

## P-BLOCK

2023

1. The difference between electron gain enthalpies will be maximum between :

(A) Ne and F

(B) Ar and F

(C) Ne and Cl

(D) Ar and Cl

+ive

+ 116

$\Delta H_{eg} = -$  ive

- 327

## P-BLOCK

2.

Match List I with List II

List I Oxide		List II Type of bond	
A	$\text{N}_2\text{O}_4$	I	1 N = O bond
B	$\text{NO}_2$	II	1 N - O - N bond
C	$\text{N}_2\text{O}_5$	III	1 N - N bond
D	$\text{N}_2\text{O}$	IV	1 N = N / N $\equiv$ N bond



Choose the correct answer from the options given below :

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

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

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

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

## P-BLOCK

3.  $\text{XeF}_4$  reacts with  $\text{SbF}_5$  to form  $[\text{XeF}_m]^{n+}[\text{SbF}_y]^{z-}$   $m + n + y + z = ?$ .



$$m = 3$$

$$n = 1$$

$$y = 6$$

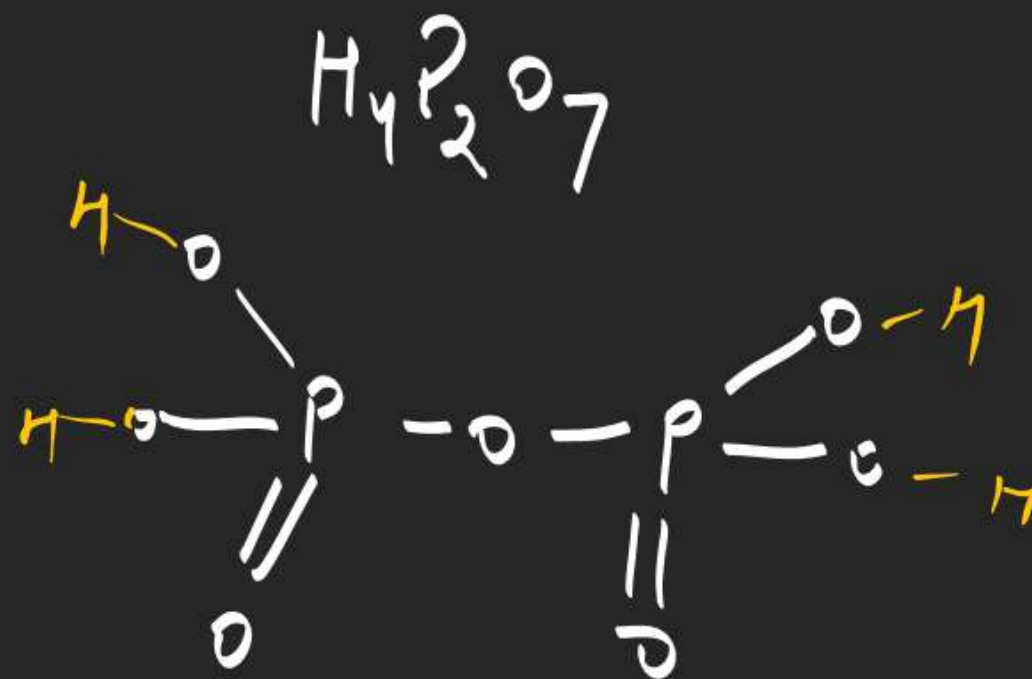
$$z = 1$$

---


$$11$$

**P-BLOCK**

4. The ratio of sigma and  $\pi$  bonds present in pyrophosphoric acid is



$$\frac{12}{2} = 6$$

**P-BLOCK**

5. Given below are two statements :

Statement-I : Methane and steam passed over a heated Ni catalyst produces hydrogen gas.



Statement-II : Sodium nitrite reacts with  $\text{NH}_4\text{Cl}$  to give  $\text{H}_2\text{O}$ ,  $\text{N}_2$  and  $\text{NaCl}$ .

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



(A) Statement I is incorrect but Statement II is correct

(B) Both the statements I and II are incorrect

(C) Statement I is correct but Statement II is incorrect

☒ (D) Both the statements I and II are correct

**P-BLOCK**

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

**Assertion A:** A solution of the product obtained by heating a mole of glycine with a mole of chlorine in presence of red phosphorous generates chiral carbon atom.

**Reason R:** A molecule with 2 chiral carbons is always optically active.

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

- (A) A is true but R is false
- (B) Both A and R are true but R is the correct explanation of A
- (C) A is false but R is true
- (D) Both A and R are true but R is NOT the correct explanation of A

## P-BLOCK

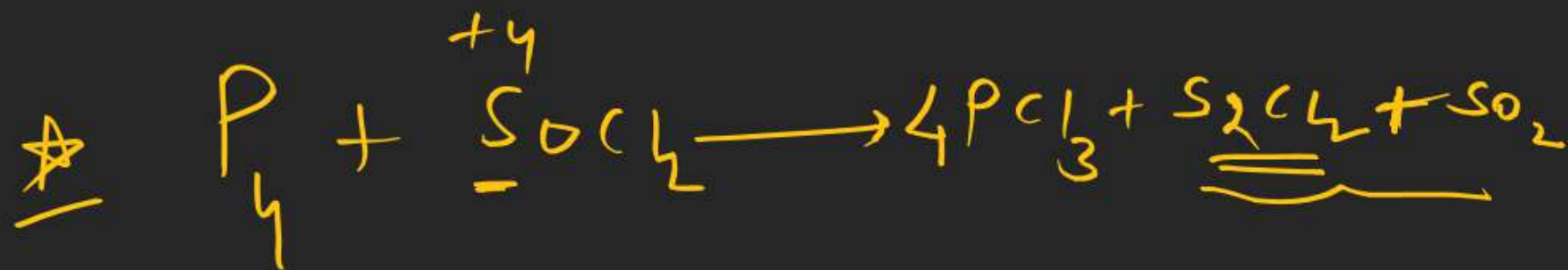
7. ✨ One mole of  $P_4$  reacts with 8 moles of  $SOCl_2$  to give 4 moles of A, x mole of  $SO_2$  and 2 moles of B. A, B and x respectively are [2023 (11 Apr Shift 2)]

