Structure of Covalent Molecule - II

Nurture: Course on Chemical Bonding for Class XI 2023

Vishal Joshi • Lesson 6 • Sept 28, 2021

Borax

or $Na_2B_4O_7 \cdot 10H_2O$

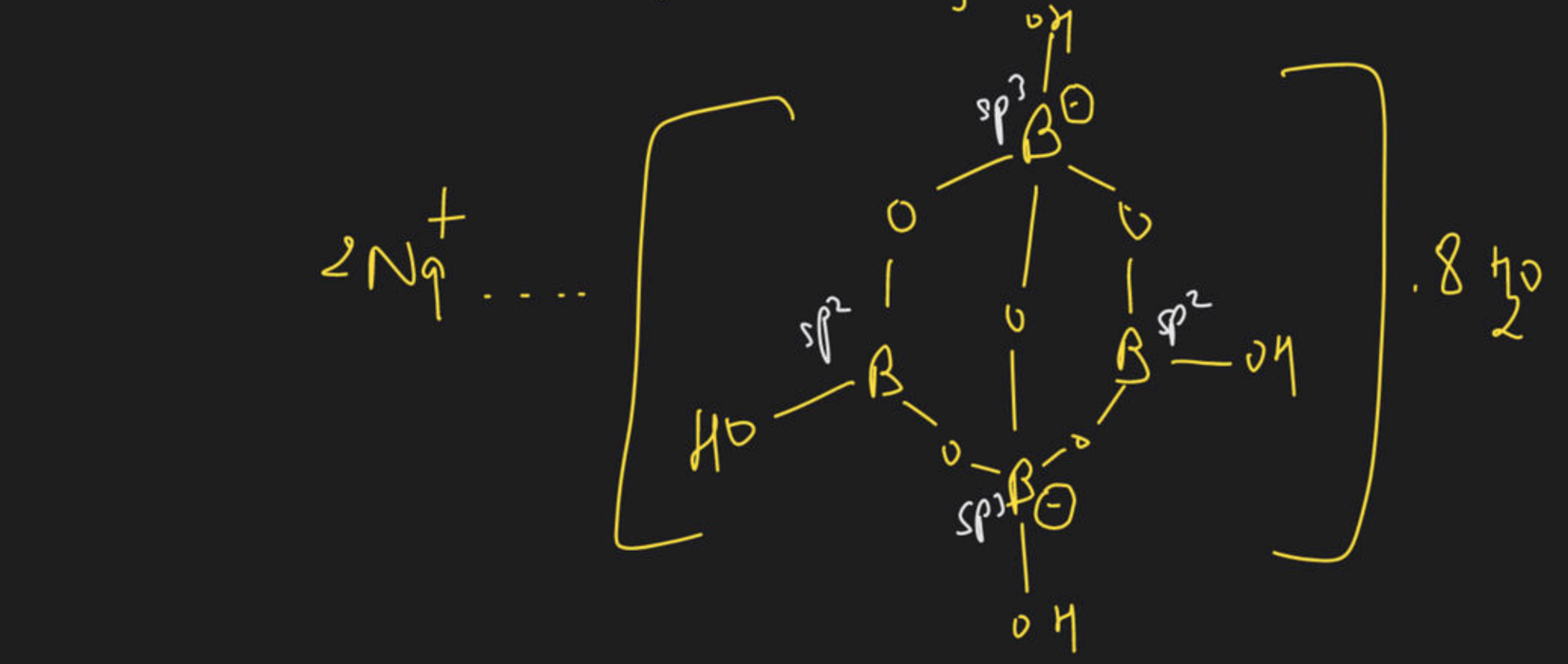
$Na_2[B_4O_5(OH)_4] \cdot 8H_2O$

$2Na^+$ $[B_4O_5(OH)_4] \cdot 8H_2O$

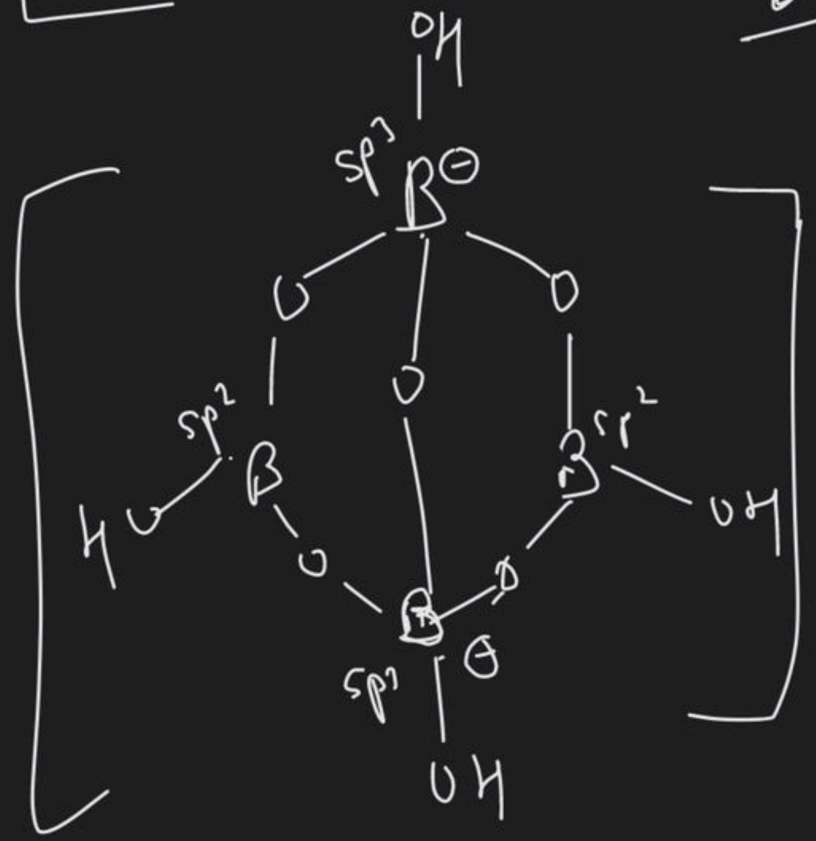
two Boron = sp^3 tet.

