

**Revised September 2004**



## AP WORKED ANSWERS

**1997, 5**

**Points 2, 2, 4**

(a)  $\text{PF}_3$  has  $5 + (3 \times 7) = 26$  valence electrons.

Lewis dot structure	3D Shape
3 BP, 1 LP	Trigonal Pyramid

$\text{PF}_5$  has  $5 + (5 \times 7) = 40$  valence electrons.

Lewis dot structure	3D Shape
5 BP, 0 LP	Trigonal Bipyramid

(b) In  $\text{PF}_3$  the dipoles caused by differences in electronegativity DO NOT cancel and therefore the molecule is polar.

(c)(i)  $\text{NF}_5$  – not likely. It is not possible for the nitrogen atom to accommodate five electron pairs since it has no 2d orbitals available and therefore cannot expand its octet via hybridization.

(ii)  $\text{AsF}_5$  – possible. As has empty d orbitals available in its valence shell for expansion. It can accommodate more than four electron pairs around itself and can expand its octet via hybridization.