(i) There is a considerable increase in covalent radius from N to P. However, from As to Bi only small increase in covalent radius is observed.
Ans: This is due to the presence of completely filled *d* and/or *f* orbital in heavier members.

(ii) Ionization enthalpy decreases down the group 15.
Ans: Due to gradual increase in atomic size.

(iii) The ionization enthalpy of the group 15 elements is much greater than that of group 14 elements in the corresponding periods.
Ans: Because of the extra stable half-filled *p* orbital electronic configuration and smaller size.

(iv) Nitrogen exists as diatomic molecule and phosphorus as P_4.
Ans: Because N_2 is Diatomic molecules, hence weak Vander Waal's force of attraction thus is a gas whereas P_4 is tetra-atomic hence Stronger Vander Waal's force of attraction thus it is solid.

(v)NH_3 is basic while BiH_3 is only feebly basic.
Ans: NH_3 is basic due to smaller size & high electro negativity of Nitrogen.

(vii)$R_3P=O$ exist but $R_3N=O$ does not.
Ans: Due to the absence of *d* orbitals in valence shell of nitrogen. Because of inability of Nitrogen to expand its covalency beyond four, nitrogen cannot form *d* π–*p*π bond

(viii)Nitrogen shows catenation properties less than phosphorus.
Ans: Because N-N bond is weaker than the single P-P bond.& strong $p\pi$–$p\pi$ overlap in Nitrogen

(ix) Ammonia has higher boiling point than Phosphine.
Ans: Ammonia (NH_3) form hydrogen bond but Phosphine (PH_3) does not .

(x) H_3PO_3 is diprotic acid.
Ans: Due to presence of two ionisable –OH group.(Draw the structure of H_3PO_3)

(xi) Oxides of nitrogen have open chain structures while those of phosphorus have closed chain or cage structures.
Ans: Nitrogen has ability to form multiple bonds involving pp-pp overlap.

(xii) A nitrogen atom has five valence electrons but it does not form the compound NCl_5.
Ans: Because of absence of d-orbitals it can't expand its covalency from 3 to 5.

(xiii) Nitrogen is fairly inert gas.

Ans: Nitrogen exists as triply bonded diatomic non polar molecule. Due to short internuclear distance between two nitrogen atoms the bond strength is very high. It is, therefore, very difficult to break the bond.

(xiv) All the bonds in the molecules of PCl_5 are not equal.
Ans: PCl_5 has a trigonal bipyramidal shape in the gas space. A trigonal bipyramidal is an irregular structure in which some bond angles are 90 degree and others of 120 degree resulting in unequal P-Cl bond lengths $PCl_5 + H_2O$à $POCl_3 + 2HCl$ & PCl_5 à $PCl_3 + Cl_2$

(xv) In solid state PCl_5 exists as Ionic compound.
Ans: Since solid phosphorous pentachloride exists as $[PCl_4]^+$ $[PCl_6]^-$ and hence exhibit some ionic character. $[PCl_4]^+$ is tetrahedral and the anion, $[PCl_6]^-$octahedral.

(xvi) Nitrogen does not form pentahalides.
Ans: Nitrogen with n = 2, has *s* and *p* orbitals only. It **does not** have *d* orbitals to expand its covalence beyond four. That is why it **does not** form pentahalide.

(xvii) NH_3 is a good complexing agent.
Ans: Because nitrogen has lone pair of electrons which it can donate to form co-ordinate bond

(xviii) Nitrogen shows anomalous behaviour.
Ans: Nitrogen differs from the rest of the members of this group due to its smaller size, high electronegativity, high ionisation enthalpy and non-availability of *d* orbitals

(xix) Pentavalent Bismuth is a strong oxidizing agent.
Ans:Bi^{3+} is more stable than Bi^{5+} due to inert pair effect

(xxi) The first ionization energy of nitrogen is greater than oxygen.
Ans: Because of the extra stable half-filled *p* orbitals electronic configuration of nitrogen.

(xxii) NCl_3 gets hydrolysed easily while NF_3 does not.
Ans: In NCl_3, Cl has vacant d-orbital **but** in NF_3, F **does not** have to accept lone pair of electrons donated by O_2 atoms of H_2O

(xxiii)PH_3 has lower boiling point than NH_3.
Ans: PH_3 molecules are **not** associated through hydrogen bonding in liquid state. That is why the boiling point of PH_3 is lower than NH_3.

(xxiv)Pentahalides of group 15 are more Covalent than trihalides
Ans: Higher the positive oxidation state of central atom, more will be its polarizing power which, in turn, increases the covalent character of bond formed between the central atom and the other atom.

(xxv)N_2 is less reactive at room temperature.

Ans: Because of strong $p\pi-p\pi$ overlap Nitrogen has triple bond between two nitrogen atoms N≡N which has high bond dissociation energy. So it is less reactive

(xxvi)NH_3 act as Lewis base.
Ans: Nitrogen atom in NH_3 has one lone pair of electrons which is available for donation. Therefore, it acts as a Lewis base

(xxvii)Bond angle in PH_4^+ is higher than that in PH_3.
Ans: Both are SP^3 hybridised. In PH_4^+ all the four orbitals are bonded whereas in PH_3 there is a lone pair of electrons on P, which is responsible for lone pair-bond pair repulsion in PH_3 reducing the bond angle to less than 109° 28′.

(xxviii) NO_2 dimerises to form N_2O_4
.**Ans:**NO_2 contains odd number of valence electrons. It behaves as a typical odd molecule. On dimerisation, it is converted to stable N_2O_4 molecule with even number of electrons.

(xxix) NO_2 is coloured but N_2O_4 is colourless.
Ans. NO_2 has unpaired electrons therefore it absorbs light from visible and radiate brown colour whereas N_2O_4 does not have unpaired electrons so it **does not** absorb light from visible region.

(xxx) H_3PO_2 and H_3PO_3 act as good reducing agents while H_3PO_4 does not.
Ans: In H_3PO_2, two H atoms are bonded directly to P atom & in H_3PO_3 one H atom is bonded directly to P atom which imparts reducing character to the acid, whereas in H_3PO_4 there is no H atom bonded

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