Quiz VI General Chemistry I Lecture Fall 14 Dr. Hahn 20 pts 11/10 M 9:30am form A quiz # _____

Name Key (print name) Name _____ (sign name)

Please show work for full credit and to get partial credit.

1. Considering periodic properties: (5 pts, 2.5 pts each)

Which atom is bigger ? [(O) or (Te)] [((circle one)

Which atom has higher ionization energy [(N) or (F)] (circle one)

↓ bigger → smaller size

IE is opposite to size

2. For the ion for Ca^{+2} , give the electron configuration in the format $1s^2$, $2s^2$, ... etc. (10 pts)

Ca is $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2$ — lose 2 ē for Ca^{+2}

valence ē

Ca^{+2} $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^0$

valence ē octet

3. Give the Lewis Dot Symbol for the element **P** (5 pts)

valence ē = group # = 5 → P in Group V A

5 dots (4 walls)

↓

put 1 ē per wall until run out of walls then double up ē

Extra Credit: (3 pts)

Lewis Dot Structure:

a. For the molecule SH_2 how many valence electrons is in the molecule ? Show work. (2 pts)

S in group VI A — 6 valence ē

H in group I A — 1 valence ē

valence ē for SH_2 → $6_e + 2(1ē) = 8ē$

b. For the molecule SH_2 choose the correct Lewis Dot Structure. (1 pt) (circle one)

(1)

11 ē pairs x2 = 22ē

- too many ē
- H can only have duet (H & He can only have duet)

S has more than octet can have

(2) correct

4 ē pairs x2 = 8ē

H has duet (2ē)

& S has octet (8ē)

green

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1. Considering periodic properties: (5 pts, 2.5 pts each)

Which atom is bigger ? [(Ba) or (Be)] [((circle one)

Which atom has higher ionization energy [(N) or (Sb)] (circle one)

size: smaller ↓ bigger

IE opposite to size

2. For the ion for S^{-2} , give the electron configuration in the format $1s^2, 2s^2, \ldots$ etc. (10 pts)

S is $1s^2, 2s^2, 2p^6, 3s^2, 3p^4$ → for S^{-2} add $2\bar{e}$

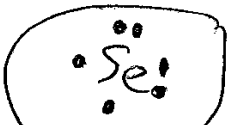
S^{-2} is $1s^2, 2s^2, 2p^6, 3s^2, 3p^6$

$3s^2, 3p^4$ → valence $\bar{e}$

$3s^2, 3p^6$ → valence $\bar{e}$ / octet

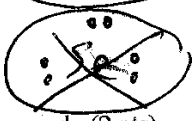
3. Give the Lewis Dot Symbol for the element **Se** (5 pts)

Se in group VI A (6 valence $\bar{e}$)



Extra Credit: (3 pts)

Lewis Dot Structure: 4 walls around atom; 1 $\bar{e}$ per wall until run out of walls, then pair up



4 walls

a. For the molecule NO_3^{-1} , how many valence electrons is in the molecule ? Show work. (2 pts)

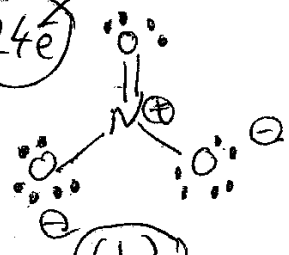
N – 5 valence $\bar{e}$ (gp. 5) O – 6 valence $\bar{e}$ (gp. 6) charge −1

$(5\bar{e}) + 3(6\bar{e}) + 1\bar{e} = 24\bar{e}$

N O charge

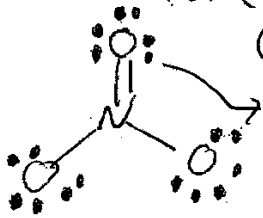
b. For the molecule NO_3^{-1} choose the correct Lewis Dot Structure. (1 pt) (circle one)

① 12 pairs × 2 = 24e



(1) correct

② all atoms have octet



(2)

① $13 \times 2 = 26\bar{e}$ (too many e)

② O has $10\bar{e}$ not octet – O

can not have more than octet – only 3rd period + higher can expand octet

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Please show work for full credit and to get partial credit.

