

- Which of the following is a tetrabasic acid  
(a) Orthophosphorus acid (b) Orthophosphoric acid  
(c) Metaphosphoric acid (d) Pyrophosphoric acid
- Chemical formula for the phosphorus molecule is  
(a)  $P$  (b)  $P_4$   
(c)  $P_2$  (d)  $P_5$
- The  $P-P-P$  bond angle in white phosphorus is  
(a)  $120^\circ$  (b)  $109^\circ 28'$   
(c)  $90^\circ$  (d)  $60^\circ$
- Dehydrated phosphorus trichloride in water gives  
(a)  $HPO_3$  (b)  $H_3PO_4$   
(c)  $H_3PO_2$  (d)  $H_3PO_3$
- Which oxide of nitrogen is coloured gas  
(a)  $N_2O$  (b)  $NO$   
(c)  $N_2O_5$  (d)  $NO_2$
- V-A group precipitate was dissolved in  $HNO_3$  and treated with excess of  $NH_4OH$ . It gives a white ppt. because of  
(a)  $Cu(OH)_2$  (b)  $Cd(OH)_2$   
(c)  $Bi(OH)_3$  (d)  $Hg(OH)_2$
- Which of the following elements of group VA does not show allotropy  
(a)  $N$  (b)  $Bi$   
(c)  $P$  (d)  $As$
- Which has the lowest boiling point  
(a)  $NH_3$  (b)  $PH_3$   
(c)  $AsH_3$  (d)  $SbH_3$
- Of the following, the most acidic is  
(a)  $As_2O_3$  (b)  $P_2O_3$   
(c)  $Sb_2O_3$  (d)  $Bi_2O_3$
- Which of the following oxides of nitrogen is the anhydride of nitrous acid  
(a)  $NO$  (b)  $N_2O_3$   
(c)  $N_2O_4$  (d)  $N_2O_5$
- On strongly heating  $Pb(NO_3)_2$  crystals, the gas formed is  
(a)  $NO_2$  (b)  $O_2$   
(c)  $NO_2 + O_2$  (d)  $NO$
- Nitrogen dioxide is released by heating

- (a)  $Pb(NO_3)_2$                       (b)  $KNO_3$   
(c)  $NaNO_2$                         (d)  $NaNO_3$

13. Which of the following oxides of nitrogen is neutral

- (a)  $N_2O_5$                             (b)  $N_2O_3$   
(c)  $N_2O_4$                             (d)  $N_2O$

14. Nitrogen is essential constituent of all

- (a) Proteins                            (b) Fats  
(c) Proteins and fats                (d) None of these

15. A hydride of nitrogen which is acidic is

- (a)  $NH_3$                                 (b)  $N_2H_4$   
(c)  $N_2H_2$                             (d)  $N_3H$

16. With reference to protonic acids, which of the following statements is correct

- (a)  $PH_3$  is more basic than  $NH_3$   
(b)  $PH_3$  is less basic than  $NH_3$   
(c)  $PH_3$  is equally basic as  $NH_3$   
(d)  $PH_3$  is amphoteric while  $NH_3$  is basic

17.  $P_2O_5$  is heated with water to give

- (a) Hypophosphorus acid (b) Orthophosphorus acid  
(c) Hypophosphoric acid (d) Orthophosphoric acid

18. Nitrogen is obtained when  $NaNO_2$  reacts with

- (a)  $NH_4Cl$                             (b)  $NH_4NO_3$   
(c)  $(NH_4)_2CO_3$                     (d)  $NH_4OH$

19. The reaction, which forms nitric oxide, is

- (a)  $C$  and  $N_2O$                     (b)  $Cu$  and  $N_2O$   
(c)  $Na$  and  $NH_3$                     (d)  $Cu$  and  $HNO_3$

20. Ammonia is dried over

- (a) Quick lime                        (b) Slaked lime  
(c) Anhy.  $CaCl_2$                     (d) None of these

21. Repeated use of which of the following fertilizers would increase the acidity of the soil

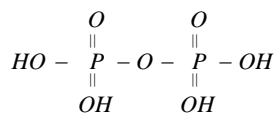
- (a) Urea                                    (b) Potassium nitrate  
(c) Ammonium sulphate (d) Superphosphate of lime

22. In compounds of type  $ECl_3$ , where  $E = B, P, As$  or  $Bi$ , the angles  $Cl - E - Cl$  for different  $E$  are in the order

- (a)  $B > P = As = Bi$                 (b)  $B > P > As > Bi$   
(c)  $B < P = As = Bi$                 (d)  $B < P < As < Bi$

