Nishant Jindal

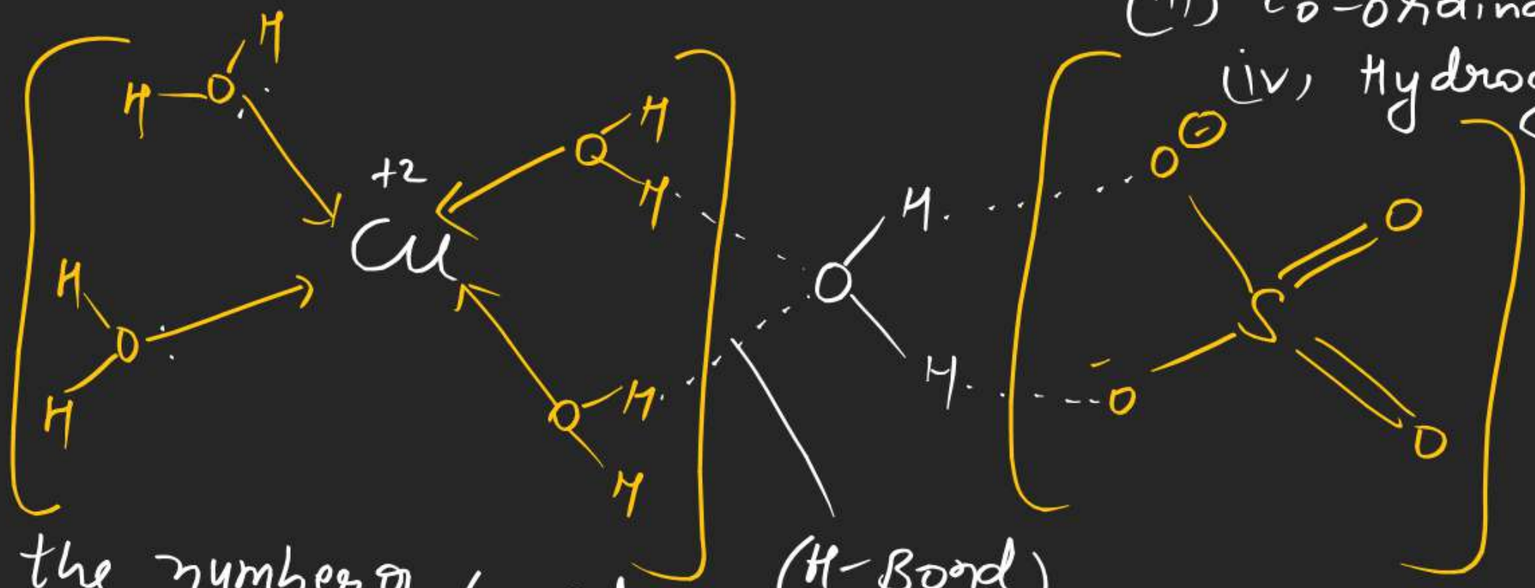
Slide - 1

Draw the Structure

$CuSO_4 \cdot 5H_2O$ (Blue vitriol)

$[Cu(H_2O)_4]SO_4 \cdot H_2O$

(i) Ionic bond / electrovalent bond
(ii) Covalent bond
(iii) Co-ordinate bond
(iv) Hydrogen bond.



Q/ find the number of Co-ordinate (H-Bond) in $CuSO_4 \cdot 5H_2O$

Ans = 4

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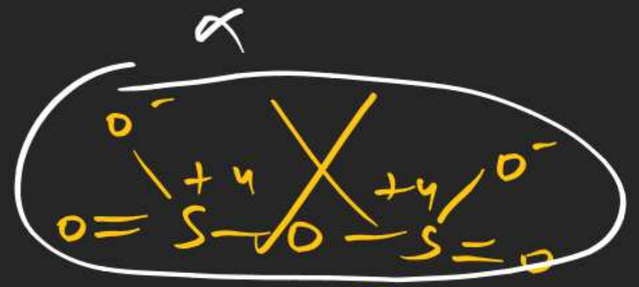
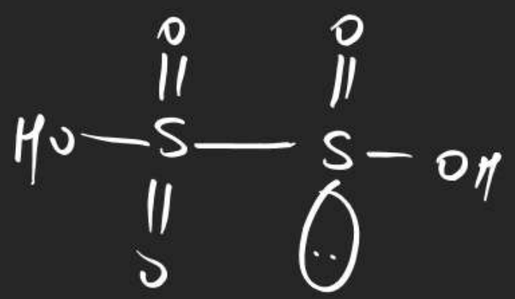
① Imp. Structure