1. Considering periodic properties: (5 pts, 2.5 pts each)

Which atom is bigger ? [(Si) or (Cl)] [((circle one)

Which atom has higher ionization energy [(Li) or (K)] (circle one)

smaller size ↓ bigger

IE opposite to size

2. For the ion for Br^{-1} , give the electron configuration in the format $1s^2, 2s^2, \ldots$ etc. (10 pts)

$Br \rightarrow 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 3d^{10}, 4p^5$ — valence e

$Br^{-1} \rightarrow 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 3d^{10}, 4p^6$ — valence e, octet

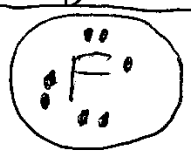
Br^{-1} gain 1e

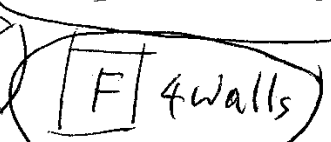
3. Give the Lewis Dot Symbol for the element **F** (5 pts)

F is in group VII A → has 7 valence e → 1 e per 4 walls then double up e

Extra Credit: (3 pts)

Lewis Dot Structure:





a. For the molecule **PCl_3** how many valence electrons is in the molecule ? Show work. (2 pts)

P in group (V) 5, Cl in group VII (7) + 3 Cl

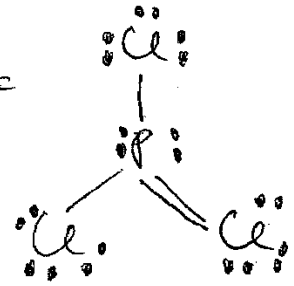
$5\bar{e} + 3*(7\bar{e}) = 26$

P Cl

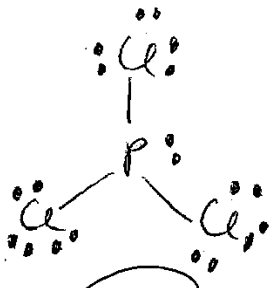
b. For the molecule **PCl_3** choose the correct Lewis Dot Structure. (1 pt) (circle one)

(1) 15 pairs x2 = 30 ē — too many ē

(2) more than octet on P-



(1)



(2) correct

① 13 pairs x2 = 26 ē

② all atoms have octet

Quiz VI General Chemistry I Lecture Fall 14 Dr. Hahn 20 pts 11/10 M 10:30am form B quiz # green

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1. Considering periodic properties: (5 pts, 2.5 pts each)

Which atom is bigger ? [(Sr) or (Rb)] [((circle one)

Which atom has higher ionization energy [(Sn) or (Sb)] (circle one)

smaller ← size → bigger

IE opposite to size

2. For the ion for Al^{+3} , give the electron configuration ~~in the format $1s^2, 2s^2, \ldots$~~ etc. (10 pts)

Al – $1s^2, 2s^2, 2p^6, 3s^2, 3p^1$ — Al^{+3} lose 3 $\bar{e}$ — valence $\bar{e}$

Al^{+3} – $1s^2, 2s^2, 2p^6, 3s^0, 3p^0$ — valence $\bar{e}$, octet

3. Give the Lewis Dot Symbol for the element **Kr** (5 pts)

Kr in group VIIIA → 8 $\bar{e}$ valence

:Kr:

$\bar{e}$ in 4 walls

1 $\bar{e}$ per wall until run out of walls + then pair up $\bar{e}$ to 8 $\bar{e}$ max

Extra Credit: (3 pts)

Lewis Dot Structure:

a. For the molecule CO_3^{-2}, ~~how many valence electrons~~ is in the molecule ? Show work. (2 pts)

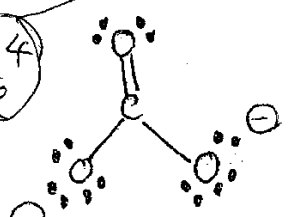
C in group 4(4$\bar{e}$), O in group 6 (6$\bar{e}$), charge –2$\bar{e}$

valence $\bar{e}$ = 4 $\bar{e}$ + (6 * 3) + 2$\bar{e}$ = 24$\bar{e}$

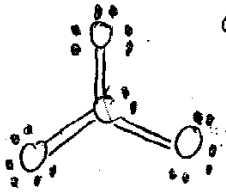
C O

b. For the molecule CO_3^{-2} choose the correct Lewis Dot Structure. (1 pt) (circle one)

