Oxyacid ⇒ acid in which oxygen and Hydrogen present

H_2SO_4 — HF HCl HBr

Hydra acids | Halogen acid

Structure

(1) least E.N atom act as C.A except Hydrogen

(2) basicity of oxyacid expressed by number of OH group which are directly attached with central atom.

P-BLOCK

8. Consider the following reaction :

A + alkali $\rightarrow$ B (Major Product)

If B is an oxoacid of phosphorus with no $P-H$ bond, then A is :

(A) White P_4 (B) Red P_4 (C) P_2O_3 (D) H_3PO_3

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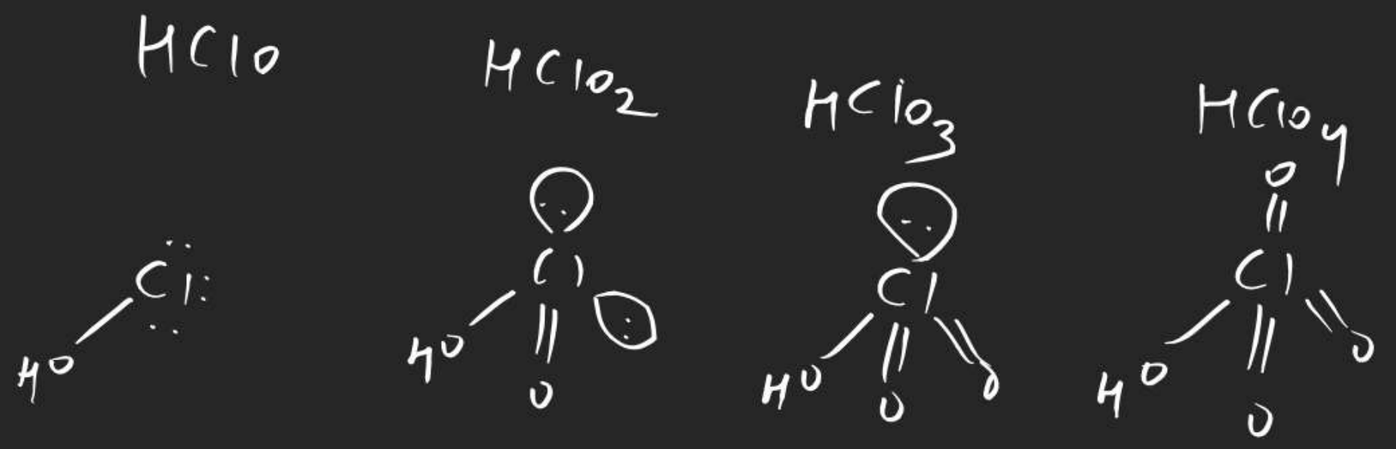

Basicity ∝ number of Hydrogen

except

		basicity
(Phosphonic acid)	H_3PO_3 [Phosphorous acid]	2
(Phosphinic acid)	H_3PO_2 [Hypophosphorous acid]	1
	$H_4P_2O_5$ [Pyrophosphorous acid]	2
	H_3BO_3 [Boric acid]	1

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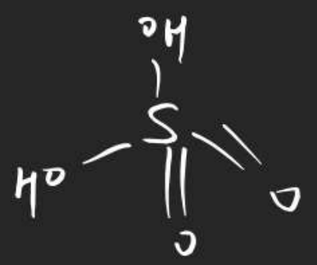
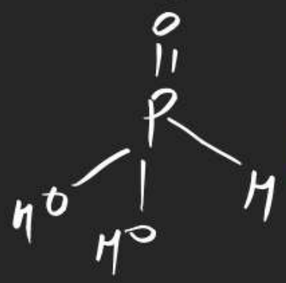
H_2SO_4