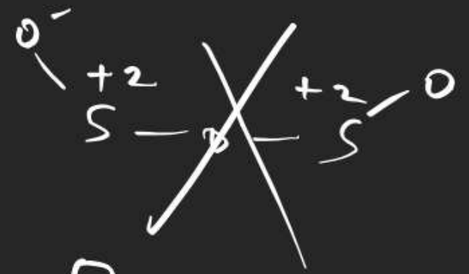
(Thiosulphate ion) $S_2O_3^{-2}$ [S = +6, S = -2]

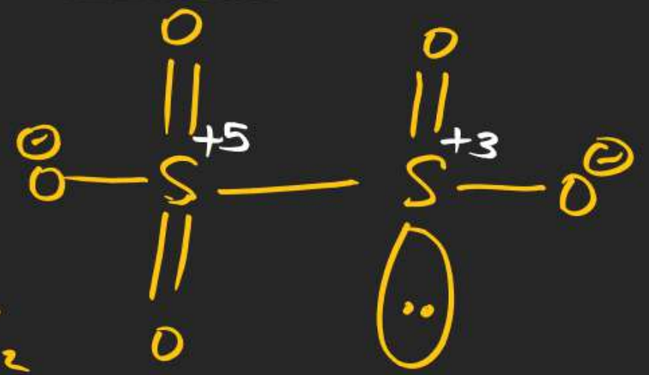
(Pyrosulphurite ion) $S_2O_5^{-2}$ [S = +5, S = +3]

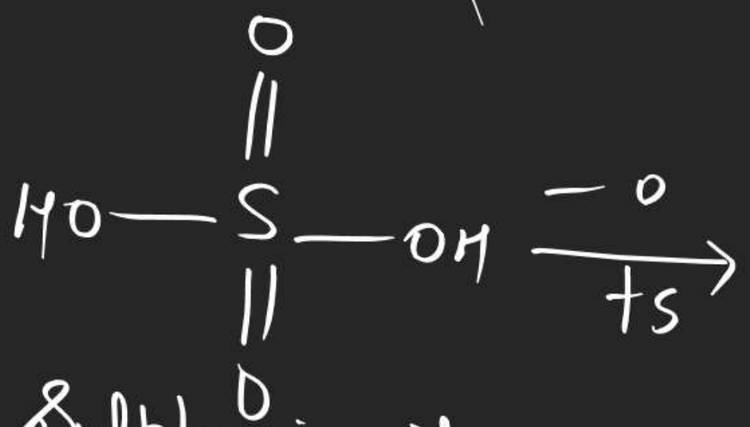


$H_2S_2O_5$









Sulphuric acid

Thiosulphuric acid

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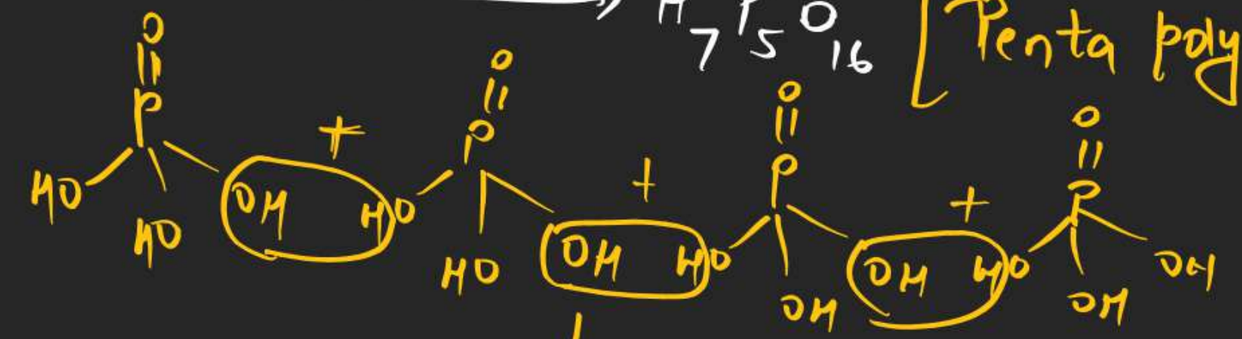
Poly phosphosphoric acid series

