

Name Key (1/2 pt print name) Print Name NA = not attempted (1/2 pt sign name) Sign

In all questions, show work for partial credit and full credit.

BA = bad attempt

1 (a) Given the angular momentum quantum number $l = 2$ what are all of the possible values of the magnetic quantum number (m_l)? (10 pts this number total, 6 pts) $m_l = -l \dots 0 \dots +l$

-2, -1, 0, +1, +2

(b) The angular momentum quantum number (l) has a letter designation, if $l = 2$, what is the letter designation? d (4 pts) (s, p, d, f)

2. For the element, Se (24 pts total, 4 pts each letter)

BA - 2

(a) Give the electron configuration of the element above in the format, ($1s^2, 2s^2, 2p^6, \dots$)

$1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 3d^{10}, 4p^4$

(b) Give the valence electron configuration of the same element in the same format.

$4s^2, 4p^4$

not valence - 1

(c) Give the valence electron configuration diagram for the same element showing a line for an orbital and up and down arrows for the $+1/2$ and $-1/2$ electrons

(format required: $\uparrow\downarrow$ \uparrow $\underline{\hspace{1cm}}$ $\underline{\hspace{1cm}}$ $\underline{\hspace{1cm}}$) (format is not necessarily the answer)

$\uparrow\downarrow$ \uparrow $\underline{\hspace{1cm}}$ $\underline{\hspace{1cm}}$
4s 4p

(d) How many valence electrons does the element have? 6

(e) Give the Lewis Dot symbol (Lewis dot structure) for the same element by itself.

$\cdot\cdot$
 $\cdot\text{Se}\cdot$
 $\cdot\cdot$

(f) Give the valence electron configuration of the anion Se⁻² in the same format as in (a) above.

$+2e^-$

$4s^2, 4p^6$

same
 $\cdot\cdot$
 $\cdot\text{Se}\cdot$
 $\cdot\cdot$

3. Periodic Trends: (15 pts total, 5 pts each letter)

- (a) Circle the element which has a **larger atomic radius** [(K) or (Ca)] (circle one)
→ smaller atom
- (b) Circle the element which has a **higher first ionization energy** [(K) or (Ca)] (circle one)
smaller atom - higher IE
- (c) Circle the element which has **higher electronegativity** [(N) or (As)] (circle one)

4. Extra Credit: (10 pts total)
F is most EN
closer to F

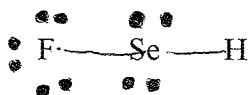
(A) For the molecule below with the molecular formula **(F Se H)**, give the total number of valence electrons in the entire molecule. (6 pts)

$$\begin{array}{ccc} \text{F} & \text{Se} & \text{H} \\ 7 & 6 & 1 \\ 7 + 6 + 1 = 14e \end{array}$$

BA -3

math -1

(B) Given the two possible Lewis Dot structures, circle the letter of the best Lewis Dot structure. (2 pts)



(a) ✓

(b)

$$7 \times 2 = 14e$$

arrange e
 $9 \times 2 = 18e$

(C) For the Lewis Dot structure which you chose in part (B), explain why the one you **did not** choose is incorrect by giving **one problem** with the bad Lewis Dot structure. (2 pts)

BA -1

- ② Se could expand octet because in period 4 - Ok.
- ③ H can only have duet - not octet

White

Name key (1/2 pt print name) Print Name NA = not attempted (1/2 pt sign name)

In all questions, **show work** for partial credit and full credit.

BA = bad attempt

1(a) Given principal quantum number, $n = 3$, what are all of the possible values of the angular momentum quantum number (ℓ)? (10 pts this number total, 6 pts) $\ell = 0, \dots, n-1$ ($n-1 = 2$)

$\ell = 0, 1, 2$

(b) The angular momentum quantum number (ℓ) has a letter designation, if $\ell = \cancel{0}$, what is the letter

designation? s (4 pts)

s	p	d	f
0	1	2	3

BA - 2

2. For the element, **Sb** (24 pts total, 4 pts each letter)

(a) Give the **electron configuration** of the element above in the format, ($1s^2, 2s^2, 2p^6, \dots$)

$1s^2, 2s^2, 2p^6, 3s^2, 3p^4, 4s^2, 3d^{10}, 4p^6, 5s^2, 4d^{10}$

$5p^3$

(b) Give the **valence** electron configuration of the same element in the same format.