(A)  $POCl_3$ ,  $S_2Cl_2$  and 2

✓ ~~(B)  $PCl_3$ ,  $S_2Cl_2$  and 4~~

(C)  $PCl_3$ ,  $S_2Cl_2$  and 2

(D)  $POCl_3$ ,  $S_2Cl_2$  and 4



**P-BLOCK**

**8. One mole of  $P_4$  reacts with 8 moles of  $SOCl_2$  to give 4 moles of A, x mole of  $SO_2$  and 2 moles of B. A, B and x respectively are**

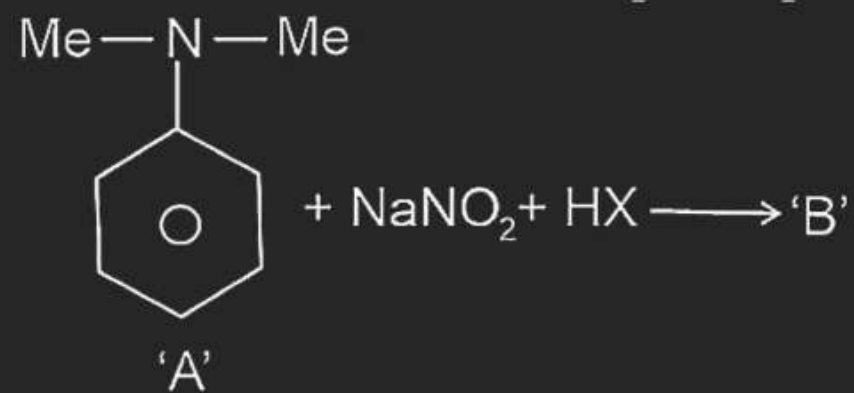
**(A)  $POCl_3$ ,  $S_2Cl_2$  and 2**

**(B)  $PCl_3$ ,  $S_2Cl_2$  and 4**

**(C)  $PCl_3$ ,  $S_2Cl_2$  and 2**

**(D)  $POCl_3$ ,  $S_2Cl_2$  and 4**

9. The incorrect statement regarding the reaction given below is



- (A) The product 'B' formed in the above reaction is p-nitroso compound at low temperature
- (B) 'B' is N-nitroso ammonium compound
- (C) The reaction occurs at low temperature
- (D) The electrophile involved in the reaction is  $\text{NO}^+$

# P-BLOCK

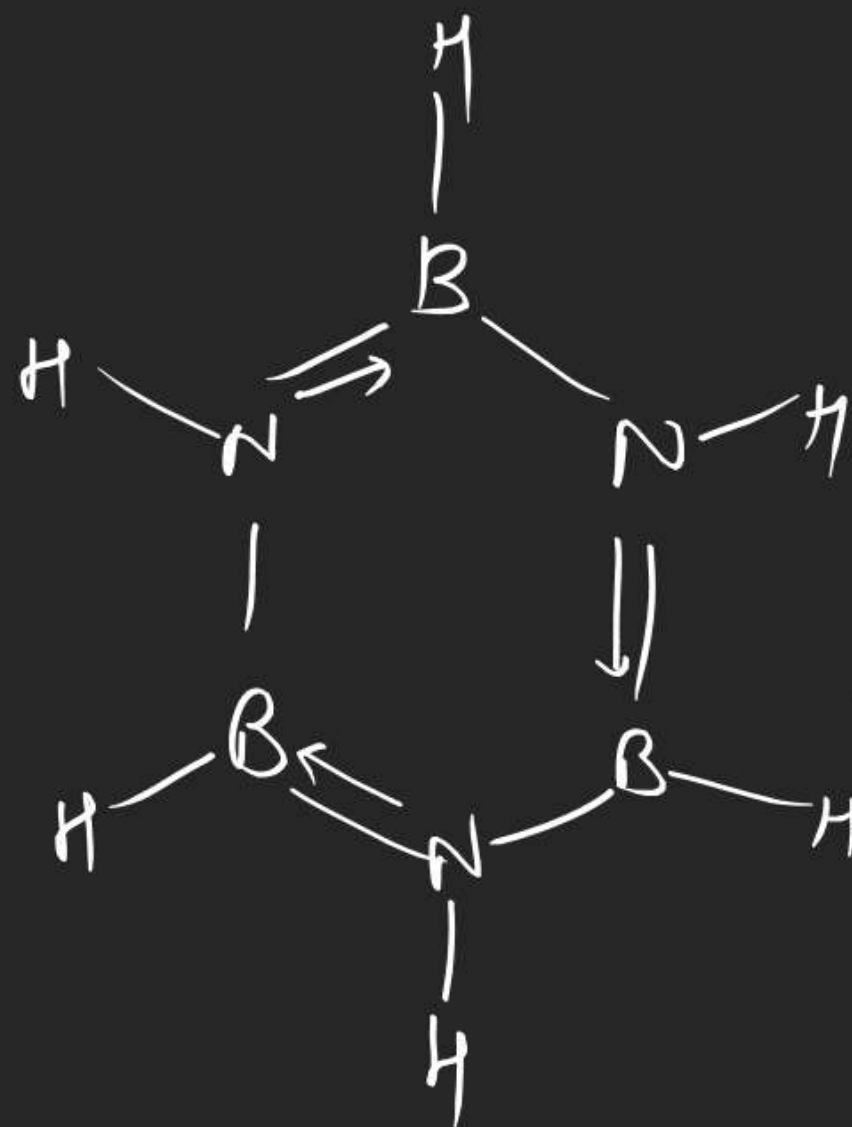
10. The incorrect statement from the following for borazine is:

