Quiz V General Chemistry I Lecture Fall 13 Dr. Hahn 20 pts 11/1 F 9:30 am Form A quiz # _____

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

Please show all work for full credit & for partial credit for all questions.

1. Given the following balanced reaction, if you start with 1.78 moles of N_2 (g), how many liters of the gas NH_3 is produced at STP? [22.4 Liters = 1 mole of gas at STP] (show work) (6 pts)

N_2 (g) + 3 H_2 (g) → 2 NH_3 (g)

$$1.78 \text{ moles } N_2 \times \frac{2 \text{ mol } NH_3}{1 \text{ mol } N_2} \times \frac{22.4 \text{ l } NH_3}{1 \text{ mol } NH_3} = 79.7 \text{ l } NH_3$$

2. Are the following quantum numbers allowed for one electron ? (yes, no) (circle one) Explain.(4 pts)
n=3, ℓ = 2, m_ℓ = -1, m_s = + ½

if $\ell = 2$, $m_\ell = -2, -1, 0, +1, +2$ so OK.
$\ell = 0$ to (3-1) so OK. $\bar{e}$ can be + or - ½ so OK.

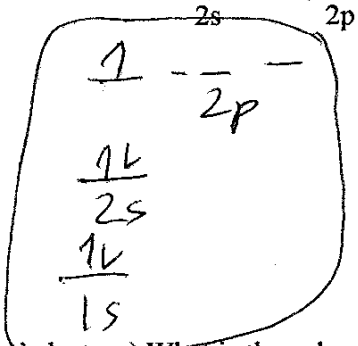
3. Give the electron configuration for the element **Ge** . You should use the format of ($1s^2$, $2s^2$, etc This is not me giving the start of your electron configuration but just telling you the format for your answer.) (5 pts)

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

(d is n-1) — count $\bar{e}$ by counting elements across periodic table

4. Give an orbital diagram for the electron configuration for the element **B** . You should show the lowest energy at the bottom of this space and the highest energy at the top of this space. (I typed the orbitals so that I can draw the thing on one line for ease of typing, you should show any difference in energy by drawing lines on different levels.) Use the format. 1↓ 1 _ _ (5 pts)
2s 2p

B $1s^2, 2s^2, 2p^1$



Extra Credit: (stuff gone over in today's ~~lecture~~) What is the valence electron configuration for the element **Sb** ? Give the valence electron configuration in the form of ($1s^2$, $2s^2$ etc. This is not me giving the start of your electron configuration but just telling you the format for your answer) (4 pts)

Sb in group 5 has 5 valence $\bar{e}$

$5s^2, 5p^3$

green

Quiz V General Chemistry I Lecture Fall 13 Dr. Hahn 20 pts 11/1 F 9:30 am Form B quiz # _____

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

Please show all work for full credit & for partial credit for all questions.

1. Given the following balanced reaction, if you start with 0.552 moles of O_2 (g), how many liters of the gas H_2O is produced at STP ? [22.4 Liters = 1 mole of gas at STP] (show work) (6 pts)

$2H_2$ (g) + O_2 (g) → $2H_2O$ (g)

$0.552\ mol\ O_2 \times \frac{2\ mol\ H_2O}{1\ mol\ O_2} \times \frac{22.4\ l\ H_2O}{1\ mol\ H_2O} = 24.7\ l\ H_2O\ (g)$

2. Are the following quantum numbers allowed for an electron ? (yes, no) (circle one) Explain. (4 pts)

n=3, $\ell = 2$, $m_\ell = -3$, $m_s = -\frac{1}{2}$

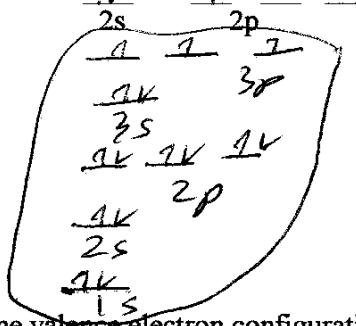
$\ell = 0, 1, 2$ OK. $m_\ell = -2, -1, 0, +1, +2$ is largest # Cannot have $m_\ell = -3$

