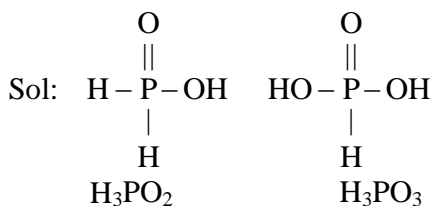


## 10. GROUP 15 ELEMENTS (V A GROUP ELEMENTS)

### PREVIOUS EAMCET BITS

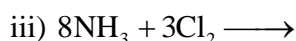
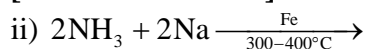
1. Which pair of oxyacids of phosphorous contain P – H bonds [EAMCET 2009 E]  
 1)  $\text{H}_3\text{PO}_4, \text{H}_3\text{PO}_3$     2)  $\text{H}_3\text{PO}_3, \text{H}_4\text{P}_2\text{O}_7$     3)  $\text{H}_3\text{PO}_3, \text{H}_3\text{PO}_2$     4)  $\text{H}_3\text{PO}_2, \text{HPO}_3$

Ans: 3



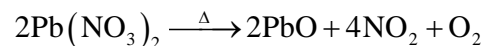
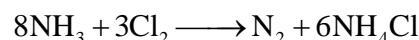
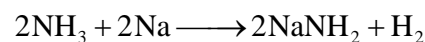
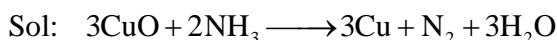
2. Which of the following reactions yields elementary gases like  $\text{N}_2, \text{H}_2, \text{O}_2$ , as the by products

[EAMCET 2009 M]



- 1) i and ii only    2) ii, iii and iv only    3) i, ii and iii only    4) all of these

Ans: 4



3. The correct order of reducing abilities of hydrides of V group elements is [EAMCET 2008 E]

- 1)  $\text{NH}_3 < \text{PH}_3 < \text{AsH}_3 < \text{SbH}_3 < \text{BiH}_3$     2)  $\text{NH}_3 > \text{PH}_3 > \text{AsH}_3 > \text{SbH}_3 > \text{BiH}_3$   
 3)  $\text{NH}_3 < \text{PH}_3 > \text{AsH}_3 > \text{SbH}_3 > \text{BiH}_3$     4)  $\text{SbH}_3 > \text{BiH}_3 > \text{AsH}_3 > \text{NH}_3 > \text{PH}_3$

Ans: 2

Sol: Reducing ability of hydrides of VA group elements increases from  $\text{NH}_3$  to  $\text{BiH}_3$

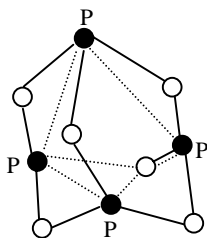
4. The number of P – O bonds and lone pairs of electron present in  $\text{P}_4\text{O}_6$  molecule respectively

[EAMCET 2008 M]

- 1) 12, 16    2) 12, 12    3) 8, 8    4) 12, 4

Ans: 1

Sol:



Number of P – O bonds = 12

Number of pair of electron = 16

5. The following are some statements related to VA group hydrides [EAMCET 2007 E]

- I) reducing property increases from  $\text{NH}_3$  to  $\text{BiH}_3$   
 II) Tendency to donate lone pair decreases from  $\text{NH}_3$  to  $\text{BiH}_3$   
 III) Bases of replacing H with Cl decreases from  $\text{NH}_3$  to  $\text{BiH}_3$   
 IV) Base of formation of hydrides decreases from  $\text{NH}_3$  to  $\text{BiH}_3$

The correct statements are of

- 1) I, II, III and IV    2) I, III and IV    3) I, II and IV    4) I and IV

Ans: 1

Sol: All statements I, II, III, IV are correct

6. Which is in the decreasing order of boiling points of V group hydrides [EAMCET 2007 M]

- 1)  $\text{NH}_3 > \text{PH}_3 > \text{AsH}_3 > \text{SbH}_3$                       2)  $\text{SbH}_3 > \text{AsH}_3 > \text{PH}_3 > \text{NH}_3$   
 3)  $\text{PH}_3 > \text{NH}_3 > \text{AsH}_3 > \text{SbH}_3$                       4)  $\text{SbH}_3 > \text{NH}_3 > \text{AsH}_3 > \text{PH}_3$

Ans: 4

Sol: Decreasing order of boiling point  $\text{SbH}_3 > \text{NH}_3 > \text{AsH}_3 > \text{PH}_3$

7. Hydrolysis of  $\text{NCl}_3$  gives  $\text{NH}_3$  and X. Which of the following is X [EAMCET 2006 E]

- 1)  $\text{HClO}_4$                       2)  $\text{HClO}_3$                       3)  $\text{HOCl}$                       4)  $\text{HClO}_2$

Ans: 3

Sol:  $\text{NCl}_3 + 3\text{H}_2\text{O} \longrightarrow \text{NH}_3 + 3\text{HOCl}$

8. What is the order of basic nature of hydride of group V elements [EAMCET 2006 M]

- 1)  $\text{AsH}_3 > \text{SbH}_3 > \text{PH}_3 > \text{NH}_3$                       2)  $\text{NH}_3 > \text{SbH}_3 > \text{PH}_3 > \text{AsH}_3$   
 3)  $\text{NH}_3 > \text{PH}_3 > \text{AsH}_3 > \text{SbH}_3$                       4)  $\text{PH}_3 > \text{NH}_3 > \text{SbH}_3 > \text{AsH}_3$