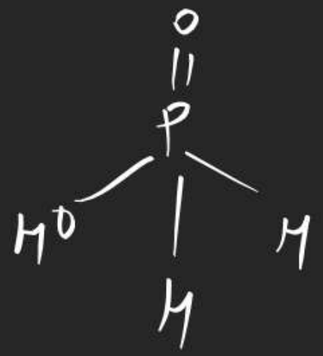
H_3PO_3



R.A

H_2SO_3

H_3PO_2



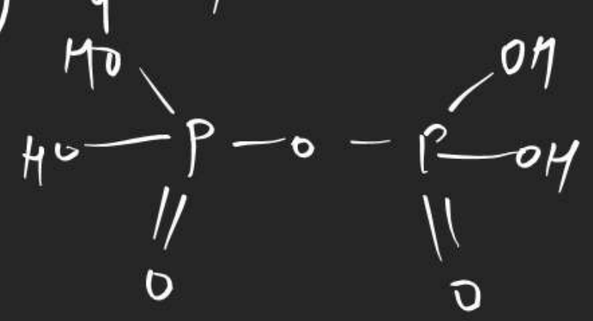
R-A

C.A = two

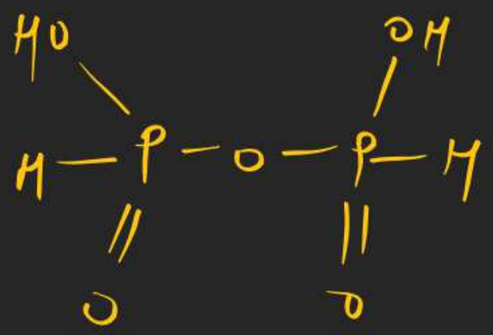
S.A = odd number

then linkage X–O–X

(Pyrophosphoric acid) $H_4P_2O_7$



$H_4P_2O_5$ [Pyrophosphorous acid]



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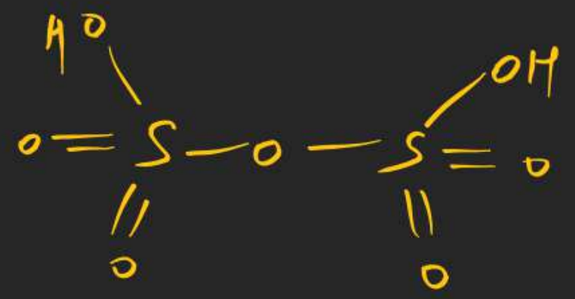
$H_2S_2O_7$ (oleum)

Pyro sulphuric acid



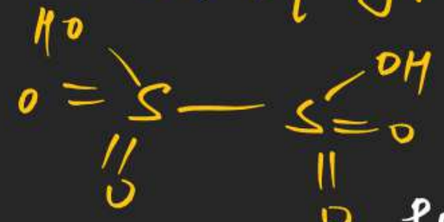
C.A = two

S.A = even number

X — X [when O.S of C.A is in Range]

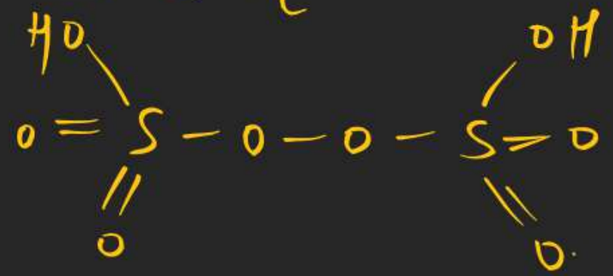
X — O — O — X ⇒ [when O.S of C.A out of Range]

$H_2S_2O_6$ [hypo sulphuric acid]



peroxodisulphuric acid

$H_2S_2O_8$ [marshall's acid]



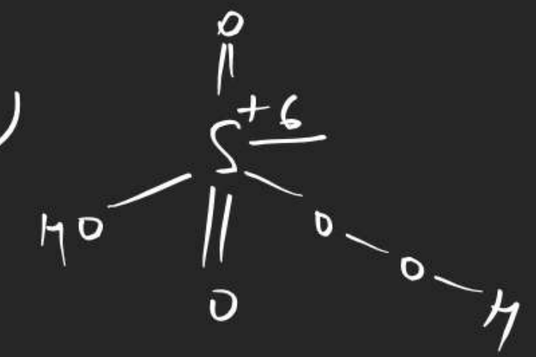
H_2SO_5 (Caro's acid)

$2+x+5(-2)=0$ Peroxomonosulphuric acid

$x=8$

(Out of Range)

So peroxy linkage.