two B = sp^2 trigonal planar

B – O – B linkage = 5



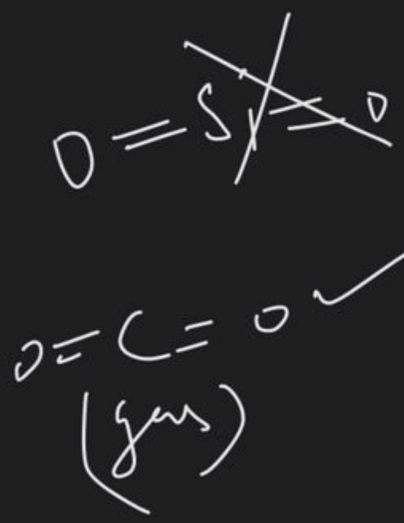
$Na_2[B_4(OH)_4O_5] \cdot 8H_2O$



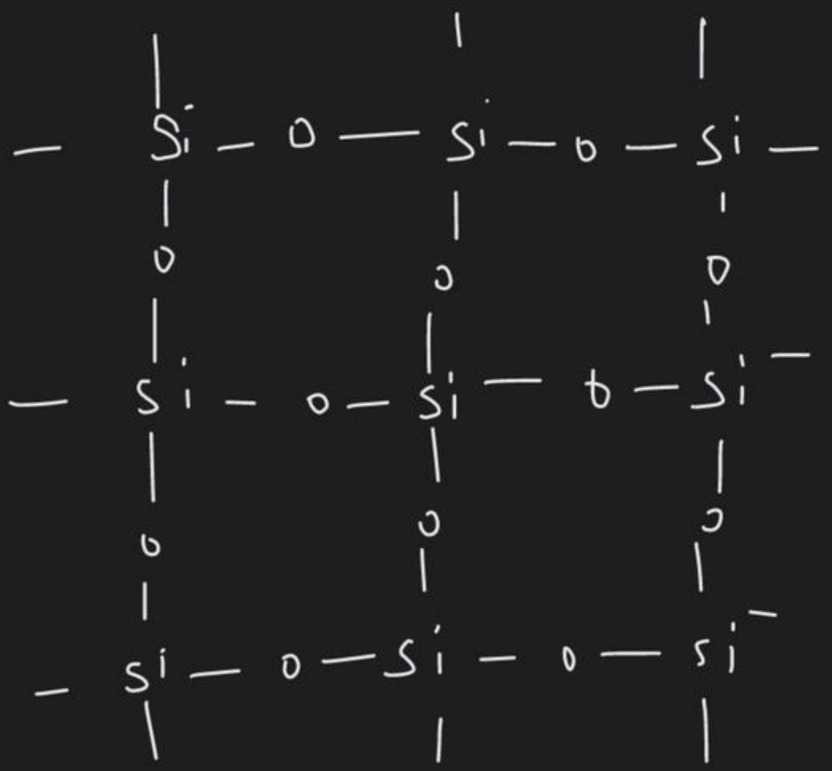
and all borons are in same plane T/F

False

SiO_2



(gas)



(Solid)

sp^3

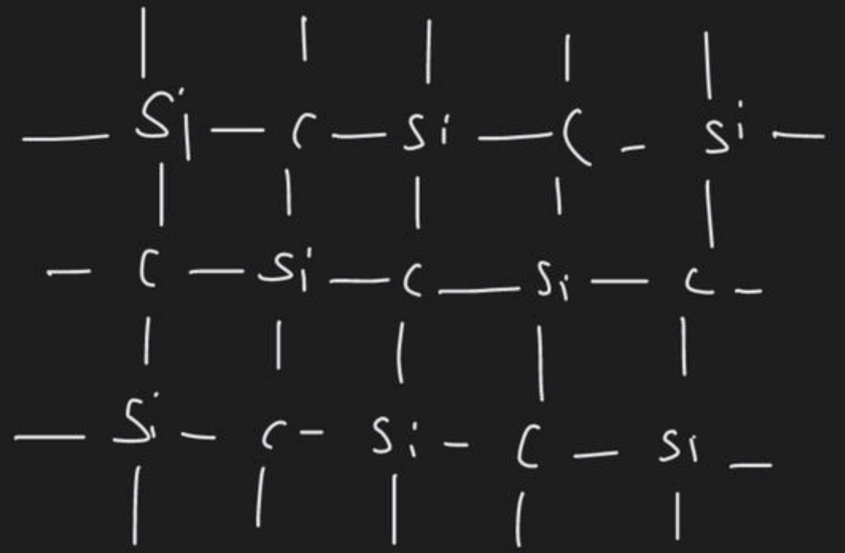
Non planar

