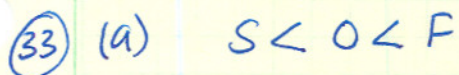
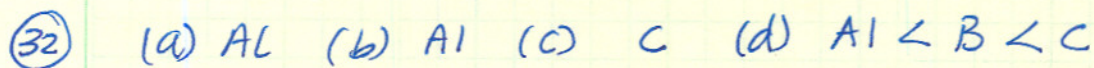
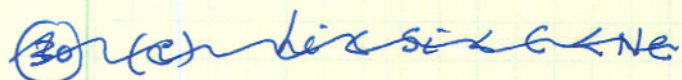
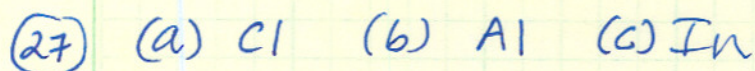
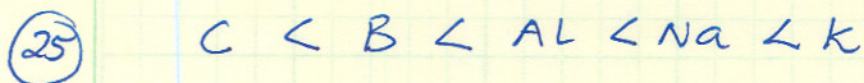


# INTRODUCTION TO NATURAL SCIENCE

## CHEMISTRY HOMEWORK - WEEK 5 - WINTER QUARTER

### Chapter 8



S has valence electrons in the 3<sup>rd</sup> energy level ( $n=3$ ) compared with O and F ( $n=2$  is the valence level). It is easier to remove electrons from  $n=3$  than from  $n=2$  since  $n=3$  is further away from the nucleus.  $\therefore$  S has the lowest IE of the three.

F is smaller in size than O. Valence electrons in F are therefore closer to the nucleus than in O.

(b) O. does.

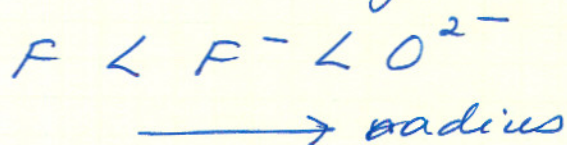
Valence electrons in O are in  $n=2$ . Those in S and Se are in  $n=3$  and  $4$  respectively. It is harder to remove electrons from  $n=2$  than from  $n=3$  &  $4$  since  $n=2$  is closer to the nucleus.  $\therefore$  IE of O is the highest.

(c) Cl is more electronegative. Since its valence orbital is  $n=3$  (that of Br and Se is  $n=4$ ) it attracts electrons better than Br & Se.

(d) F has a smaller radius than  $F^-$ .

	$F^-$	$O^{2-}$
# of $e^-$	10	10
# of p	9	8

$\therefore F^-$  is smaller in radius than  $O^{2-}$   
 $\therefore O^{2-}$  has the largest radius.



(3\*) (a)  $F < O < S$

$n=2$   $n=2$   $n=3$  ← valence energy level.

S has the valence level furthest away from the nucleus.  $\therefore$  S is largest.

In F and O, valence  $e^-$  are filling into the

same  $n=2$  level. F has 9 protons attracting the electrons, O has only 8 of them.  $\therefore$  F is smaller in size than O.

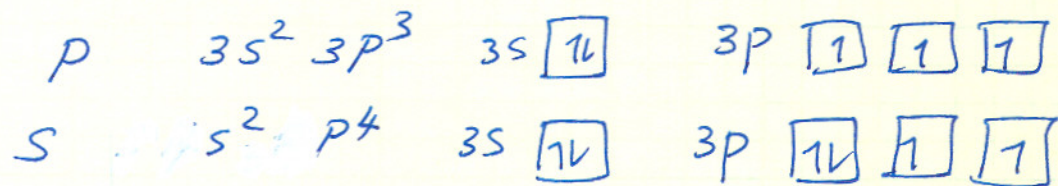
(b) S is hardest to ionize among the 4.

Se has valence  $\bar{e}$  in  $n=4$ ,  
 Si, P, S all have valence  $\bar{e}$  in  $n=3$  }  $\therefore$  Se is the easiest to ionize. Lowest I.E.

Ionization energy increases across a period in general therefore

I.E. of Si < I.E. of P < I.E. of S

but there is an exception between P and S



Due to  $\bar{e}-\bar{e}$  repulsion, it is easier to remove an  $\bar{e}$  from S than from P.

$\therefore$ , S has the highest I.E.

(c)	$O^{2-}$	$N^{3-}$	$F^-$
# of $\bar{e}$	10	10	10
# of p	8	7	9

$F^-$  is smallest since it has more protons to attract 10  $\bar{e}$ .  $N^{3-}$  is largest since it has only 7 p to attract the 10  $\bar{e}$