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$HClO$	$HClO_2$	$HClO_3$	$HClO_4$
Hypochlorous acid	Chlorous acid	Chloric acid	Perchloric acid

$(HPO_3)_n$

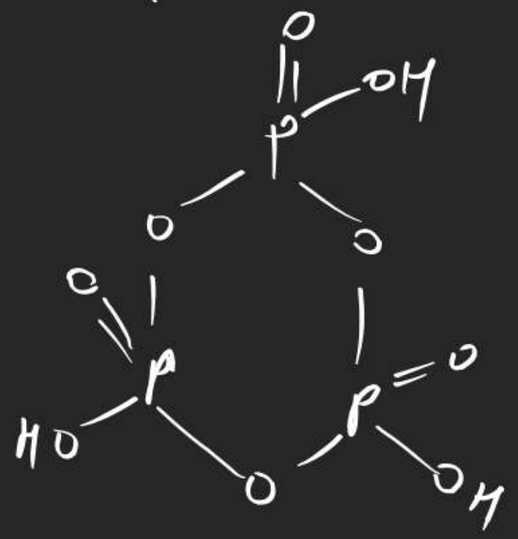
$n = 1, 2$ ✗

$n =$	3	4	5	6
	$H_3P_3O_9$	$H_4P_4O_{12}$	$H_5P_5O_{15}$	$H_6P_6O_{18}$
	Cyclic trimeta phosphoric acid	cyclic tetra meta phosphoric acid		

Cyclic $\Rightarrow$ C.A more than two

S.A should be greater than equal to C.A in number

$H_3P_3O_9$



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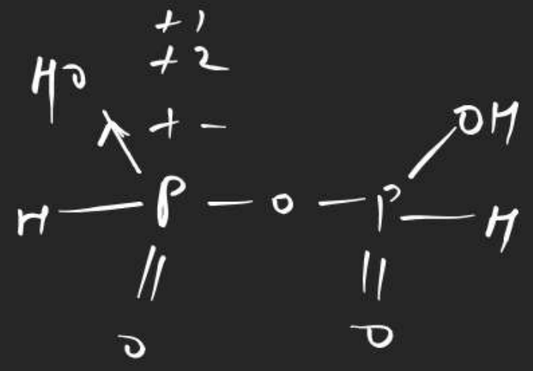
$H_4P_2O_5$



P-BLOCK

9. Polar stratospheric clouds facilitate the formation of :

(A) $ClONO_2$ (B) $HOCl$ (C) ClO (D) CH_4

P-BLOCK

10. Match List-I with List-II

List–I (Si–Compounds)	List–II (Si–Polymeric/other products)
(A) $(CH_3)_4Si$	(I) Chain silicone
(B) $(CH_3)Si(OH)_3$	(II) Dimeric silicone
(C) $(CH_3)_2Si(OH)_2$	(III) Silane
(D) $(CH_3)_3Si(OH)$	(IV) 2D – Silicone

Choose the correct answer from the options given below:

(A) (A) - (III), (B) - (II), (C) - (I), (D) - (IV)

(B) (A) - (IV), (B) - (I), (C) - (II), (D) - (III)

(C) (A) - (II), (B) - (I), (C) - (IV), (D) - (III)

(D) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

P-BLOCK

11. Heating white phosphorus with conc. $NaOH$ solution gives mainly

(A) Na_3P and H_2O

(B) H_3PO and NaH

(C) $P(OH)_3$ and NaH_2PO_4

(D) PH_3 and NaH_2PO_2

$$P_4 + NaOH \longrightarrow \overset{-3}{P}H_3 + Na\overset{+1}{H_2}PO_2$$

Sodium Hypophosphite

P-BLOCK

12. The gas produced by treating an aqueous solution of ammonium chloride with sodium nitrite is

(A) NH_3 (B) N_2 (C) N_2O (D) Cl_2

$$NH_4Cl + NaNO_2 \xrightarrow{\Delta} N_2$$

P-BLOCK

13. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A : Fluorine forms one oxoacid.