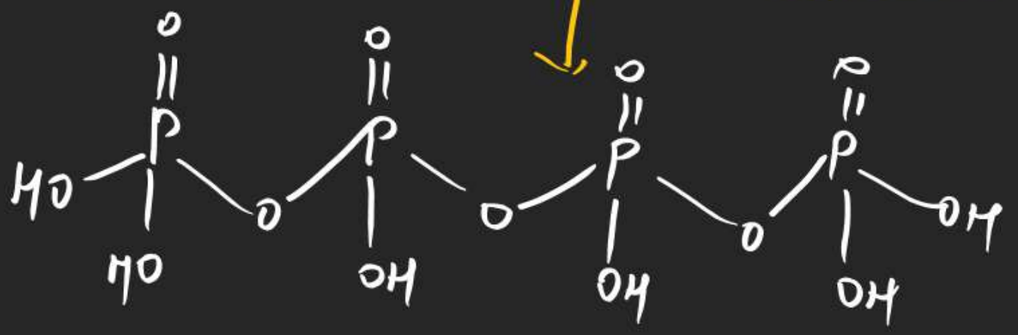
$2H_3PO_4 \xrightarrow{-H_2O} H_4P_2O_7$ (Di poly phosphonic acid) [Pyrophosphonic acid]

$3H_3PO_4 \xrightarrow{-2H_2O} H_5P_3O_{10}$ [Tri poly phosphonic acid]

$4H_3PO_4 \xrightarrow{-3H_2O} H_6P_4O_{13}$ (Tetra poly phosphonic acid)

$5H_3PO_4 \xrightarrow{-4H_2O} H_7P_5O_{16}$ [Penta poly phosphonic acid]





P-O-P linkage = 3

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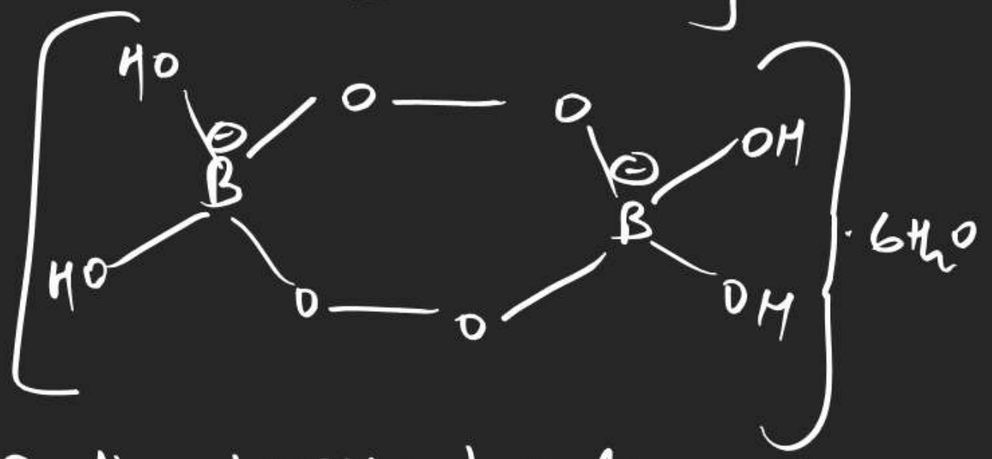
$Na_2[B_2(O_2)_2(OH)_4] \cdot 6H_2O$