23. Orthophosphoric acid represents the molaysis condition due to  
(a) Hydrogen bonding  
(b) Phosphorous group  
(c) Maximum oxygen group  
(d) Tribasicity
24. An element ( $X$ ) forms compounds of the formula  $XCl_3$ ,  $X_2O_5$  and  $Ca_3X_2$ , but does not form  $XCl_5$ , which of the following is the element  $X$   
(a)  $B$  (b)  $Al$   
(c)  $N$  (d)  $P$
25. Which of the following oxy acids of phosphorus is a reducing agent and monobasic  
(a)  $H_3PO_2$  (b)  $H_3PO_3$   
(c)  $H_3PO_4$  (d)  $H_4P_2O_6$
26. Which element exist as a solid at  $25^\circ C$  and 1 atmospheric pressure among the following  
(a)  $Br$  (b)  $Cl$   
(c)  $Hg$  (d)  $P$
27. The number of hydrogen atom (s) attached to phosphorus atom in hypophosphorous acid is  
(a) Zero (b) Two  
(c) One (d) Three
28.  $(NH_4)_2Cr_2O_7$  on heating liberates a gas. The same gas will be obtained by  
(a) Heating  $NH_4NO_2$   
(b) Heating  $NH_4NO_3$   
(c) Treating  $H_2O_2$  with  $NaNO_2$   
(d) Treating  $Mg_3N_2$  with  $H_2O$
29. Which of the following compound show sublimation  
(a)  $NH_4Cl$  (b)  $CaCO_3$   
(c)  $BaSO_4$  (d)  $CaHPO_3$
30. When plants and animals decay, the organic nitrogen is converted into inorganic nitrogen. The inorganic nitrogen is in the form of  
(a) Ammonia (b) Elements of nitrogen  
(c) Nitrates (d) Nitrides

1. (d)
- $H_4P_2O_7$
- pyrophosphoric acid



Tetrabasic (4 - OH groups)

2. (b)

3. (D)

4. (d)
- $3H_2O + PCl_3 \rightarrow H_3PO_3 + 3HCl$

5. (d)
- $NO_2$
- brown coloured gas.

6. (c) When the black ppt. of
- $Bi_2S_3$
- is dissolved in 50%
- $HNO_3$
- and a solution of
- $NH_4OH$
- is added. A white ppt. of
- $Bi(OH)_3$
- is obtained.

7. (b) Bismuth does not show allotropy other elements show allotropy.

Nitrogen  $\rightarrow$   $\alpha$ -nitrogen and  $\beta$ -nitrogen (solid crystalline forms)Phosphorus  $\rightarrow$  White, Red and Black formsArsenic  $\rightarrow$  Yellow and Grey formsAntimony  $\rightarrow$  Yellow and Grey forms

8. (b) Hydride
- $NH_3$
- $PH_3$
- $AsH_3$
- $SbH_3$
- $BiH_3$
- 
- Boiling point 238.5 185.5 210.6 254.6 290

9. (b)
- $N_2O_3$
- $P_2O_3$
- $As_2O_3$
- $Sb_2O_3$
- $Bi_2O_3$
- 
- Acidic Oxides Amphoteric Basic
- 
- Acidic character decreases down the group
- $\rightarrow$

10. (b)
- $2HNO_2 \rightarrow H_2O + N_2O_3$

11. (c)
- $2Pb(NO_3)_2 \rightarrow 2PbO + 4NO_2 + O_2$

12. (a)
- $2Pb(NO_3)_2 \rightarrow 2PbO + 4NO_2 + O_2$

13. (D)

14. (A)

15. (d)
- $N_3H \rightleftharpoons N_3^- + H^+$
- 
- Hydrazoic acid

16. (b)
- $PH_3$
- is less basic because lone pair is not easily available for donation.

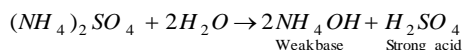
17. (d)
- $P_2O_5 + 3H_2O \rightarrow 2H_3PO_4$
- orthophosphoric acid.

18. (a)
- $NH_4Cl + NaNO_2 \xrightarrow{\Delta} NH_4NO_2$
- 
- $NH_4NO_2 \longrightarrow N_2 + 2H_2O$

19. (d) Copper react with conc. nitric acid to form a nitric oxide.

20. (A)

21. (c)  $(NH_4)_2SO_4$  is a salt of weak base & strong acid



22. (b)  $B > P > As > Bi$

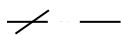
As we go down the group bond angle decreases because repulsion between bonded pairs of electron decreases.

23. (b)

24. (c)  $N_2$  can form  $NCl_3$ ,  $N_2O_5$  and  $Ca_3N_2$  but does not form  $NCl_5$ .

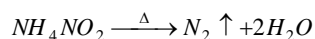
25. (a) Hypophosphorus acid ( $H_3PO_2$ ) is a monobasic acid which act as reducing agent. In this molecule two  $P-H$  bonds are responsible for its reducing character and one  $O-H$  bond is responsible for its monobasic acid character.

26. (d) Phosphorus exist as solid at  $27^\circ C$  and 1 atmospheric pressure (m.p. of white phosphorus =  $44^\circ C$ )



27. (b) Hypophosphorous acid is  $H_3PO_2$ .

28. (a)  $(NH_4)_2Cr_2O_7 \xrightarrow{\Delta} N_2 \uparrow + Cr_2O_3 + 4H_2O$



29. (a) When a solid compound on heating change into gaseous state without changing into liquid state, the phenomenon is known as sublimation. e.g.,  $I_2$ ,  $NH_4Cl$  and camphor.

30. (a) The inorganic nitrogen exists in the form of ammonia, which may be lost as gas to the atmosphere, may be acted upon by nitrifying bacteria, or may be taken up directly by plants.