Reason R : Fluorine has smallest size amongst all halogens and is highly electronegative

In the light of the above statements, choose the most appropriate answer from the options given below.

(A) Both A and R are correct and R is the correct explanation of A.

(B) Both A and R are correct but R is NOT the correct explanation of A.

(C) A is correct but R is not correct.

(D) A is not correct but R is correct

14. On the surface of polar stratospheric clouds, hydrolysis of chlorine nitrate gives A and B while its reaction with HCl produces B and C. A, B and C are, respectively

(A) $HOCl, HNO_3, Cl_2$

(B) $Cl_2, HNO_3, HOCl$

(C) $HClO_2, HNO_2, HOCl$

(D) $HOCl, HNO_2, Cl_2O$

P-BLOCK

15. Nitrogen gas is obtained by thermal decomposition of

(A) $Ba(NO_3)_2$ (B) $Ba(N_3)_2$ (C) $NaNO_2$ (D) $NaNO_3$

$$Ba(N_3)_2 \xrightarrow{\Delta} Ba + N_2$$

$$NaN_3 \xrightarrow{\Delta} Na + N_2$$

} pure N_2

16. Given below are two statements :

Statement -I :The pentavalent oxide of group- 15 element. E_2O_5. is less acidic than trivalent oxide. E_2O_3. of the same element.

Statement -II :The acidic character of trivalent oxide of group 15 elements. E_2O_3. decreases down the group.

In light of the above statements. choose most appropriate answer from the options given below:

(A) Both Statement I and Statement II are true.

(B) Both Statement I and Statement II are false.

(C) Statement I true. but statement II is false.

(D) Statement I is false but statement II is true.

