

Exercise X – Answers

1) Draw the geometry of the following molecules: PCl_3 **pyramidal**, N_2O **linear**, NO_2 **bent**

2) What type of reaction is the conversion of H_3PO_4 to $\text{H}_4\text{P}_2\text{O}_7$:
neutralization, hydrolysis, **condensation** or reduction ?

3) Which of the following compounds is not a radical: NO_2 , NO , **FNO**, or NF_2

4) Why is the bond distance in the peroxide ion longer than in O_2 ?
 O_2^{2-} has a bond order of only 1 (the two extra electrons go into antibonding orbitals)

5) Which statement is incorrect?

H_2O_2 is kinetically stable with respect to decomposition to H_2O and O_2

H_2O_2 is thermodynamically stable with respect to decomposition to H_2O and O_2

H_2O_2 is explosive when in contact with readily oxidized materials

H_2O_2 reacts with Cl_2 to release O_2

6) Cl_2O_7 is the anhydride of what acid: HOCl , HClO_2 , HClO_3 or **HClO_4** ?

7) Which statement is incorrect about the hydrogen halides?

Each gaseous HX molecule is polar

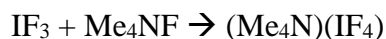
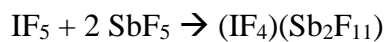
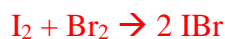
All are gases at 298 K

Bond dissociation energies for HX decrease down the group

For each HX , the $\text{p}K_a$ value is negative indicating that each is a strong acid ($\text{p}K_a$ of HF : 3.2)

8) Which compound is paramagnetic: Cl_2O , **ClO_2** , Cl_2O_6 or Cl_2O_7 ?

9) In which reaction is iodine oxidized?



10) What is the formula of hypochlorous acid ? **HClO**