Ans: 3

Sol: Basic nature order  $\text{NH}_3 > \text{PH}_3 > \text{AsH}_3 > \text{SbH}_3$

9. Which of the following is not correct [EAMCET 2005]

- 1) Ammonia is used as refrigerant  
 2) A mixture of  $\text{Ca}(\text{CN})_2$  and C is known as nitrolium  
 3) A mixture of  $\text{Ca}(\text{H}_2\text{PO}_4)_2$  and  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$  is known as super phosphate of lime  
 4) Hydrolysis of  $\text{NCl}_3$  gives  $\text{NH}_3$  and  $\text{HOCl}$

Ans: 2

Sol: Nitrolium is a mixture of calcium cyanamide and graphite ( $\text{CaCN}_2 + \text{C}$ )

10. Which of the following is not correct [EAMCET 2005]

- 1) Hydrolysis of  $\text{NCl}_3$  gives  $\text{NH}_3$  and  $\text{HOCl}$   
 2)  $\text{NH}_3$  is less stable than  $\text{PH}_3$   
 3)  $\text{NH}_3$  is weak reducing agent compared to  $\text{PH}_3$   
 4) Nitric Oxide in solid state exhibits paramagnetic property.

Ans: 2

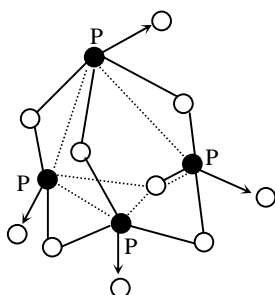
Sol: Order of stability is  $\text{NH}_3 > \text{PH}_3 > \text{AsH}_3$

11. The number of oxygen atoms bounded to each phosphorous atom in  $\text{P}_4\text{O}_{10}$  is [EAMCET 2004]

- 1) 3                      2) 4                      3) 5                      4) 6

Ans: 2

Sol:



In  $\text{P}_4\text{O}_{10}$  four oxygen atoms are attached to each phosphorous atom.

12. The number of oxygen atoms bounded to one phosphorous atom in  $\text{P}_4\text{O}_6$  is [EAMCET 2004 E]

- 1) 4                      2) 3                      3) 6                      4) 5

Ans: 2

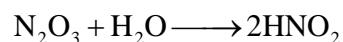
Sol: In  $P_4O_6$  three oxygen atom are attached to each phosphorous atom.

13. Two oxides of Nitrogen, NO and  $NO_2$  react together at  $253^\circ$  K and form a compound Nitrogen X. X reacts with water to yield another compound of Nitrogen Y. The shape of the anion of Y molecule is  
[EAMCET 2003 E]

- 1) Tetrahedral      2) Triangular planar      3) Square planar      4) Pyramidal

Ans: 2

Sol:  $NO + NO_2 \longrightarrow N_2O_3$



shape of  $NO_2^-$  ion is triangular planar

14. The atomicity of phosphorus is X and the ppp bond angle in molecule is Y. What are X and Y.

[EAMCET 2003 M]

- 1) X = 4    Y =  $90^\circ$                                       2) X = 4    Y =  $60^\circ$   
3) X = 3    Y =  $120^\circ$                                     4) X = 2    Y =  $180^\circ$

Ans: 2

Sol: Atomicity of phosphorous is 4( $P_4$ ) bond angle is  $60^\circ$ .

15. The bond energies (in KJ mole<sup>-1</sup>) of P – H, AS – H and N – H are respectively [EAMCET 2002E]

- 1) 247, 138 and 389                                      2) 247, 389 and 318  
3) 318, 389 and 247                                    4) 318, 247 and 389

Ans: 4

Sol: Order of stability is  $NH_3 > PH_3 > AsH_3$

order of bond energy is  $N - H > P - H > As - H$

389 318 247

16. Which one of the following elements does not form the compound,  $M_4O_{10}$  (M = element)?

[EAMCET 2002M]

- 1) P                                      2) Sb                                      3) As                                      4) Bi

Ans: 4

Sol: Except N and Bi all other elements of V group forms  $M_4O_{10}$  type oxides.

17. Ionic radius (in A°) of  $As^{3+}$ ,  $Sb^{3+}$  and  $Bi^{3+}$  follow the order ...

[EAMCET 2001E]

- 1)  $As^{3+} > Sb^{3+} > Bi^{3+}$     2)  $Sb^{3+} > Bi^{3+} > As^{3+}$     3)  $Bi^{3+} > As^{3+} > Sb^{3+}$     4)  $Bi^{3+} > Sb^{3+} > As^{3+}$

Ans: 4

Sol: Ionic radii top of bottom is V group increases  $Bi^{3+} > Sb^{3+} > As^{3+}$

18. Aqueous sodium hydroxide reacts with white phosphorous to form phosphine and [EAMCET 2001M]

- 1)  $NaH_2PO_2$                       2)  $P_2O_5$                                       3)  $NaPO_3$                                       4)  $P_2O_3$

Ans: 1

Sol:  $3NaOH + 4P + 3H_2O \longrightarrow 3NaH_2PO_2 + PH_3$

Sodium hypo phosphite

19. What is the molecular formula of white phosphorous ?

[EAMCET 2000E]

- 1)  $P_2$                                       2)  $P_4$                                       3)  $P_5$                                       4)  $P_6$

Ans: 2

Sol: Molecular formula white phosphorous is  $P_4$