P-BLOCK

17. Among the following basic oxide is :

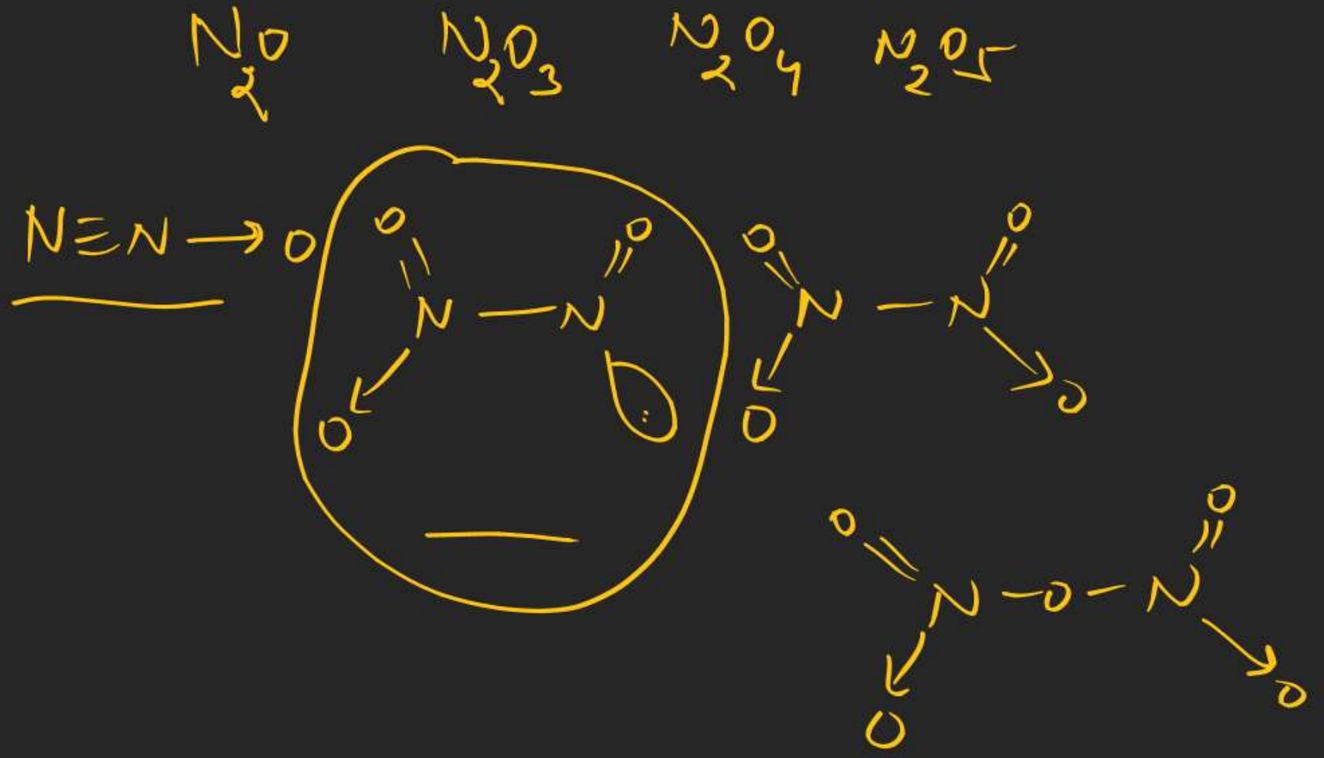
(A) SO_3 (B) SiO_2 (C) CaO (D) Al_2O_3

S-block oxides are basic except BeO Amphoteric

P-BLOCK

18. Among the given oxides of nitrogen; N_2O, N_2O_3, N_2O_4 and N_2O_5, the number of compound/(s) having $N-N$ bond is :

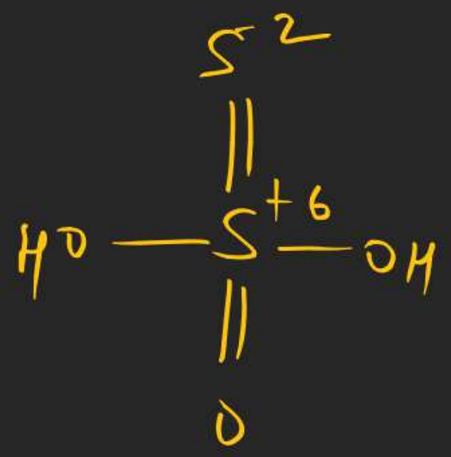
(A) 1 (B) 2 (C) 3 (D) 4



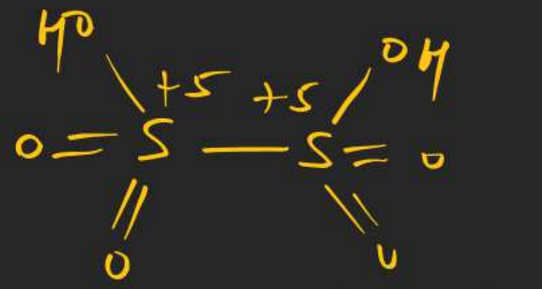
P-BLOCK

19. Which of the following oxoacids of sulphur contains " S " in two different oxidation states?

(A) $H_2S_2O_3$ (B) $H_2S_2O_6$ (C) $H_2S_2O_7$ (D) $H_2S_2O_8$

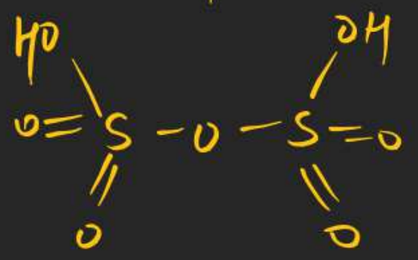


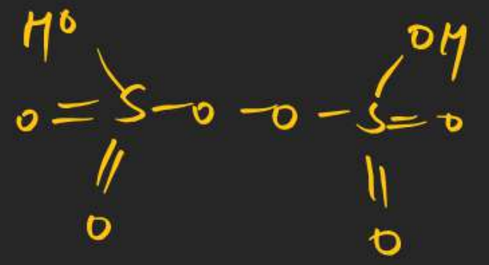
Thiosulphuric acid



Hyposulphuric

Pyrosulphuric acid





20. The oxoacid of phosphorus that is easily obtained from a reaction of alkali and white phosphorus and has two P-H bonds, is :