(A) It contains banana bonds

(B) It can react with water

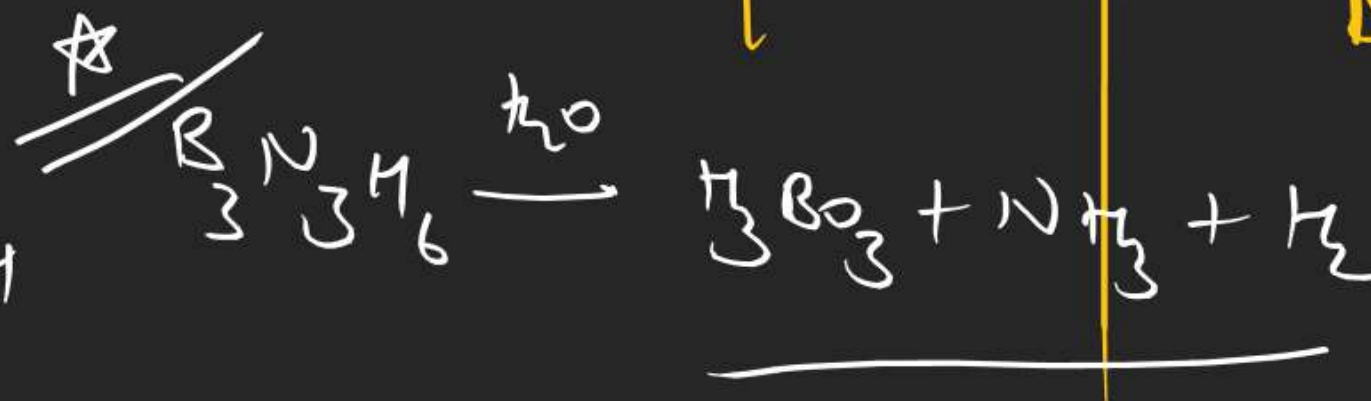
(C) It is a cyclic compound

(D) It has electronic delocalization



$B_3N_3H_6$   
(Inorganic benzene)

Borazine | Borazol



$(BN)_x$   
Inorganic graphite  
Borazole

## P-BLOCK

11.

The correct group of halide ions which can be oxidized by oxygen in acidic medium is

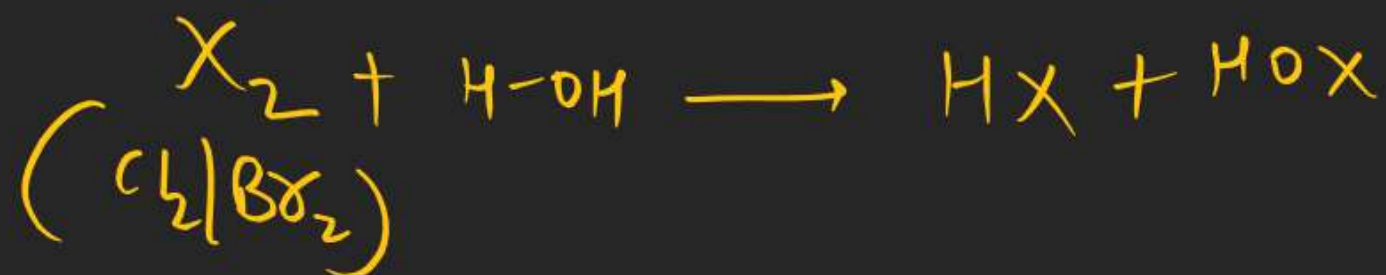
(A)  $\text{Br}^-$  and  $\text{I}^-$  only

(B)  $\text{Br}^-$  only

☒ (C)  $\text{I}^-$  only

(D)  $\text{Cl}^-$ ,  $\text{Br}^-$  and  $\text{I}^-$  only

order of oxidising agent



**P-BLOCK**

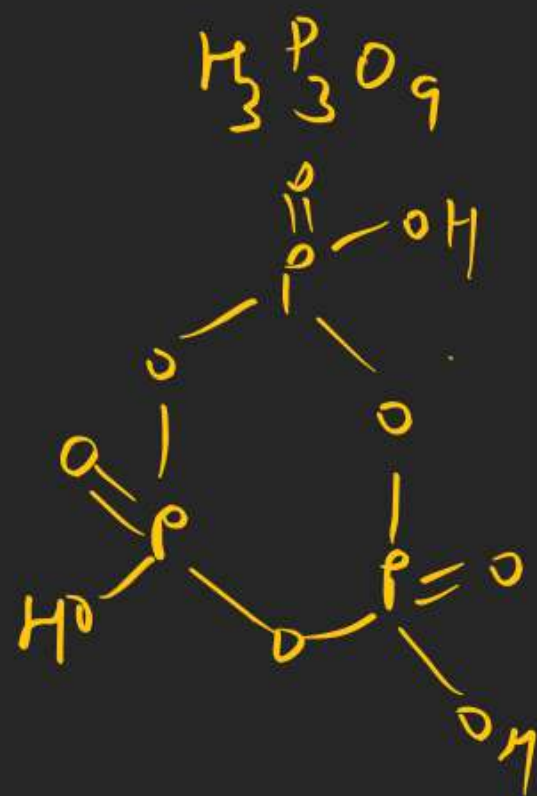
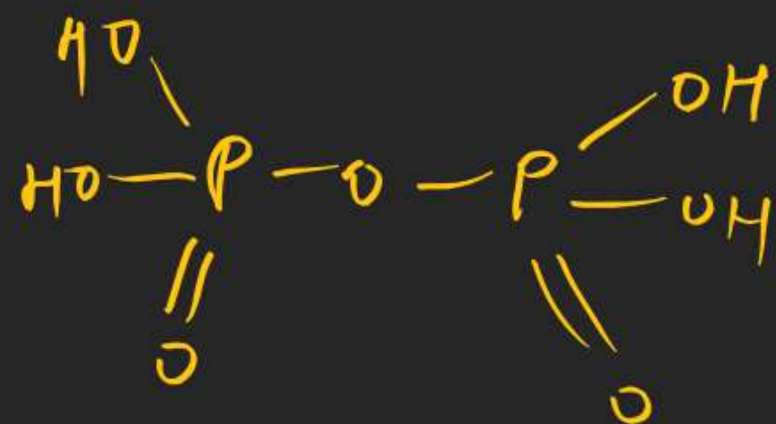
12. The number of P – O – P bonds in  $\text{H}_4\text{P}_2\text{O}_7$ ,  $(\text{HPO}_3)_3$ , and  $\text{P}_4\text{O}_{10}$  are respectively