3. Give the electron configuration for the element **Se** . You should use the format of ($1s^2$, $2s^2$, etc This is not me giving the start of your electron configuration but just telling you the format for your answer.) (5 pts) $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 3d^{10}, 4p^4$

(ℓ is n-1) count $\bar{e}$ by counting elements across periodic table

4. Give an orbital diagram for the electron configuration for the element **P** using the format. You should show the lowest energy at the bottom of this space and the highest energy at the top of this space. (I typed the orbitals so that I can draw the thing on one line for ease of typing, you should show any difference in energy by drawing lines on different levels.) Use the format. ↑↓ ↑ _ _ (5 pts)

P $1s^2, 2s^2, 2p^6, 3s^2, 3p^3$



Extra Credit: (stuff gone over in today's lecture) What is the valence electron configuration for the element **Ga** ? Give the valence electron configuration in the form of ($1s^2$, $2s^2$ etc. This is not me giving the start of your electron configuration but just telling you the format for your answer) (4 pts)

$4s^2, 4p^1$ → Ga is in group 3 — has 3 valence $\bar{e}$

Quiz V General Chemistry I Lecture Fall 13 Dr. Hahn 20 pts 11/1 F 10:30 am Form A quiz # _____

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

Please show all work for full credit & for partial credit for all questions.

1. Given the following balanced reaction, if you start with 15.7 moles of Na (s) , how many liters of the gas H_2 (g) is produced at STP ? [22.4 Liters = 1 mole of gas at STP] (show work)

2 Na (s) + 2 H_2O (l) → 2 Na OH (aq) + H_2 (g)

$15.7 \text{ mol Na (s)} \times \frac{1 \text{ mol } H_2}{2 \text{ mol Na}} \times \frac{22.4 \text{ L } H_2}{1 \text{ mol } H_2} = 175.8$

w sig fig
176 L H_2

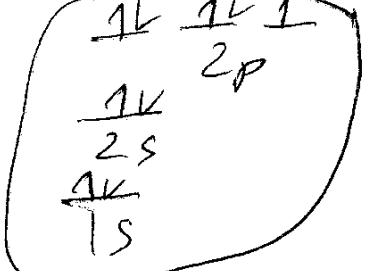
2. a. If principal quantum number n = 3 what are the possible (4 pts)

angular momentum quantum numbers (ℓ) = 0, 1, 2 (or $n-1 = 3-1 = 2$)

3. Give the electron configuration for the element **Br** . You should use the format of ($1s^2$, $2s^2$, etc This is not me giving the start of your electron configuration but just telling you the format for your answer.) (5 pts) $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 3d^{10}, 4p^5$

4. Give an orbital diagram for the electron configuration for the element **F** using the format. You should show the lowest energy at the bottom of this space and the highest energy at the top of this space. (I typed the orbitals so that I can draw the thing on one line for ease of typing, you should show any difference in energy by drawing lines on different levels.) Use the format. 1↓ 2s 1 2p ___ ___ (5 pts)

F $1s^2, 2s^2, 2p^5$



Extra Credit: (stuff gone over in today's lecture) (4 pts) What is the valence electron configuration for the element **Cl** ? Give the valence electron configuration in the form of ($1s^2$, $2s^2$ etc. This is not me giving the start of your electron configuration but just telling you the format for your answer)

$3s^2, 3p^5$ — note Cl in group 7 has 7 valence e⁻

Quiz V General Chemistry I Lecture Fall 13 Dr. Hahn 20 pts 11/1 F 10:30 am Form B green quiz # ____

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

Please show all work for full credit & for partial credit for all questions.

