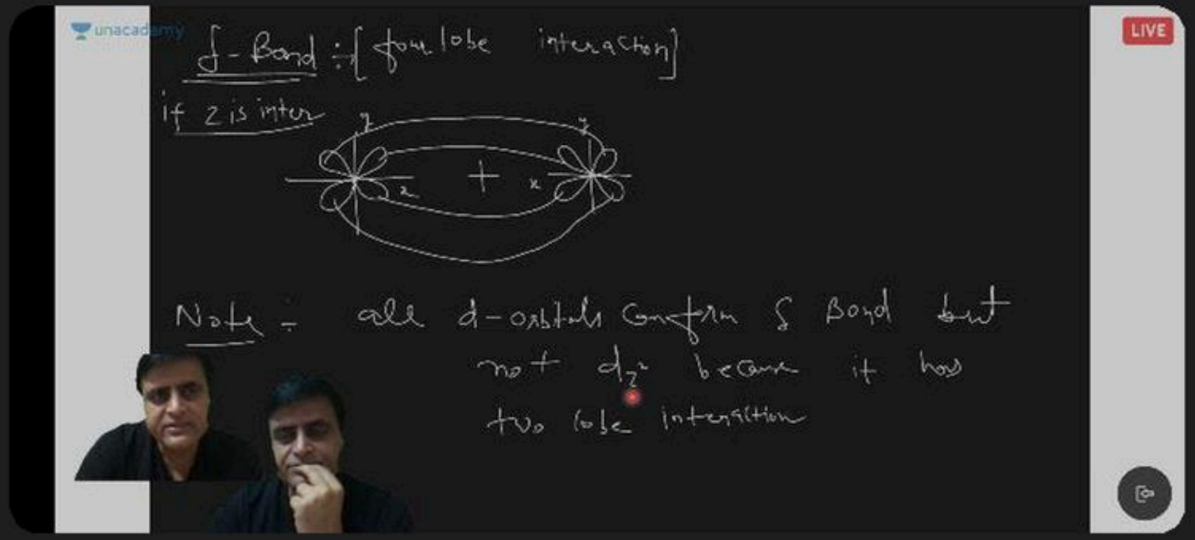

y
x


y
z


y
x
+

y
x

Question
from Himanshu



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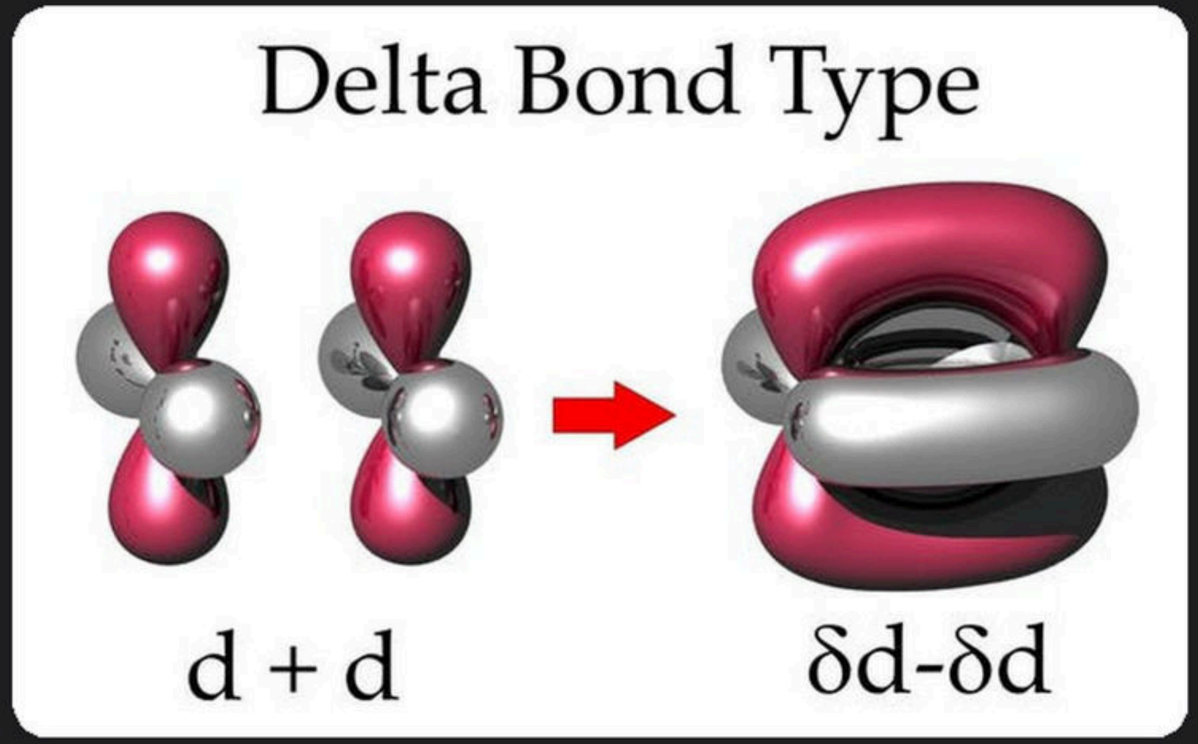
Question
from ARNAVGUPTA

delta bond



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y
z
x

x
p_x

p_y

z
p_z