(A) 0, 3, 6

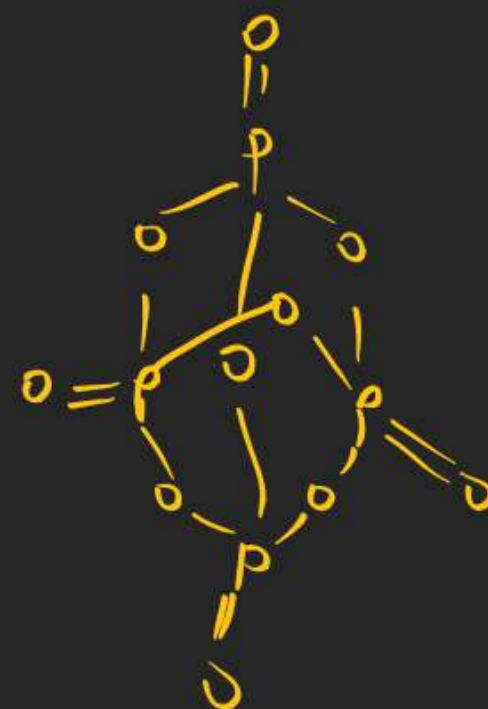
(B) 0, 3, 4

(C) 1, 2, 4

(D) 1, 3, 6



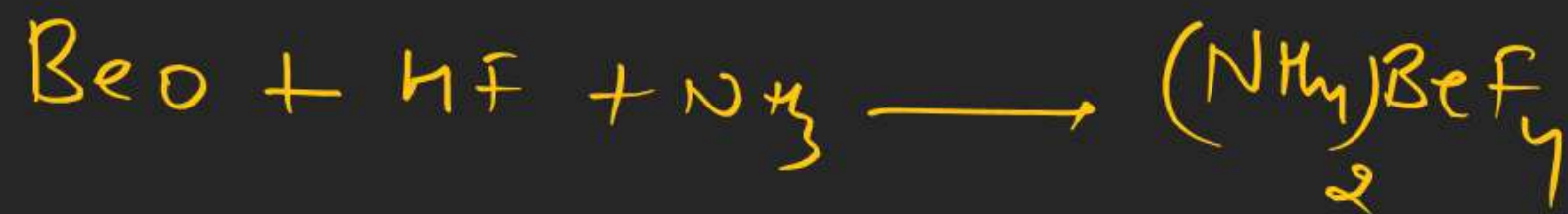
Pyrophosphoric  
acid



Cyclic  
trimeta  
phosphoric  
acid

## P-BLOCK

13. Reaction of BeO with ammonia and hydrogen fluoride gives 'A' which on thermal decomposition gives  $\text{BeF}_2$  and  $\text{NH}_4\text{F}$ . What is 'A'?



# P-BLOCK

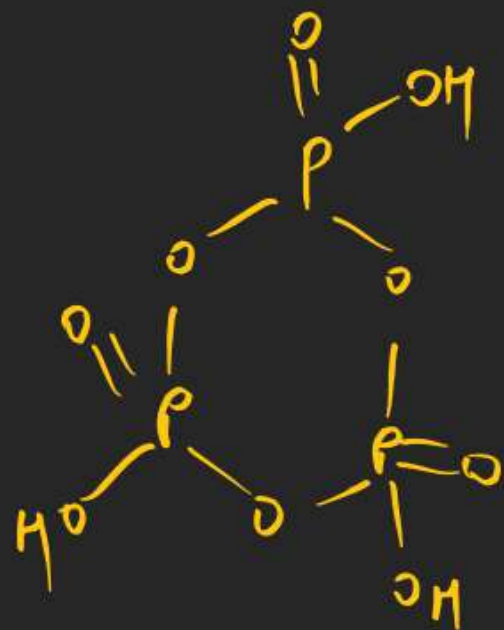
14. Which of the Phosphorus oxoacid can create silver mirror from  $\text{AgNO}_3$  solution ?