Sodium peroxy borate

it is used as brightner in washing powder

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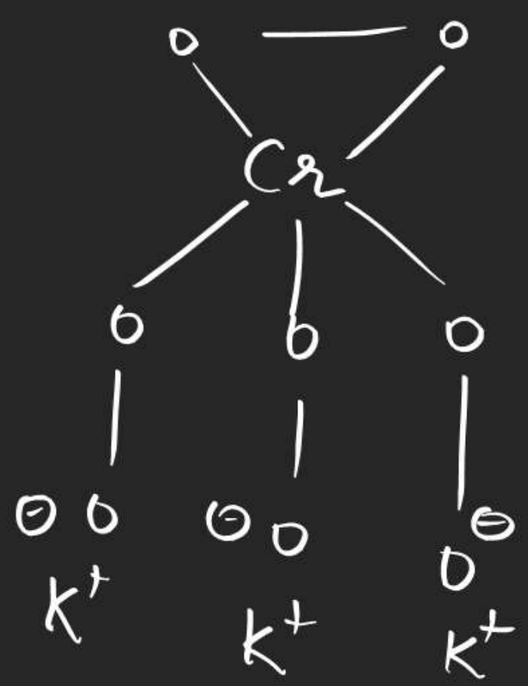
K_3CrO_8



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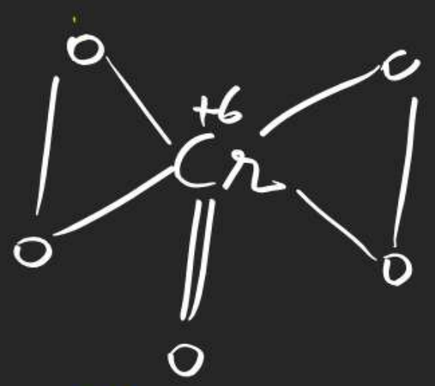
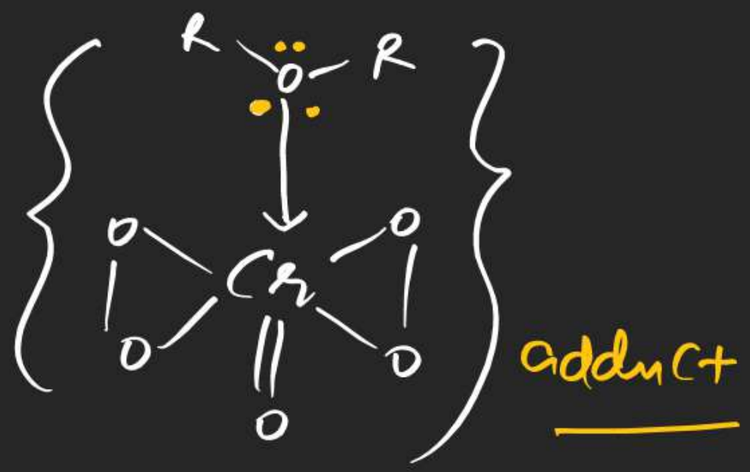
CrO_5





adduct

Blue Colour

two three memb. Rings are present in this Compound so it's Blue Colour fads away in aqueous sol. but in presence of organic solvent it's Blue Colour remains same

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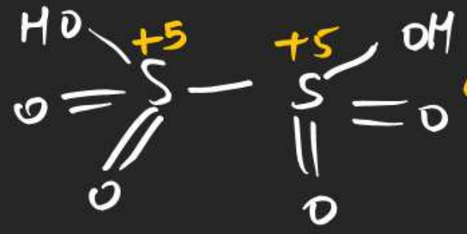
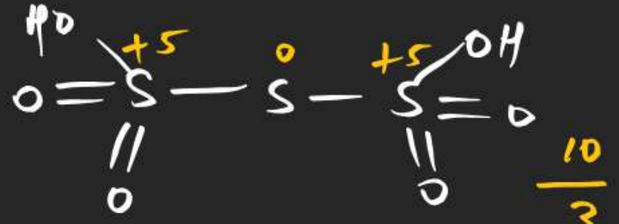
Polythionic acid Series



avg o.s $= \frac{10}{2}$ $H_2S_2O_6$ (Dithionic acid)



$\frac{10}{3}$ $H_2S_3O_6$ (Trithionic acid)