3D network like structure

si doesn't form π-bond with oxygen due to it's large size.

SiC (Silicon Carbide)

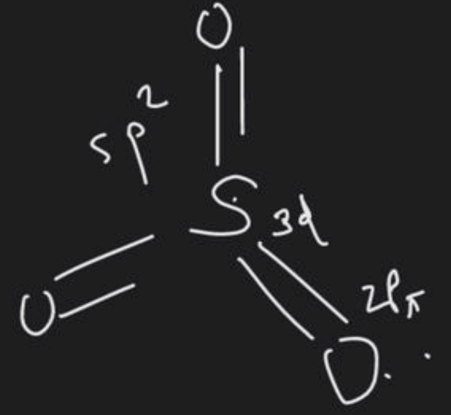
Carborundum



sp^3 tet. non planar

Second hardest material after diamond

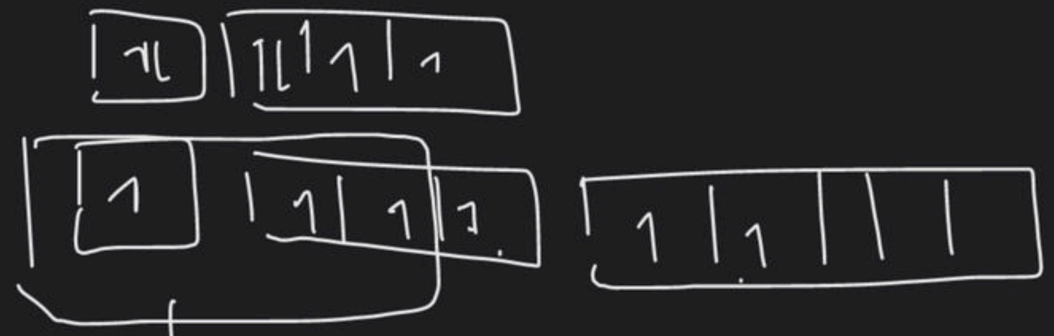
find the number of $d_\pi - p_\pi$ bonds in SO_3