(A)  $(\text{HPO}_3)_n$

(B)  $\text{H}_4\text{P}_2\text{O}_5$

(C)  $\text{H}_4\text{P}_2\text{O}_6$

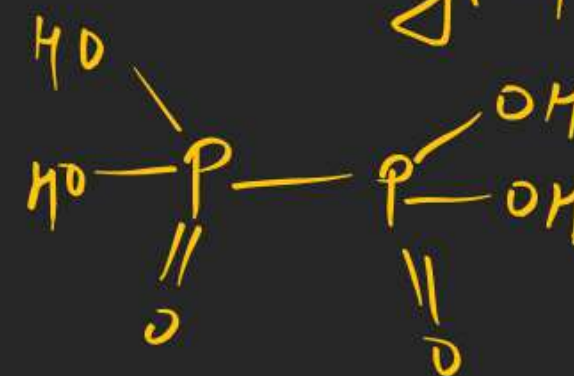
(D)  $\text{H}_4\text{P}_2\text{O}_7$



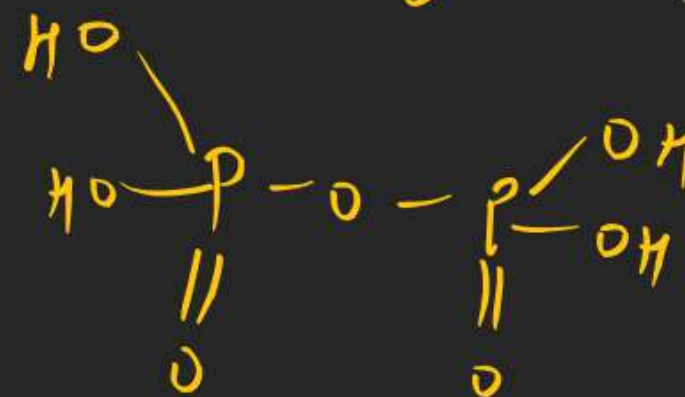
Reducing agent



Pyrophosphorous  
acid



Hypophosphoric acid

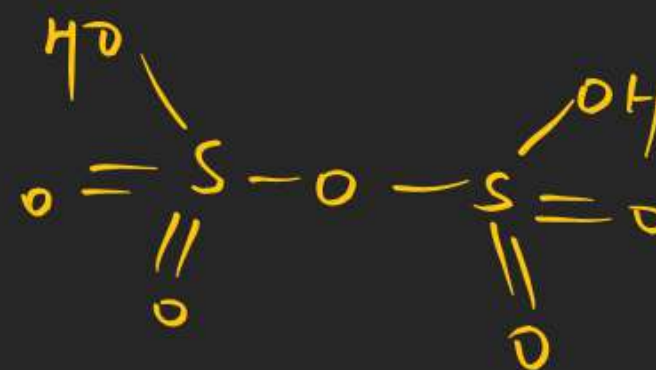
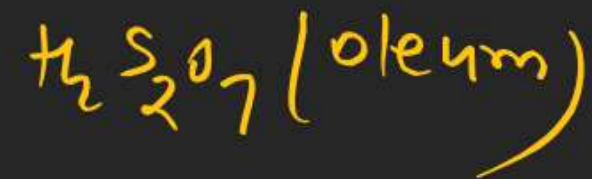


**P-BLOCK**

15. Sum of  $\pi$ -bonds present in peroxodisulphuric acid and pyrosulphuric acid is



$$4 + 4 = \underline{8}$$



## P-BLOCK

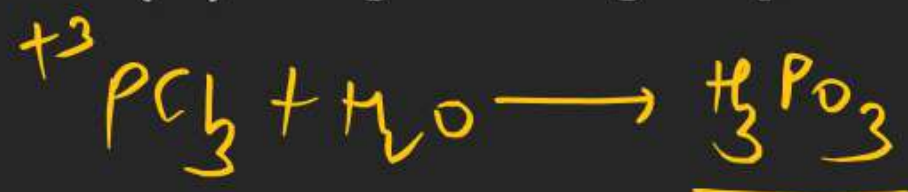
16. Reaction of thionyl chloride with white phosphorus forms a compound [A], which on hydrolysis gives [B], a dibasic acid. [A] and [B] are respectively

