

SRIGAYATRI EDUCATIONAL INSTITUTIONS

INDIA

15th GROUP

- When zinc reacts with very dilute HNO_3 , the oxidation state of nitrogen changes from
 - 1) +5 to +1
 - 2) +5 to -3
 - 3) +5 to +4
 - 4) +5 to +3
- The product formed by complete hydrolysis of PCl_3 are
 - 1) H_3PO_3 and HCl
 - 2) POCl_3 and HCl
 - 3) H_3PO_4 and HCl
 - 4) $\text{H}_4\text{P}_2\text{O}_7$ and HCl
- Heating of ammonium dichromate produces
 - 1) NH_3 , Cr_2O_3 and H_2O
 - 2) N_2 , Cr_2O_3 and H_2O
 - 3) NO , Cr_2O_3 and H_2O
 - 4) N_2O , Cr_2O_3 and H_2O
- In which process does the nitrogen undergo oxidation.
 - 1) $\text{N}_2 \rightarrow 2\text{NH}_3$
 - 2) $\text{N}_2\text{O}_4 \rightarrow 2\text{NO}_2$
 - 3) $\text{NO}_3^- \rightarrow \text{N}_2\text{O}_5$
 - 4) $\text{NO}_2^- \rightarrow \text{NO}_3^-$
- N_2 gas is liberated by thermal decomposition of
 - 1) NH_4NO_2
 - 2) NaN_3
 - 3) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$
 - 4) All
- Two oxides of nitrogen, NO and NO_2 are allowed to react together at 243°K and form a coloured compound of nitrogen (X). When compound (X) react with water to yield another compound of nitrogen (Y). The shape of the anion of (Y) molecule is
 - 1) Angular (planar)
 - 2) Triangular pyramidal
 - 3) Tetrahedral
 - 4) Square planar
- Consider the following sequence of reaction
$$\text{Na} + \text{NH}_3(\text{g}) \rightarrow [\text{X}] \xrightarrow{\text{N}_2\text{O}} [\text{Y}] \xrightarrow[\text{Gas Pure}]{\text{heat}} [\text{Z}]$$
Identify gas [Z]:
 - 1) N_2
 - 2) NH_3
 - 3) O_2
 - 4) H_2
- Which of the following on heating produces NO_2 gas?
 - 1) NaNO_3
 - 2) AgNO_3
 - 3) NH_4NO_3
 - 4) NH_4NO_2
- $\text{A} + \text{H}_2\text{O} \rightarrow \text{B} + \text{HCl}$; $\text{B} + \text{H}_2\text{O} \rightarrow \text{C} + \text{HCl}$
Compound A, B and C respectively
 - 1) PCl_5 , POCl_3 , H_3PO_3
 - 2) PCl_5 , POCl_3 , H_3PO_4
 - 3) SOCl_2 , POCl_3 , H_3PO_3
 - 4) PCl_3 , POCl_3 , H_3PO_4

10. Which of the following statements are correct about the reaction between the copper metal and dilute HNO_3 ?
- I) The principal reducing product is NO gas
 II) Cu metal oxidized to $Cu_{(aq)}^{+2}$ ion which is blue in colour
 III) NO is paramagnetic and has one unpaired electron in antibonding molecular orbital
 IV) NO reacts with O_2 to produce NO_2 which is linear in shape
- 1) I, II, III 2) I, III 3) II, IV 4) all the above
11. $NH_3 + O_2 \xrightarrow[\Delta]{Pt} A + H_2O$
 $A + O_2 \rightarrow B$
 $B + O_2 + H_2O \rightarrow C$
- A, B and C are
- 1) N_2O, NO_2 and HNO_3 2) NO, NO_2 and NO_3
 3) NO_2, NO and HNO_3 4) N_2O, NO and HNO_3
12. Amongst the following compounds.
- I) $H_5P_3O_{10}$ II) $H_6P_4O_{13}$ III) $H_5P_5O_{15}$ IV) $H_7P_5O_{16}$
- Non-cyclic phosphates are
- 1) I, III 2) I, II, III 3) I, II, IV 4) I, II, III, IV
13. Which is correct sequence of the following properties? For the correct order mark (T) and for the incorrect order mark (F).
- i) Melting point: $NH_3 > SbH_3 > AsH_3 > PH_3$
 ii) Boiling point: $NH_3 > SbH_3 > AsH_3 > PH_3$
 iii) Dipole moment order: $NH_3 > SbH_3 > AsH_3 > PH_3$
- 1) TFT 2) FTF 3) FTT 4) TTF
14. Among the following compounds, which on heating do not produce N_2 ?
- 1) $(NH_4)_2Cr_2O_7$ 2) $NH_4Cl + NaNO_2$ 3) $NH_4Cl + CaO$ 4) $Ba(N_3)_2$
15. Incorrect statement about PH_3 is
- 1) It is produced by hydrolysis of Ca_3P_2 2) It gives black ppt (Cu_3P_2) with $CuSO_4$ solution
 3) Spontaneously burns in presence of P_2H_4 4) It does not react with B_2H_6