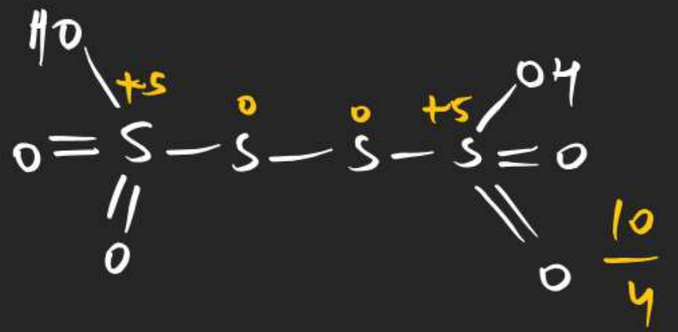
$H_2S_4O_6$ (tetrathionic)

⋮

$H_2S_nO_6$ [polythionic acid]

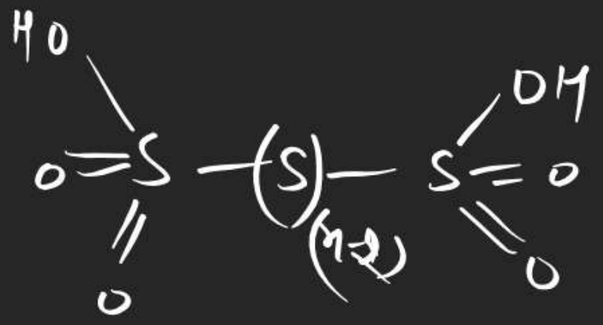
$S-S$ linkage $= n-1$

n = number of S



$\frac{10}{4}$

Note ⇒ no of S atom ↑ then avg o.s ↓



CaC_2 [Calcium Carbide]

S-Block and NH_4^+ Cation form Ionic Compound

except BeX_2 [X = F Cl Br I]

AlX_3 | MgX_2 | LiX [X = Cl Br I] } Predom Covalent

AlF_3 | MgF_2 | LiF ⇒ Predom. Ionic

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CaC_2

Ca^{+2} $\quad$ C_2^{-2}

$\overset{\ominus}{C} \equiv \overset{\ominus}{C}$

$\frac{\sigma}{\pi} = \frac{1}{2}$

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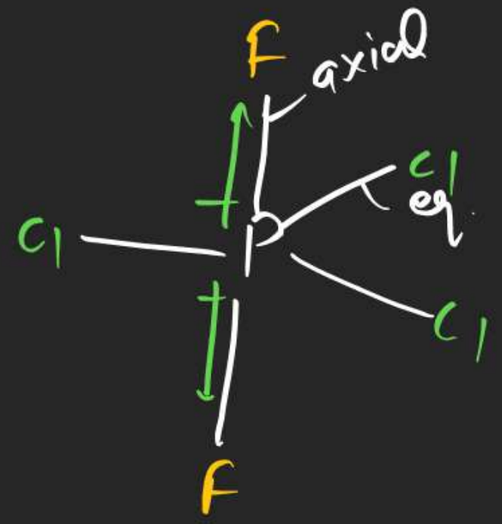
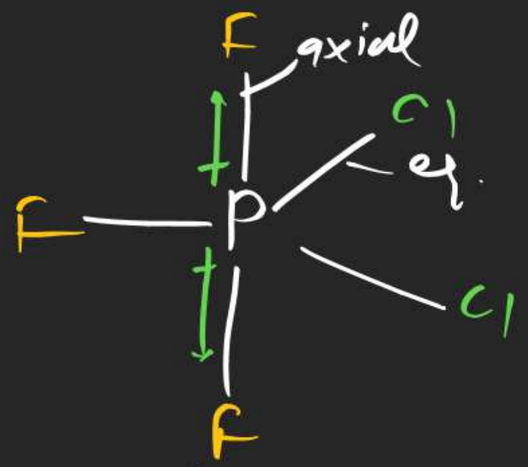
PCl_3F_2