(A)  $P_4O_6$  and  $H_3PO_3$

~~(B)  $PCl_3$  and  $H_3PO_3$~~

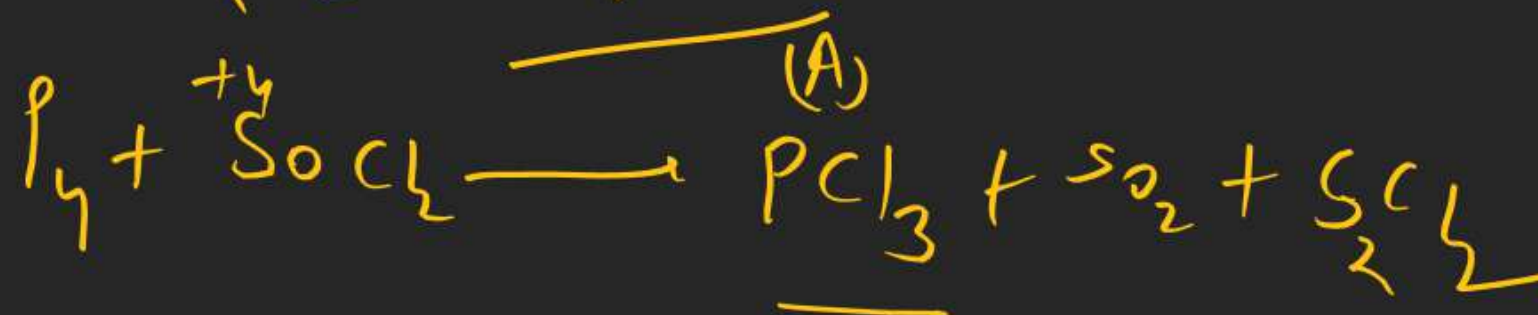
(C)  $PCl_5$  and  $H_3PO_4$

(D)  $POCl_3$  and  $H_3PO_4$



$SOCl_2$  = Thionyl chloride

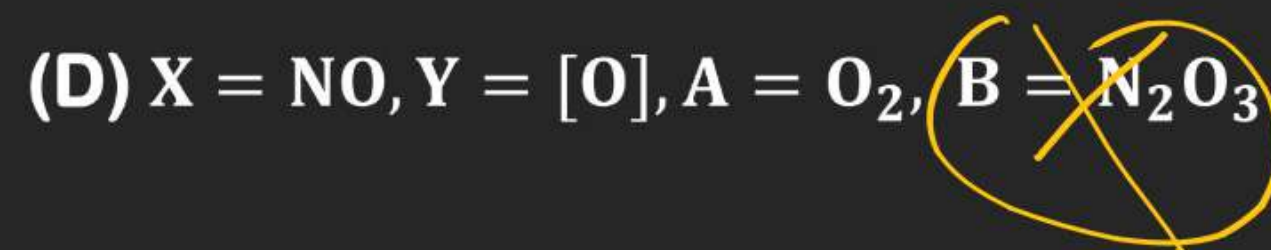
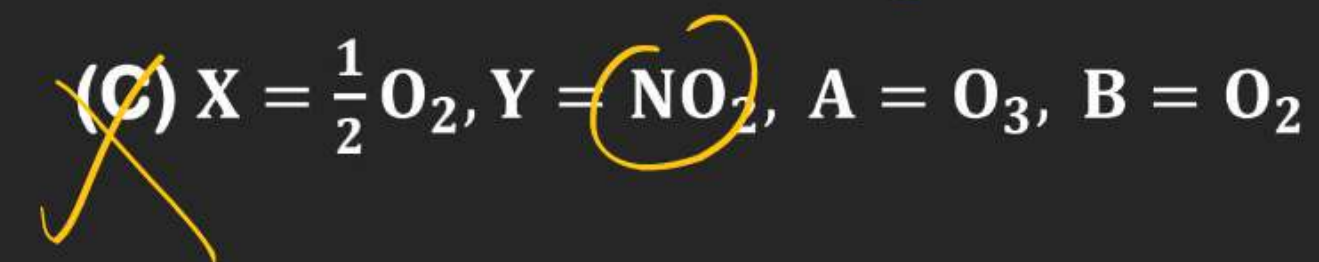
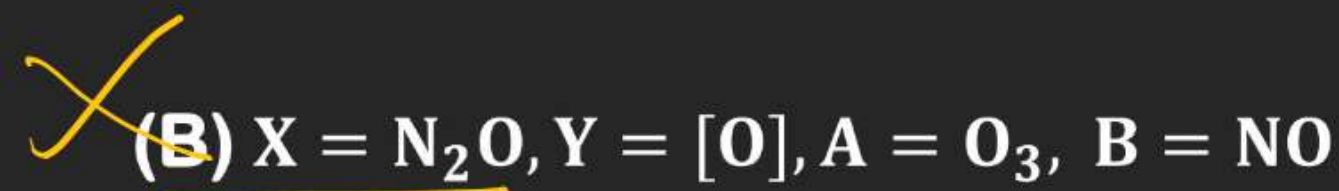
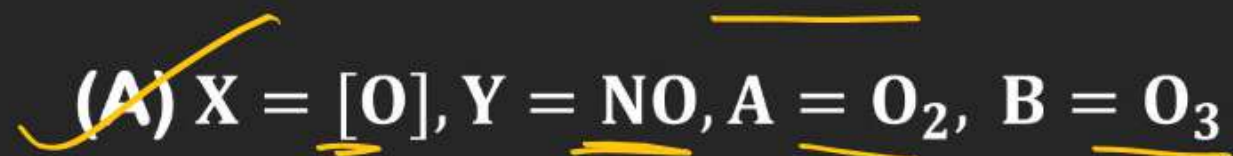
$SO_2Cl_2$  = Sulphuric chloride



## P-BLOCK

17. Some reactions of  $\text{NO}_2$  relevant to photochemical smog formation are

Identify A, B, X and



**P-BLOCK**

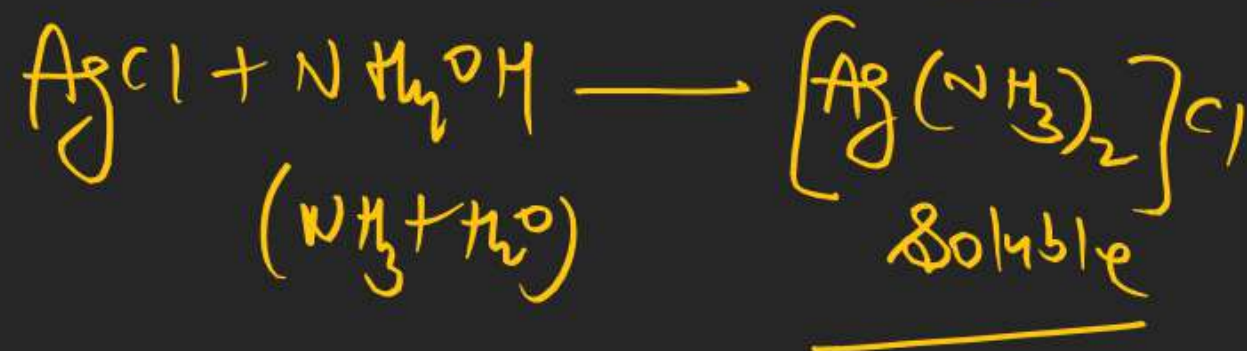
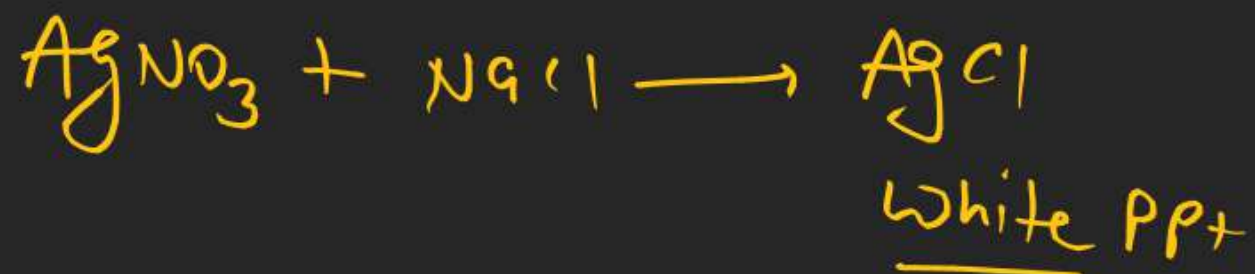
18. A chloride salt solution acidified with dil.  $\text{HNO}_3$  gives a curdy white precipitate, [A], on addition of  $\text{AgNO}_3$ . [A] on treatment with  $\text{NH}_4\text{OH}$  gives a clear solution, B.