one = $p_\pi - p_\pi$

two = $d_\pi - p_\pi$

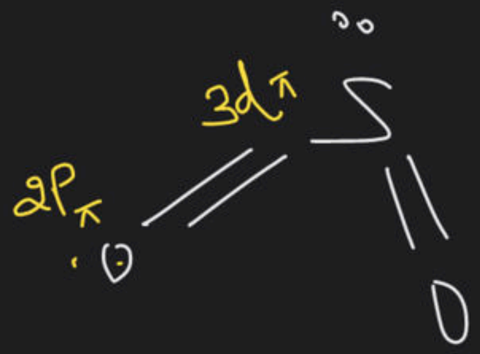
S = $3s^2\ 3p^4$ (3d)



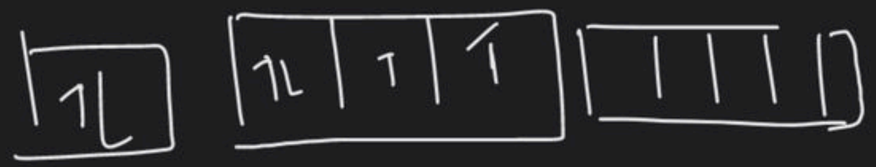
sp^2

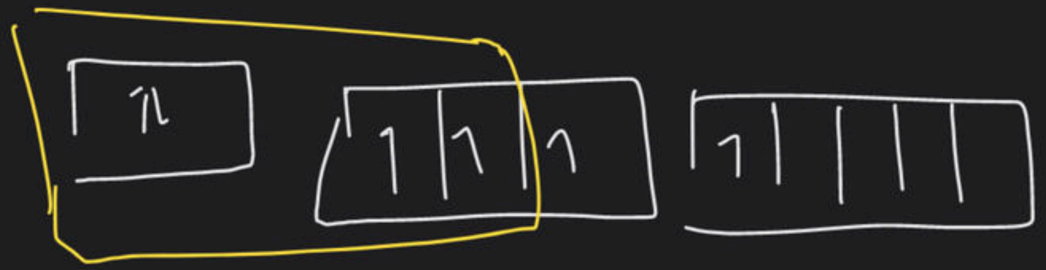
find the number of $p_\pi - d_\pi$ in SO_2

$O = 1s^2 2s^2 \; 2p^4$



$S = 3s^2 \; 3p^4 \; 3d$





Naming of Oxy acid

highest O.S = ic

not highest = ous

H_2SO_4 = Sulphuric acid

H_2SO_3 = Sulphurous acid

H_3PO_4 = phosphoric acid

H_3PO_3 = phosphorous acid

HNO_3 = nitric acid

HNO_2 = nitrous acid

naming of oxysalt

ic acid — ate

ous acid — ite

ion

$H_2SO_4 \rightleftharpoons H^+ + HSO_4^-$ [hydrogen sulphate]

$HSO_4^- \rightleftharpoons H^+ + SO_4^{-2}$ [sulphate]

$H_3PO_4 \rightleftharpoons H^+ + H_2PO_4^-$ [dihydrogen phosphate)

$H_2PO_4^- \rightleftharpoons H^+ + HPO_4^{-2}$ (hydrogenphosphate

$HPO_4^{-2} \rightleftharpoons H^+ + PO_4^{-3}$ [phosphate]

$H_3PO_3 \rightleftharpoons H^+ + HPO_3^-$ [Hydrogenphosphite]

$H_2PO_3^- \rightleftharpoons H^+ + HPO_3^{-2}$ [phosphite]

		basicity
Phosphorous	H_3PO_3	2
Hypophosphorous acid	H_3PO_2	1
Boric acid	H_3BO_3	1
Pyrophosphorous acid	$H_4P_2O_5$	2