$5s^2, 5p^3$

not valence - 1 etc.

(c) Give the valence electron configuration diagram for the same element showing a line for an orbital and up and down arrows for the $+1/2$ and $-1/2$ electrons

(format required: $\uparrow\downarrow$ \uparrow $\underline{\hspace{1cm}}$ $\underline{\hspace{1cm}}$ $\underline{\hspace{1cm}}$) (format is not necessarily the answer)

+3 e⁻ $\begin{array}{c} \uparrow\downarrow \\ 5s \end{array}$ $\begin{array}{c} \uparrow \\ 5p \end{array}$ $\begin{array}{c} \uparrow \\ 5p \end{array}$ $\begin{array}{c} \uparrow \\ 5p \end{array}$

(d) How many **valence electrons** does the element have? 5

(e) Give the Lewis Dot symbol (Lewis dot structure) for the same element by itself.

$\cdot\overset{\cdot\cdot}{\text{Sb}}\cdot$

(f) Give the **valence** electron configuration of the anion **Sb⁻³** in the same format as in (a) above.

$5s^2, 5p^6$

Gene etc. $\cdot\overset{\cdot\cdot}{\text{Sb}}\cdot$

3. Periodic Trends: (15 pts total, 5 pts each letter)

(a) Circle the element which has a **larger atomic radius** [(Na) or (K)] (circle one)

larger down group

(b) Circle the element which has a **higher first ionization energy** [(Na) or (K)] (circle one)

(c) Circle the element which has **higher electronegativity** [(C) or (O)] (circle one)

higher IE - smaller

F is most EN - C further away

4. Extra Credit: (10 pts total)

(A) For the molecule below with the molecular formula **(H N Cl₂)**, give the total number of valence electrons in the entire molecule. (6 pts)

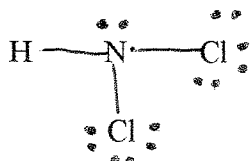
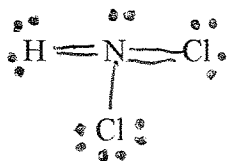


$$1e + 5e + (7e)2 = 20e$$

BA-3

math-1

(B) Given the two possible Lewis Dot structures, circle the letter of the best Lewis Dot structure. (2 pts)



$$10e \text{ pairs} \times 2 = 20e$$

(a)

(b)

$$14e \text{ pairs} \times 2 = 28e$$

(C) For the Lewis Dot structure which you chose in part (B), explain why the one you **did not** choose is incorrect by giving **one problem** with the bad Lewis Dot structure. (2 pts)

(a) has too many e, N cannot have more than octet because in period 2, N has more than octet, H cannot have more than duet

BA-1

green

Name _____ (1/2 pt print name) Print Name _____ (1/2 pt sign name) Sign _____

In all questions, **show work** for partial credit and full credit.

1 (a) Given the angular momentum quantum number $\ell = 2$ what are all of the possible values of the magnetic quantum number (m_ℓ) ? (10 pts this number total, 6 pts)

(b) The angular momentum quantum number (ℓ) has a letter designation, if $\ell = 2$, what is the letter designation ? _____ (4 pts)

2. For the element, Se (24 pts total, 4 pts each letter)

(a) Give the **electron configuration** of the element above in the format, ($1s^2, 2s^2, 2p^6, \dots$)

(b) Give the **valence** electron configuration of the same element in the same format.

