Note: Be^{3+} has only one e^-

1) $\Delta E = R_H Z^2 (n_i^{-2} - n_f^{-2})$

•don't know R_H?

$\Delta E_H = 2.18 \times 10^{-18} J$

$\Delta E = R_H (1)^2 (1^{-2} - \infty^{-2})$

$\Delta E = R_H = 2.18 \times 10^{-18} J$

$\Delta E_{Be} = (2.18 \times 10^{-18} J)(4^2)(1^{-2} - \infty^{-2}) =$

$= 3.49 \times 10^{-17} J.$

2) $K_{max} = hf - W$

$\lambda = 275 nm$ $\quad c = f\lambda$

$K_{max} = 4.327 \times 10^{-20} J$

$W = hf - K_{max}$

$= \frac{hc}{\lambda} - K_{max}$

$= \frac{(6.63 \times 10^{-34})(3.0 \times 10^8 m/s)}{(275 \times 10^{-9} m)} - 4.327 \times 10^{-20} J$

$W = 6.8 \times 10^{-19} J$

=> lead.

3) $\Delta E = hf = \frac{hc}{\lambda} = \frac{(6.63 \times 10^{-34})(3.0 \times 10^8 m/s)}{(486.1 \times 10^{-9} m)}$

$= 4.092 \times 10^{-19} J$

$\Delta E = R_H Z^2 (n_i^{-2} - n_f^{-2})$

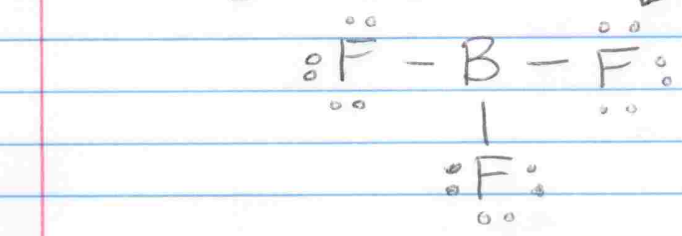
energy emitted, negative.

$\frac{(-4.092 \times 10^{-19})}{(2.18 \times 10^{-18})} + \frac{1}{4} = \frac{1}{n_i^2}$

$n_i = 4$

4) Note: B is an exception to the octet rule.

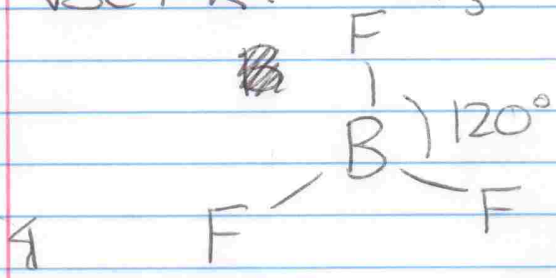
BF_3 $3+21=24$ ← note it does not form double bonds.



hybridization: sp^2

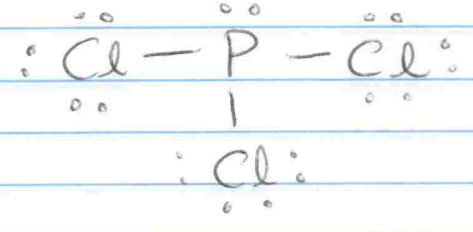
bond angles: 120°

VSEPR: AX_3



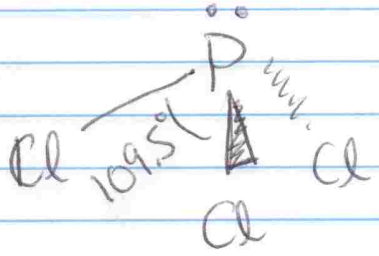
molecular geo = trigonal planar
electronic geo = trigonal planar

PCl_3 $5+21=26$



hybridization: sp^3

VSEPR:
molecular geo = trigonal pyrami
electronic geo = tetrahedral.



Hydrogen bonding

5) london dispersion < dipole-dipole < hydrogen bonding

$HF > HCl > F_2 > H_2$

HF: hydrogen bonding

HCl: polar molecule

F_2: london dispersion. Can assume heavier molecules experience greater london forces.

H_2: london dispersion