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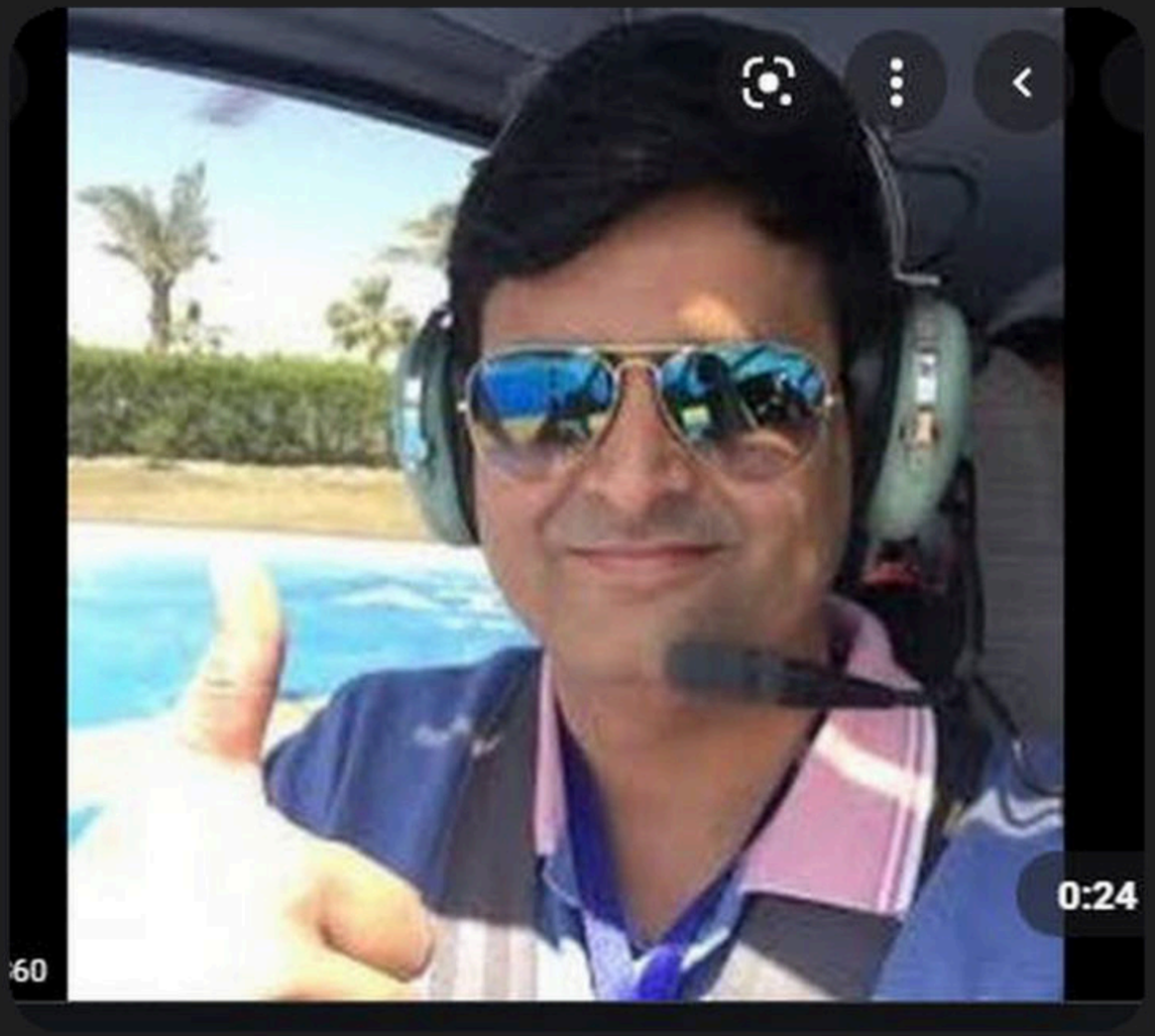
▲ 16 • Asked by Priyanshu ...