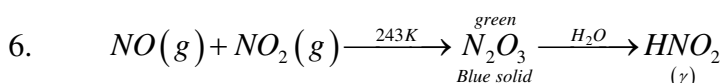
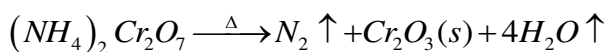
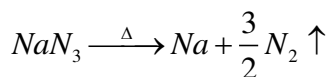
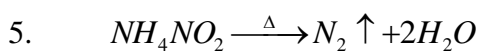
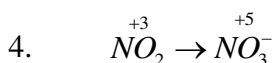
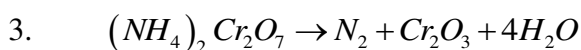
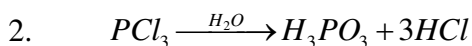
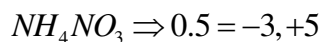
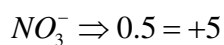
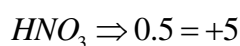
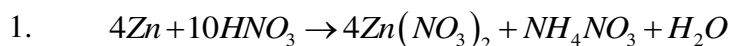
Numericals

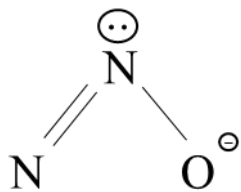
16. Calculate $x+y+z$ for H_3PO_4 acid, where x is number of lone pairs, y is number of σ -bonds and z is number of π -bonds.
17. In phosphorus acid, if x is number of non-bonding electron pairs, y is number of σ -bonds and z is number of π -bonds. Then calculate the value of " $y \times z - x$ ".
18. How many moles of NaOH are required to react with one mole of solid N_2O_5 ?
19. Atomicity of white (g) yellow phosphorous is 4 and it is represented as P_4 molecule.
- * x is total number of vertex angles in P_4
- * y is total number of lone pairs in P_4 molecule
- * z is total number of p-p bonds in P_4 molecule
- Calculate the value of expression $\frac{x.y}{z}$.
20. The difference in the oxidation numbers of the two types of Sulphur atoms in $Na_2S_4O_6$ is

KEY SHEET

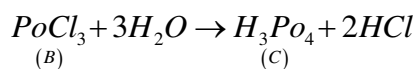
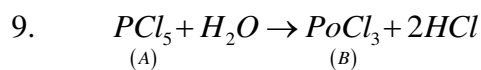
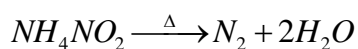
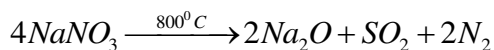
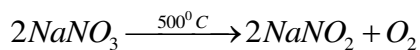
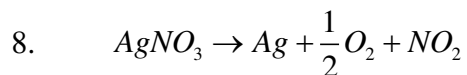
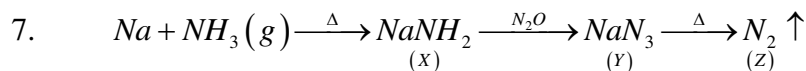
1) 2	2) 1	3) 2	4) 4	5) 4	6) 1	7) 1	8) 2	9) 2	10) 1
11) 2	12) 3	13) 1	14) 3	15) 4	16) 16	17) 0	18) 2	19) 8	20) 5

SOLUTIONS





Anion of HNO_2 is NO_2^- sp^2 angular

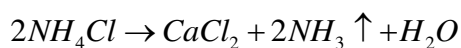
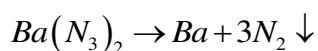
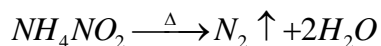


10. Conceptual

11. Conceptual

12. Conceptual

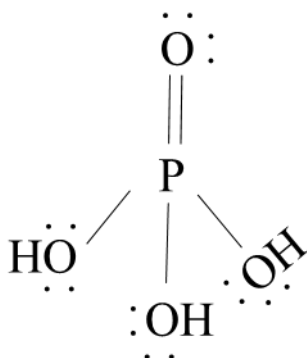
13. Conceptual



15. Lewis base react with Lewis acid



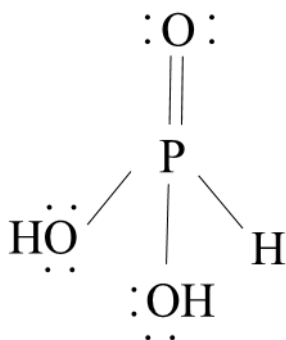
16.



$$x = 8; y = 7; z = 1$$

$$x+y+z=16$$

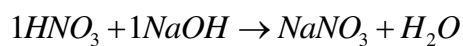
17. Phosphorous acid H_3PO_3



$$x = 6; y = 6; z = 1$$

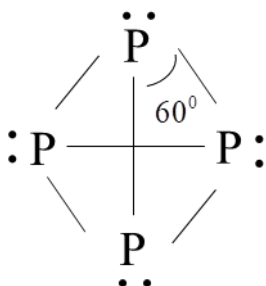
$$y \times z - x = 6 \times 1 - 6$$

18. $2HNO_3 \rightarrow H_2N_2O_6 \xrightarrow{-H_2O} N_2O_5$



$2HNO_3$ reacts with $2NaOH$

19.



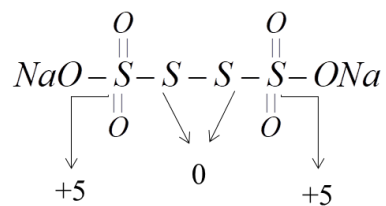
Vertex angle \Rightarrow bond angle

$$x = 12; y = 4; z = 6$$

$$\frac{x \cdot y}{z} = \frac{12 \times 4}{6}$$

$$= 8$$

20.



Difference b/w +5 and 0=5