(A)  $\text{H}[\text{AgCl}_2] \& [\text{Ag}(\text{NH}_3)_2]\text{Cl}$

(B)  $\text{H}[\text{AgCl}_2] \& (\text{NH}_4)[\text{Ag}(\text{OH})_2]$

✓ (C)  $\text{AgCl} \& [\text{Ag}(\text{NH}_3)_2]\text{Cl}$

(D)  $\text{AgCl} \& (\text{NH}_4)[\text{Ag}(\text{OH})_2]$



**P-BLOCK**

- 19.**
- a. Ammonium salts produce haze in atmosphere.**
  - b. Ozone gets produced when atmospheric oxygen reacts with chlorine radicals.**
  - c. Polychlorinated biphenyls act as cleansing solvents.**
  - d. 'Blue baby' syndrome occurs due to the presence of excess of sulphate ions in water.**

**Choose the correct answer from the options given below :-**

**(A) A, B and C only**

**(B) B and C only**

**(C) A and D only**

**(D) A and C only**

## P-BLOCK

20. "A" obtained by Ostwald's method involving air oxidation of  $\text{NH}_3$ , upon further air oxidation produces "B". "B" on hydration forms an oxoacid of Nitrogen along with evolution of "A". The oxoacid also produces "A" and gives positive brown ring test

(A)  $\text{NO}_2$ ,  $\text{N}_2\text{O}_5$

(B)  $\text{NO}_2$ ,  $\text{N}_2\text{O}_4$

☒ (C)  $\text{NO}$ ,  $\text{NO}_2$

(D)  $\text{N}_2\text{O}_3$ ,  $\text{NO}_2$

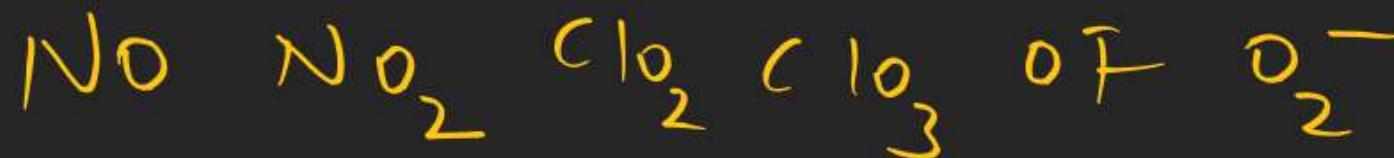


# P-BLOCK

21. The number of molecules or ions from the following, which do not have odd number of electrons are



(3)



# P-BLOCK

22. Total number of acidic oxides among  $\cancel{\text{N}_2\text{O}_3}$ ,  $\cancel{\text{NO}_2}$ ,  $\text{N}_2\text{O}$ ,  $\cancel{\text{Cl}_2\text{O}_7}$ ,  $\cancel{\text{SO}_2}$ ,  $\text{CO}$ ,  $\text{CaO}$ ,  $\text{Na}_2\text{O}$  and  $\text{NO}$  is

(4)

$\text{NO}$   $\text{N}_2\text{O}$   $\text{CO}$   $\text{H}_2\text{O}$   
neutral

S-block oxides are

Basic except  $\text{BeO}$

Amphoteric

**P-BLOCK**

23. Bond dissociation energy of E-H bond of the " $H_2E$ " hydrides of group 16 elements (given below), follows order.

(a) O

(b) S

(c) Se

(d) Te

~~(A)  $A > B > C > D$~~ (B)  $A > B > D > C$ (C)  $B > A > C > D$ (D)  $D > C > B > A$ 

→  
size ↑ Bond strength weak

24. Identify X, Y and Z in the following reaction. (Equation not balanced)



(A)  $\text{X} = \text{ClONO}_2$ ,  $\text{Y} = \text{HOCl}$ ,  $\text{Z} = \text{NO}_2$

(B)  $\text{X} = \text{ClNO}_2$ ,  $\text{Y} = \text{HCl}$ ,  $\text{Z} = \text{HNO}_3$

(C)  $\text{X} = \text{ClONO}_2$ ,  $\text{Y} = \text{HOCl}$ ,  $\text{Z} = \text{HNO}_3$

(D)  $\text{X} = \text{ClNO}_3$ ,  $\text{Y} = \text{Cl}_2$ ,  $\text{Z} = \text{NO}_2$

**P-BLOCK**

25. The oxidation state of phosphorus in hypophosphoric acid is +



(4)



$$4 + 2x + 6(-2) = 0$$

$$x = \underline{+4}$$

**P-BLOCK**

26. Given below are two statements:

Statement I: Chlorine can easily combine with oxygen to form oxides: and the product has a tendency to explode.



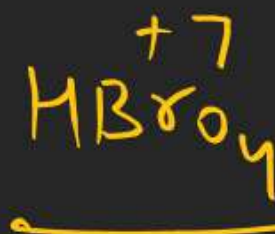
Statement II: Chemical reactivity of an element can be determined by its reaction with oxygen and halogens.

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

- (A) Both the statements I and II are true
- (B) Statement I is true but Statement II is false
- (C) Statement I is false but Statement II is true
- (D) Both the Statements I and II are false

**P-BLOCK**

27. Sum of oxidation states of bromine in bromic acid and perbromic acid is



$$\underline{7 + 5 = 12}$$

2022

1.

Given below are the oxides:

 $\text{Na}_2\text{O}$ ,  $\text{As}_2\text{O}_3$ ,  $\text{N}_2\text{O}$ ,  $\text{NO}$  and  $\text{Cl}_2\text{O}_7$ 

Number of amphoteric oxides is:

(A) 0

(B) 1

(C) 2

(D) 3

*Basic**Amphoteric**acidic**neutral*

## P-BLOCK

2. Identify the correct statement for  $B_2H_6$  from those given below.

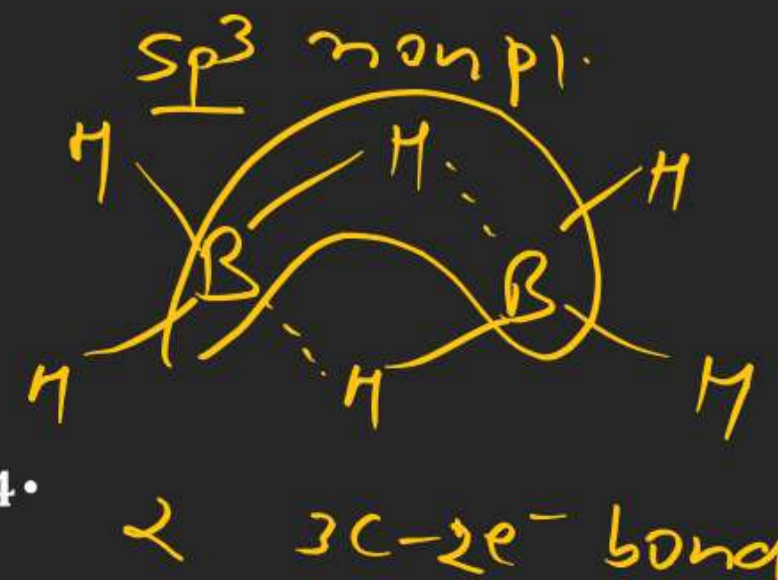
~~(a)~~ In  $B_2H_6$ , all B-H bonds are equivalent.