wow awesome sir



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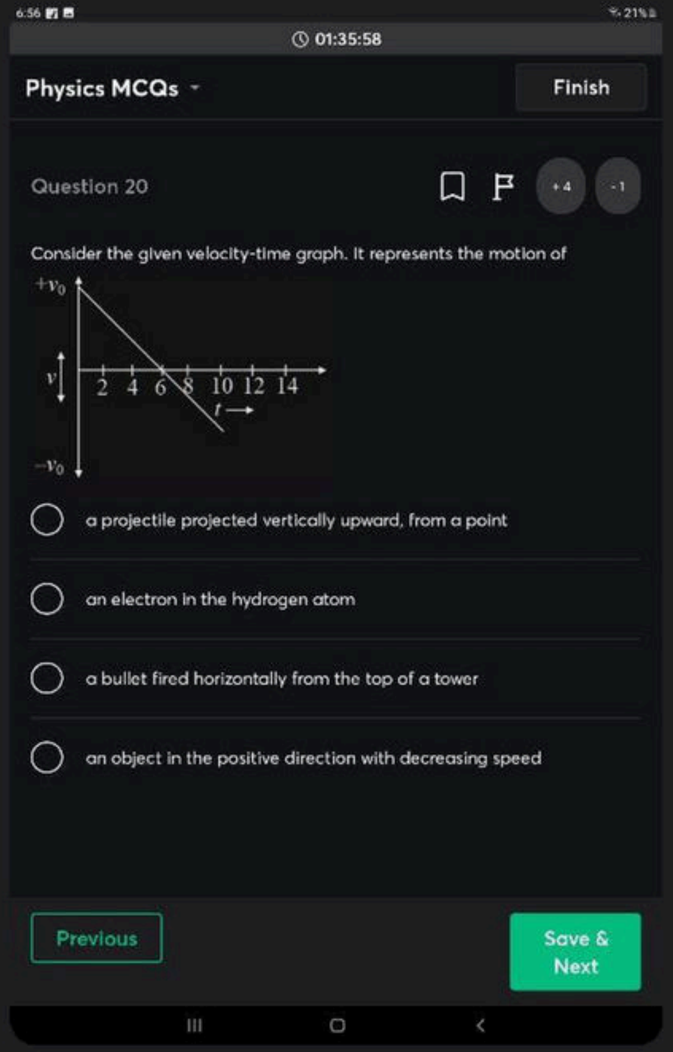
▲ 5 • Asked by Anurag

Please help me with this doubt



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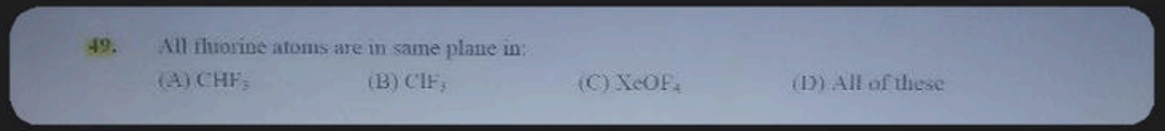
▲ 4 • Asked by Prasad

Sir 1st option mai sare f ek plane mai kaise aye ye samaz nhiaya


49. All fluorine atoms are in same plane in:
(A) CHF_3 (B) ClF_3 (C) $XeOF_4$ (D) All of these

$$H_3PO_3 \rightleftharpoons H^+ + H_2PO_3^-$$

(hydrogenphosphite)

$$H_2PO_3^- \rightleftharpoons H^+ + HPO_3^{-2}$$

(phosphite)

Prefix for Oxyacid :-

(1) Meta

$$H_3PO_4 \xrightarrow{-H_2O} (HPO_3)_n$$

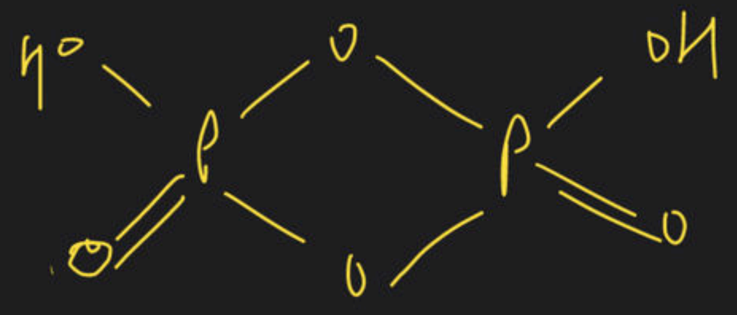
Phosphoric acid — Metaphosphoric acid

When one water molecule is removed from one molecule of acid.

$(HPO_3)_n$

$n = 1, 2$ acid x

Proposed structure.