1. Given the following balanced reaction, if you start with 0.772 moles of NaN_3 (s), how many liters of the gas N_2 is produced at STP ? [22.4 Liters = 1 mole of gas at STP] (show work) (6 pts)

$2NaN_3\,(s) \rightarrow 2\,Na(s) + 3\,N_2\,(g)$

$$0.772\,\text{mol}\,NaN_3 \times \frac{3\,\text{mol}\,N_2}{2\,\text{mol}\,NaN_3} \times \frac{22.4\,\text{l}\,N_2}{1\,\text{mol}\,N_2} = 25.9\,\text{l}\,N_2$$

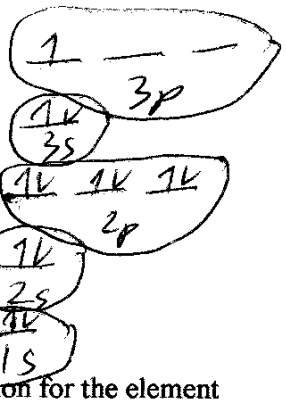
2. If angular momentum quantum number is $\ell = 2$(nickname **d**) ~~1 (nickname p),~~ what are the possible (4 pts)

magnetic quantum numbers (m_ℓ) $-2, -1, 0, +1, +2$

3. Give the electron configuration for the element **Ga** . You should use the format of ($1s^2$, $2s^2$, etc This is not me giving the start of your electron configuration but just telling you the format for your answer.) (5 pts) $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 3d^{10}, 4p^1$

4. Give an orbital diagram for the electron configuration for the element **Al** You should show the lowest energy at the bottom of this space and the highest energy at the top of this space. (I typed the orbitals so that I can draw the thing on one line for ease of typing, you should show any difference in energy by drawing lines on different levels.) Use the format. 1v 2s 1 2p _ _ _ (5 pts)

Al $1s^2, 2s^2, 2p^6, 3s^2, 3p^1$



Extra Credit: (stuff gone over in today's lecture) What is the valence electron configuration for the element **Bi** ? Give the valence electron configuration in the form of ($1s^2$, $2s^2$ etc. This is not me giving the start of your electron configuration but just telling you the format for your answer) (4 pts)

$6s^2, 6p^3$ Bi in group V, 5 valence e⁻

Quiz V General Chemistry I Lecture Fall 13 Dr. Hahn 20 pts 11/1 F 9:30 am Form A quiz # _____

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

Please show all work for full credit & for partial credit for all questions.

1. Given the following balanced reaction, if you start with 1.78 moles of N_2 (g), how many liters of the gas NH_3 is produced at STP? [22.4 Liters = 1 mole of gas at STP] (show work) (6 pts)

N_2 (g) + 3 H_2 (g) → 2 NH_3 (g)

2. Are the following quantum numbers allowed for one electron ? (yes, no) (circle one) Explain.(4 pts)
n=3, $\ell = 2$, $m_\ell = -1$, $m_s = +\frac{1}{2}$

3. Give the electron configuration for the element **Ge** . You should use the format of ($1s^2$, $2s^2$, etc This is not me giving the start of your electron configuration but just telling you the format for your answer.) (5 pts)

4. Give an orbital diagram for the electron configuration for the element **B** . You should show the lowest energy at the bottom of this space and the highest energy at the top of this space. (I typed the orbitals so that I can draw the thing on one line for ease of typing, you should show any difference in energy by drawing lines on different levels.) Use the format. $\underset{2s}{\uparrow\downarrow}$ $\underset{2p}{\uparrow}$ ___ ___ (5 pts)

Extra Credit: (stuff gone over in today's lecture) What is the valence electron configuration for the element **Sb** ? Give the valence electron configuration in the form of ($1s^2$, $2s^2$ etc. This is not me giving the start of your electron configuration but just telling you the format for your answer) (4 pts)

Quiz V General Chemistry I Lecture Fall 13 Dr. Hahn 20 pts 11/1 F 9:30 am Form B quiz # _____

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

Please show all work for full credit & for partial credit for all questions.