(A) Phosphonic acid

(B) Phosphinic acid

(C) Pyrophosphorus acid

(D) Hypophosphoric acid

$P_4 + alkali \longrightarrow H_3PO_2$

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P-BLOCK

21. The acid that is believed to be mainly responsible for the damage of Taj Mahal is

(A) Sulfuric acid

(B) Hydrofluoric acid

(C) Phosphoric acid

(D) Hydrochloric acid

acid rain

P-BLOCK

22. Match List - I with List - II

List – I	List - II
(a) $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$	(I) Cu
(B) $CO(g) + 3H_2(g) \rightarrow CH_4(g) + H_2O(g)$	(II) $Cu/ZnO - Cr_2O_3$
(C) $CO(g) + H_2(g) \rightarrow HCHO(g)$	(III) $Fe_xO_y + K_2O + Al_2O_3$
(D) $CO(g) + 2H_2(g) \rightarrow CH_3OH(g)$	(IV) Ni

Choose the correct answer from the options given below :

(A) (A) - (II), (B) - (IV), (C) - (I), (D) - (III)

(B) (A) - (II), (B) - (I), (C) - (IV), (D) - (III)

(C) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

(D) (A) - (III), (B) - (I), (C) - (IV), (D) - (II)

P-BLOCK

23. The geometry around boron in the product ' B ' formed from the following reaction is

$$BF_3 + NaH \xrightarrow{450\ K} A + NaF$$

$$A + NMe_3 \rightarrow B$$

(A) trigonal planar

(B) tetrahedral

(C) pyramidal

(D) square planar

$$B_2H_6 + NMe_3 \longrightarrow 2BH_3 \cdot NMe_3$$

P-BLOCK

24. Borazine, also known as inorganic benzene, can be prepared by the reaction of 3-equivalents of " X " with 6-equivalents of "Y". "X" and "Y", respectively are :

(A) $B(OH)_3$ and NH_3

(B) B_2H_6 and NH_3

(C) B_2H_6 and HN_3

(D) NH_3 and B_2O_3

P-BLOCK

25. The metal that has very low melting point and its periodic position is closer to a metalloid is :

(A) Al (B) Ga (C) Se (D) In

26. Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A : Boric acid is a weak acid

Reason R : Boric acid is not able to release H^+ ion on its own. It receives OH^- ion from water and releases H^+ ion.

In the light of the above statements, choose the most appropriate answer from the options given below.

(A) Both A and R are correct and R is the correct explanation of A

(B) Both A and R are correct but R is NOT the correct explanation of A

(C) A is correct but R is not correct

(D) A is not correct but R is correct

27. Given below are two statements:

Statement I : The chlorides of Be and Al have Cl-bridged structure. Both are soluble in organic solvents and act as Lewis bases.

Statement II: Hydroxides of Be and Al dissolve in excess alkali to give beryllate and aluminate ions. In the light of the above statements. Choose the correct answer from the options given below.

(A) Both statement I and Statement II are true

(B) Both statement I and Statement II are false

(C) Statement I is true but Statement II is false

(D) Statement I is false but Statement II is true

28. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R)

Assertion (A) : Boron is unable to form BF_6^{3-}

Reason (R) : Size of B is very small.

In the light of the above statements, choose the correct answer from the options given below:

(A) Both (A) and (R) are true and (R) is the correct explanation of (A)

(B) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(C) (A) is true but (R) is false

(D) (A) is false but (R) is true

P-BLOCK

29. When borax is heated with CoO on a platinum loop, blue coloured bead formed is largely due to

(A) B_2O_3 (B) $Co(BO_2)_2$ (C) CoB_4O_7 (D) $Co[B_4O_5(OH)_4]$