$n = 3, 4, 5, 6 \ldots$

$(HPO_3)_3$

$H_3P_3O_9$

cyclic + tri meta

phosphoric acid

$(HPO_3)_4$

$H_4P_4O_{12}$

$H_5P_5O_{15}$

$H_6P_6O_{18}$

↓

cyclic

hexa meta

phosphoric acid

$H_3PO_3 \xrightarrow{-H_2O} HPO_2$

metaphosphorous acid

$n\,H_3BO_3 \xrightarrow{-nH_2O} (HBO_2)_n$

n = only 3

$H_3B_3O_6$ [cyclic metaboric acid]

Ortho :— ortho prefix provided for those oxy acid which can form meta prefix

Orthophosphoric acid $H_3PO_4 \xrightarrow{-H_2O} (HPO_3)_n$

Orthophosphorous acid $H_3PO_3 \xrightarrow{-H_2O} HPO_2$

Orthoboric acid H_3BO_3 —— $(HBO_2)_3$

Note :-

$H_2SO_4 \xrightarrow{-H_2O} SO_3$

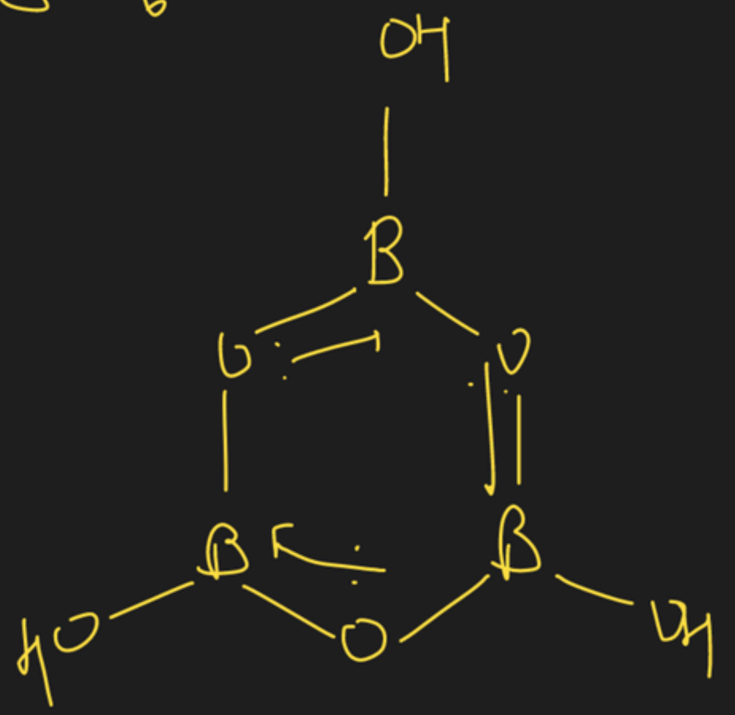
$H_2SO_3 \xrightarrow{-H_2O} SO_2$

$H_2CO_3 \xrightarrow{-H_2O} CO_2$

meta X

these are anhydride

H_3BO_3



sp^3d^2

($d_{x^2-y^2}$ d_{z^2})