1. Given the following balanced reaction, if you start with 0.552 moles of O_2 (g), how many liters of the gas H_2O is produced at STP ? [22.4 Liters = 1 mole of gas at STP] (show work) (6 pts)

$2H_2$ (g) + O_2 (g) → $2H_2O$ (g)

2. Are the following quantum numbers allowed for an electron ? (yes, no) (circle one) Explain. (4 pts)

$n=3, \ell = 2, m_\ell = -3, m_s = -½$

3. Give the electron configuration for the element **Se** . You should use the format of ($1s^2$, $2s^2$, etc This is not me giving the start of your electron configuration but just telling you the format for your answer.) (5 pts)

4. Give an orbital diagram for the electron configuration for the element **P** using the format. You should show the lowest energy at the bottom of this space and the highest energy at the top of this space. (I typed the orbitals so that I can draw the thing on one line for ease of typing, you should show any difference in energy by drawing lines on different levels.) Use the format. $\underset{2s}{\uparrow\downarrow}$ $\underset{2p}{\uparrow}$ ___ ___ (5 pts)

Extra Credit: (stuff gone over in today's lecture) What is the valence electron configuration for the element **Ga** ? Give the valence electron configuration in the form of ($1s^2$, $2s^2$ etc. This is not me giving the start of your electron configuration but just telling you the format for your answer) (4 pts)

Quiz V General Chemistry I Lecture Fall 13 Dr. Hahn 20 pts 11/1 F 10:30 am Form A quiz # 5-8

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

Please show all work for full credit & for partial credit for all questions.

1. Given the following balanced reaction, if you start with 15.7 moles of Na (s) , how many liters of the gas H_2 (g) is produced at STP ? [22.4 Liters = 1 mole of gas at STP] (show work)

$2\ Na\ (s) + 2\ H_2O\ (l) \rightarrow 2\ Na\ OH\ (aq) + H_2\ (g)$

2. a. If principal quantum number n = 3 what are the possible (4 pts)

angular momentum quantum numbers (ℓ) _____

3. Give the electron configuration for the element **Br** . You should use the format of ($1s^2$, $2s^2$, etc This is not me giving the start of your electron configuration but just telling you the format for your answer.) (5 pts)

4. Give an orbital diagram for the electron configuration for the element **F** using the format. You should show the lowest energy at the bottom of this space and the highest energy at the top of this space. (I typed the orbitals so that I can draw the thing on one line for ease of typing, you should show any difference in energy by drawing lines on different levels.) Use the format. $\underset{2s}{\uparrow\downarrow}$ $\underset{2p}{\uparrow}$ ___ ___ (5 pts)

Extra Credit: (stuff gone over in today's lecture) (4 pts) What is the valence electron configuration for the element **Cl** ? Give the valence electron configuration in the form of ($1s^2$, $2s^2$ etc. This is not me giving the start of your electron configuration but just telling you the format for your answer)

Quiz V General Chemistry I Lecture Fall 13 Dr. Hahn 20 pts 11/1 F 10:30 am Form B quiz # 5-7

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

Please show all work for full credit & for partial credit for all questions.

1. Given the following balanced reaction, if you start with 0.772 moles of NaN_3 (s), how many liters of the gas N_2 is produced at STP ? [22.4 Liters = 1 mole of gas at STP] (show work) (6 pts)

$2NaN_3$ (s) → 2 Na(s) + 3 N_2 (g)

2. If angular momentum quantum number is $\ell = 2$(nickname **d**) ~~$\ell = 1$(nickname **p**)~~, what are the possible (4 pts)

magnetic quantum numbers (m_ℓ) _____

3. Give the electron configuration for the element **Ga** . You should use the format of ($1s^2$, $2s^2$, etc This is not me giving the start of your electron configuration but just telling you the format for your answer.) (5 pts)

4. Give an orbital diagram for the electron configuration for the element **Al** You should show the lowest energy at the bottom of this space and the highest energy at the top of this space. (I typed the orbitals so that I can draw the thing on one line for ease of typing, you should show any difference in energy by drawing lines on different levels.) Use the format. $\underset{2s}{\uparrow\downarrow}$ $\underset{2p}{\uparrow}$ ___ ___ (5 pts)

Extra Credit: (stuff gone over in today's lecture) What is the valence electron configuration for the element **Bi** ? Give the valence electron configuration in the form of ($1s^2$, $2s^2$ etc. This is not me giving the start of your electron configuration but just telling you the format for your answer) (4 pts)