PCl_2F_3



Note ⇒ more E.N element prefer → axial

$\mu = 0$

non polar

$\mu \neq 0$

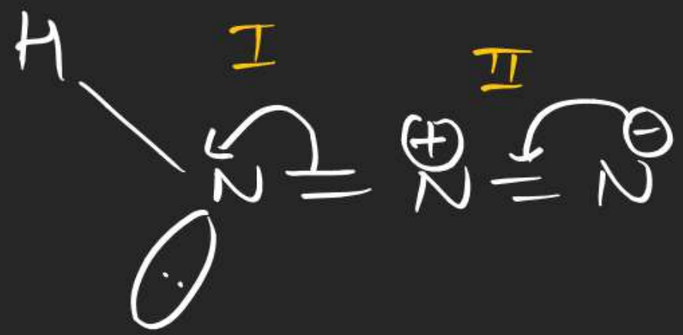
Polar

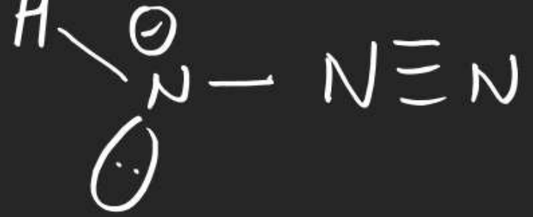
Ans

Ans Hydrogen Azide order of Bond order

I II

< 2 >2





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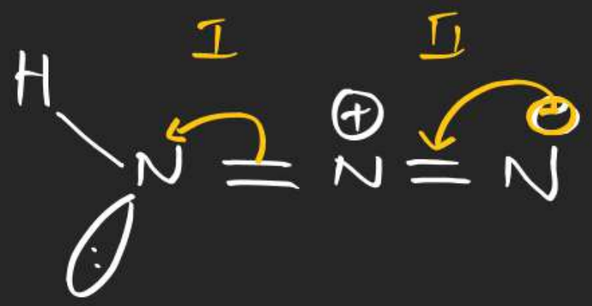
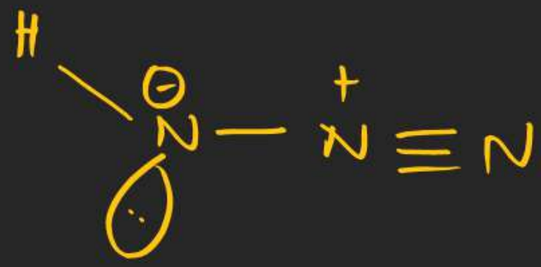
HN_3 [Hydrazoic acid]





PYQs

JEE Mains 2018

Hydrazoic acid bond order find between bond I and II

	I	II
(a)	$=2$	$=2$
(b)	>2	<2
(c)	<2	>2
(d)	none	

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$(CN)_2$ Cyanogen gas

$N \equiv C - C \equiv N$

$(SCN)_2$ + thio cyanogen gas

$N \equiv C - S - S - C \equiv N$

C_3O_2 [Carbon Sub oxide]

$O = \underset{sp}{C} = \underset{sp}{C} = \underset{sp}{C} = O$

linear

Mg_2C_3

$2Mg^{+2}$ C_3^{-4}

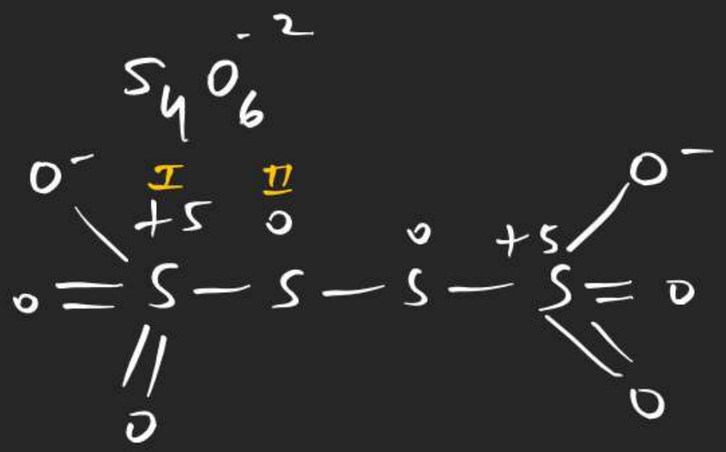
$\overset{-2}{C} = C = \overset{-2}{C}$

$\frac{\sigma}{\pi} = \frac{2}{2} = 1$

$Na_2S_4O_6$

Sodium tetrathionate

$2Na^+$

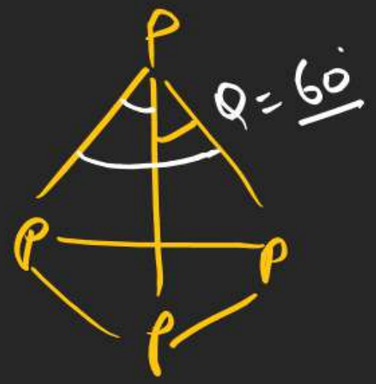


Que find diff of oxid. state of Sulphur

S – O

Ans (5)