$d_{x^2-y^2}$ d_{z^2}

d_{xy} d_{yz} d_{zx}

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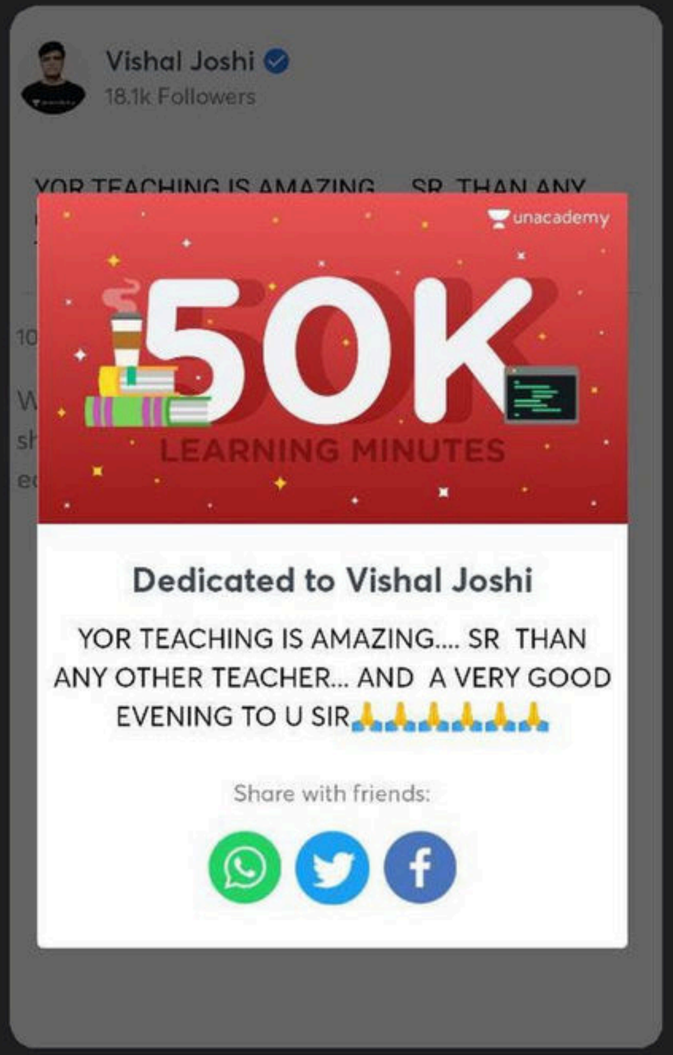
▲ 7 • Asked by Sameer



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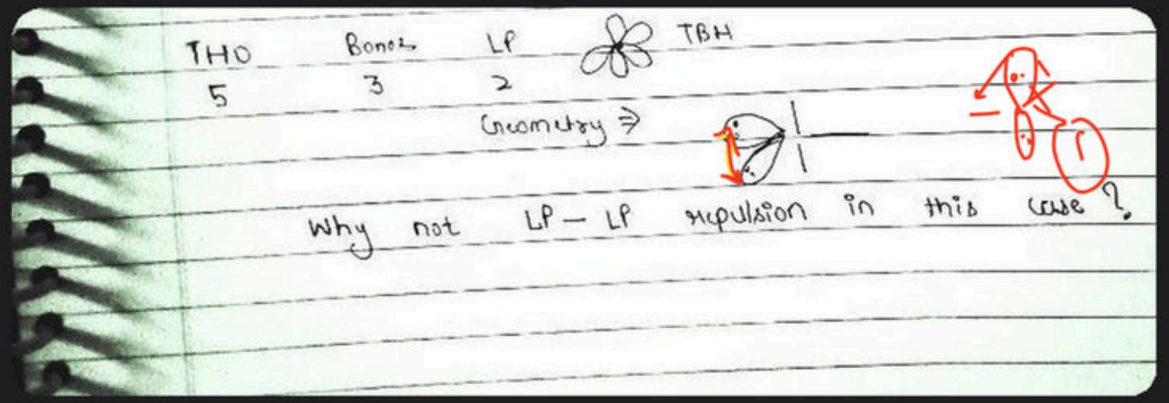
▲ 3 • Asked by Atharv Ath...

LP - LP repulsion hoga to iska structure me LP ko dur rakhna chahiye n?



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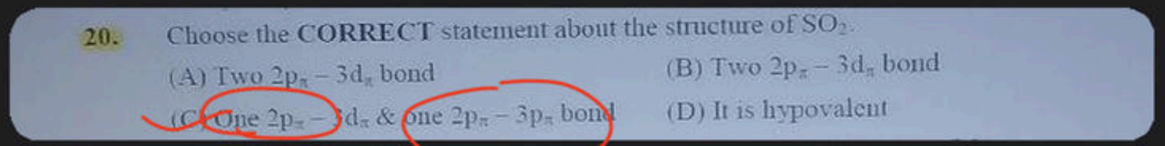
▲ 3 • Asked by Prasad

Sir isamai option kyu hai???



20. Choose the **CORRECT** statement about the structure of SO_2.

(A) Two $2p_\pi - 3d_\pi$ bond

(B) Two $2p_\pi - 3d_\pi$ bond

(C) One $2p_\pi - 3d_\pi$ & one $2p_\pi - 3p_\pi$ bond

(D) It is hypovalent