~~(b)~~ In  $B_2H_6$  there are four 3-centre-2-electron bonds.

~~(c)~~  $B_2H_6$  is a Lewis acid.

~~(d)~~  $B_2H_6$  can be synthesized from both  $BF_3$  and  $NaBH_4$ .

~~(e)~~  $B_2H_6$  is a planar molecule.



Choose the most appropriate answer from the options given below :

(A) (A) and (E) only

(B) (B), (C) and (E) only

~~(C)~~ (C) and (D) only

(D) (C) and (E) only

**P-BLOCK**

**3. Which one of the following elemental forms is not present in the enamel of the teeth?**

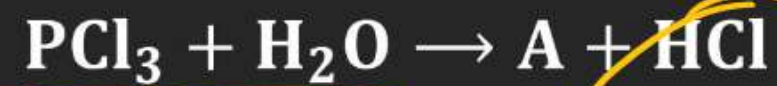


**P-BLOCK**

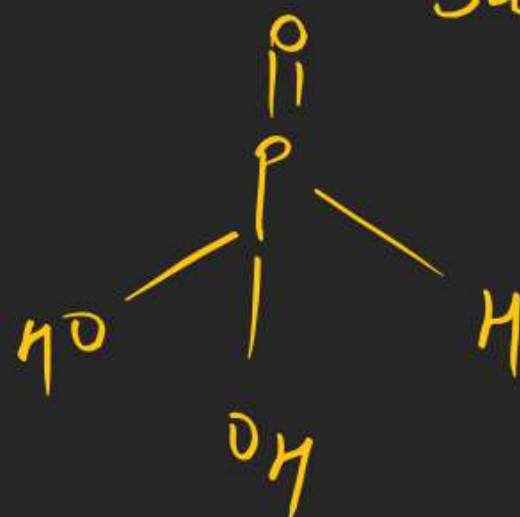
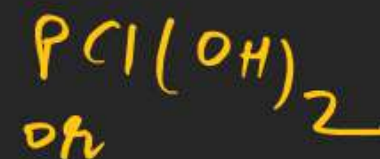
4.  $\text{PCl}_5$  is well known. but  $\text{NCl}_5$  is not. Because.
- (A) nitrogen is less reactive than phosphorous.
  - ☒ (B) nitrogen doesn't have d-orbitals in its valence shell.
  - (C) catenation tendency is weaker in nitrogen than phosphorous.
  - (D) size of phosphorous is larger than nitrogen.

# P-BLOCK

5. Consider the following reactions :



number of ionizable protons present in the product B



basicity = 2

## P-BLOCK

6.

Consider the following reaction :



The dihedral angle in product A in its solid phase at 110 K is :

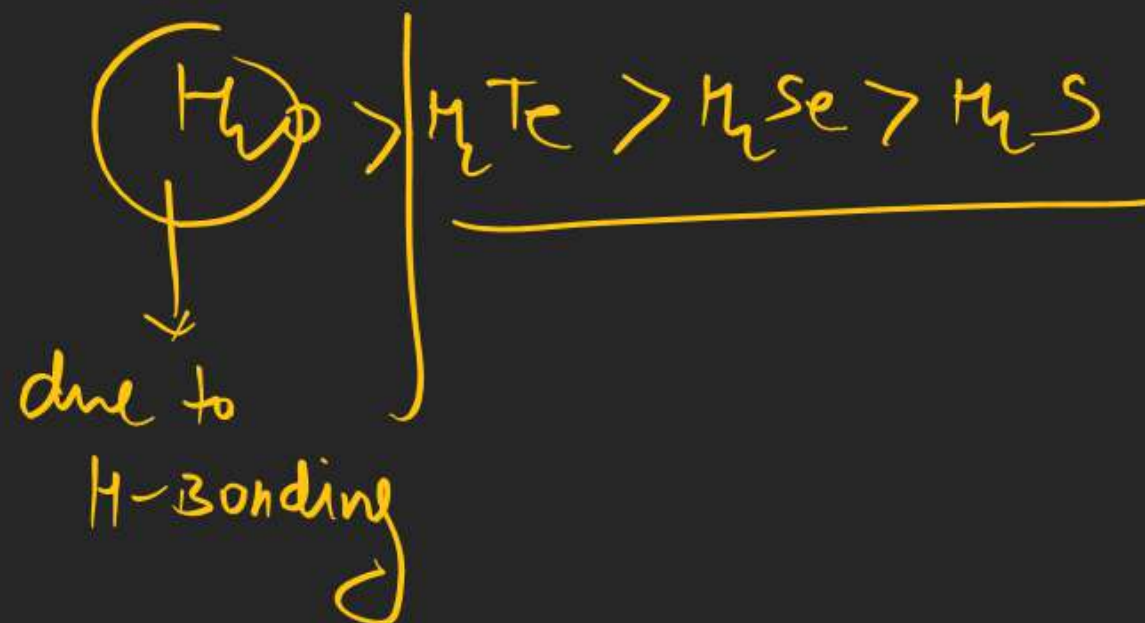
(A)  $104^\circ$ (B)  $111.5^\circ$ ☒ (C)  $90.2^\circ$ (D)  $111.0^\circ$ 

Hydrogen and it's compound

$\text{H}_2\text{O}_2$

**P-BLOCK**

7. The correct order of melting points of hydrides of group 16 elements is :



8. Consider the following reaction :



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)  $H_3PO_3$