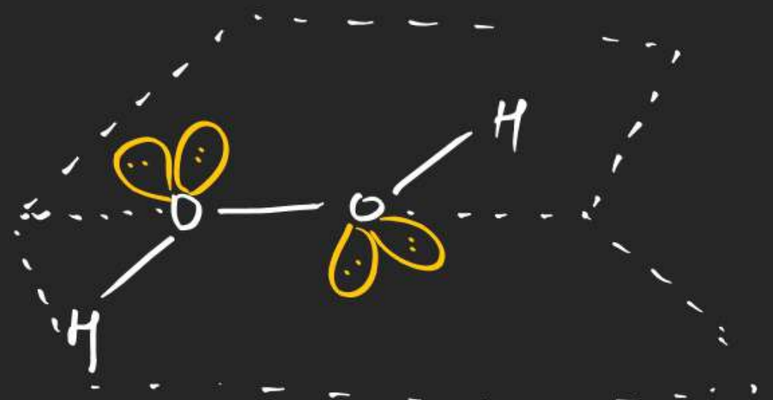
P_4 (white P)

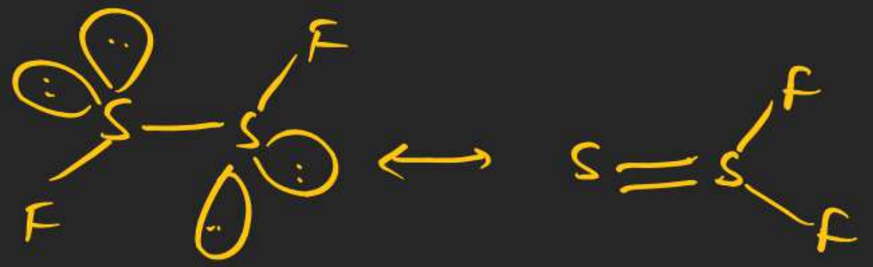


P — P — P number = 12

O_2F_2 H_2O_2 S_2Cl_2 S_2F_2

open book like structure





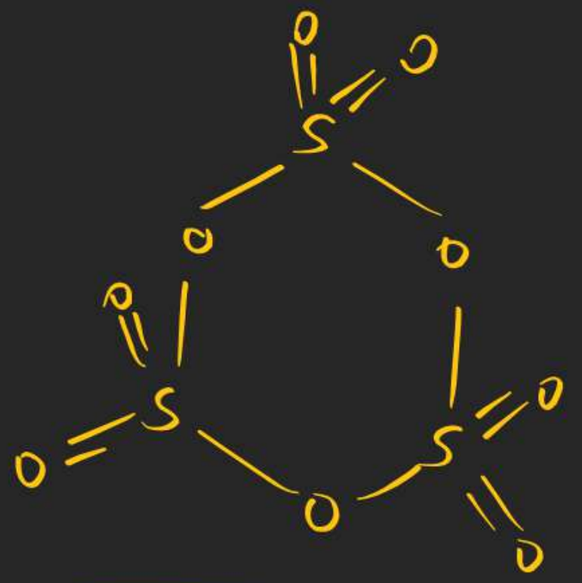
$\mu \neq 0$ Polar

nonplanar

(allotropes of SO_3)

SO_3 — α, β, (γ – SO_3)