① 12 $\bar{e}$ x 2 pairs = 24 $\bar{e}$ — same — ② all atoms have octet



(1) correct



(2)

① 16 x 2 = 32$\bar{e}$

② O has more than octet — not allowed — n=2, can't have d subshell

expanded octet only allowed in period 3+ higher

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Which atom is bigger ? [(O) or (Te)] [((circle one)

Which atom has higher ionization energy [(N) or (F)] (circle one)

2. For the ion for $\mathbf{Ca^{+2}}$, give the electron configuration in the format $1s^2$, $2s^2$, ... etc. (10 pts)

3. Give the Lewis Dot Symbol for the element **P** (5 pts)

Extra Credit: (3 pts)

Lewis Dot Structure:

a. For the molecule $\mathbf{SH_2}$ how many valence electrons is in the molecule ? Show work. (2 pts)

b. For the molecule $\mathbf{SH_2}$ choose the correct Lewis Dot Structure. (1 pt) (circle one)

(1)

(2)

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1. Considering periodic properties: (5 pts, 2.5 pts each)

Which atom is bigger ? [(Ba) or (Be)] [((circle one)

Which atom has higher ionization energy [(N) or (Sb)] (circle one)

2. For the ion for S^{-2} , give the electron configuration in the format $1s^2$, $2s^2$, ... etc. (10 pts)

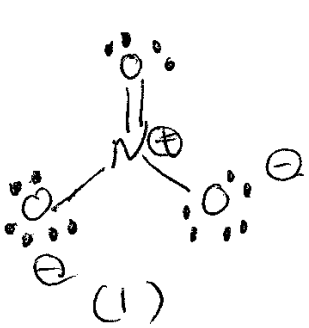
3. Give the Lewis Dot Symbol for the element **Se** (5 pts)

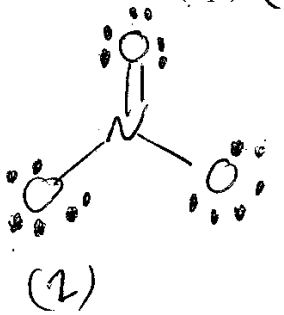
Extra Credit: (3 pts)

Lewis Dot Structure:

a. For the molecule NO_3^{-1} , how many valence electrons is in the molecule ? Show work. (2 pts)

b. For the molecule NO_3^{-1} choose the correct Lewis Dot Structure. (1 pt) (circle one)





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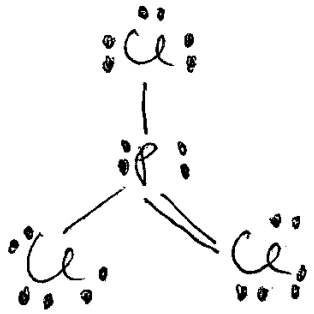
3. Give the Lewis Dot Symbol for the element **F** (5 pts)

Extra Credit: (3 pts)

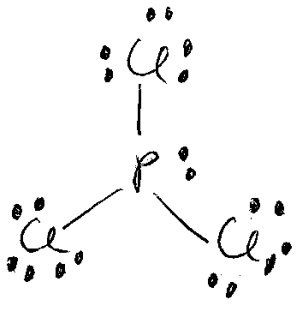
Lewis Dot Structure:

a. For the molecule **PCl_3** how many valence electrons is in the molecule ? Show work. (2 pts)

b. For the molecule **PCl_3** choose the correct Lewis Dot Structure. (1 pt) (circle one)



(1)



(2)

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Extra Credit: (3 pts)

Lewis Dot Structure:

a. For the molecule $\mathbf{CO_3^{-2}}$, how many valence electrons is in the molecule ? Show work. (2 pts)

b. For the molecule $\mathbf{CO_3^{-2}}$ choose the correct Lewis Dot Structure. (1 pt) (circle one)