(c) Give the valence electron configuration diagram for the same element showing a line for an orbital and up and down arrows for the +1/2 and -1/2 electrons

(**format** required: $\begin{array}{c} \uparrow \downarrow \\ 1s \end{array} \begin{array}{c} \uparrow \\ 2s \end{array} \begin{array}{c} \\ 2p \end{array} \dots$) (format is not necessarily the answer)

(d) How many **valence electrons** does the element have ? _____

(e) Give the Lewis Dot symbol (Lewis dot structure) for the same element by itself. _____

(f) Give the **valence** electron configuration of the anion Se⁻² in the same format as in (a) above.

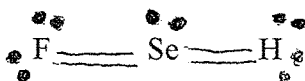
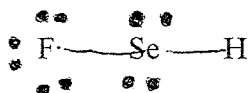
3. Periodic Trends: (15 pts total, 5 pts each letter)

- (a) Circle the element which has a **larger atomic radius** [(K) or (Ca)] (circle one)
- (b) Circle the element which has a **higher first ionization energy** [(K) or (Ca)] (circle one)
- (c) Circle the element which has **higher electronegativity** [(N) or (As)](circle one)

4. Extra Credit: (10 pts total)

- (A) For the molecule below with the molecular formula **(F Se H)** , give the total number of valence electrons in the entire molecule. (6 pts)

(B) Given the two possible Lewis Dot structures, circle the letter of the best Lewis Dot structure. (2 pts)



- (C) For the Lewis Dot structure which you chose in part (B), explain why the one you **did not** choose is incorrect by giving **one problem** with the bad Lewis Dot structure. (2 pts)

Name _____ (1/2 pt print name) Print Name _____ (1/2 pt sign name) Sign _____

In all questions, **show work** for partial credit and full credit.

1(a) Given principal quantum number, $n = 3$, what are all of the possible values of the angular momentum quantum number (ℓ)? (10 pts this number total, 6 pts)

(b) The angular momentum quantum number (ℓ) has a letter designation, if $\ell = \cancel{2} 0$, what is the letter designation? _____ (4 pts)

2. For the element, **Sb** (24 pts total, 4 pts each letter)

(a) Give the **electron configuration** of the element above in the format, ($1s^2, 2s^2, 2p^6, \dots$)

(b) Give the **valence** electron configuration of the same element in the same format.

(c) Give the valence electron configuration diagram for the same element showing a line for an orbital and up and down arrows for the $+1/2$ and $-1/2$ electrons

(**format** required: $\begin{array}{c} \uparrow \downarrow \\ 1s \end{array} \begin{array}{c} \uparrow \\ 2s \end{array} \begin{array}{c} \\ 2p \end{array} \dots$) (format is not necessarily the answer)

(d) How many **valence electrons** does the element have? _____

(e) Give the Lewis Dot symbol (Lewis dot structure) for the same element by itself. _____

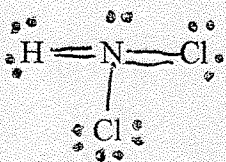
(f) Give the **valence** electron configuration of the anion **Sb⁻³** in the same format as in (a) above.

3. Periodic Trends: (15 pts total, 5 pts each letter)

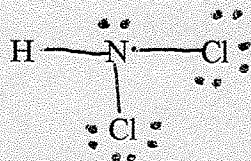
- (a) Circle the element which has a **larger atomic radius**. [(Na) or (K)] (circle one)
- (b) Circle the element which has a **higher first ionization energy**. [(Na) or (K)] (circle one)
- (c) Circle the element which has **higher electronegativity**. [(C) or (O)] (circle one)

4. Extra Credit: (10 pts total)

- (A) For the molecule below with the molecular formula **(H N Cl₂)**, give the total number of valence electrons in the entire molecule. (6 pts)



(a)



(b)

- (C) For the Lewis Dot structure which you chose in part (B), explain why the one you **did not** choose is incorrect by giving **one problem** with the bad Lewis Dot structure. (2 pts)