$S_3O_9[\gamma - SO_3]$

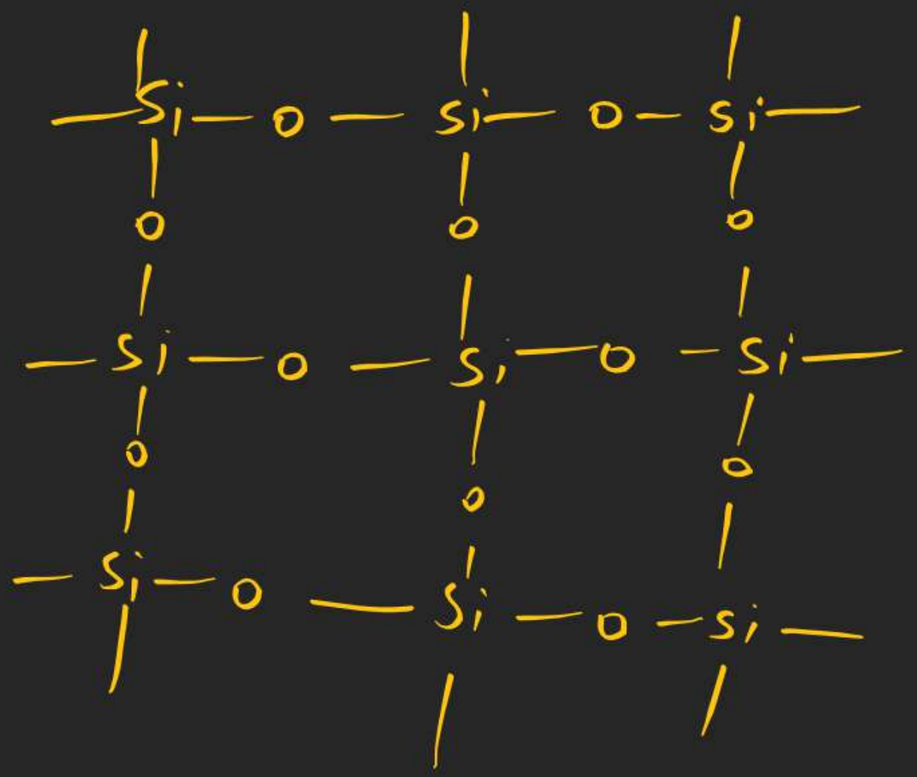


SiO_2 is solid while CO_2 is gas why.

O = C = O

due to small size carbon can form π bond and exist as above

but due to large size Si does not form π bond and it satified it's covalency with oxygen through single bond.



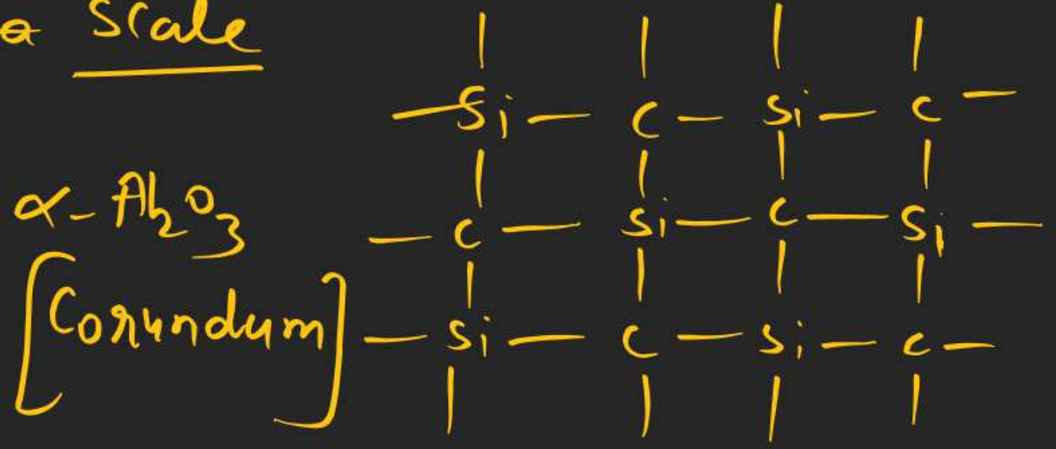
sp3

3D network like structure non planar

SiC (Silicon Carbide)
(carborundum)

Mosh Sa scale

Dia > SiC > α-Al_2O_3
[Corundum]



sp^3 non planar

2nd Hardest material after diamond