Quiz V General Chemistry I Lecture Fall 14 Dr. Hahn 20 pts 10/29 W 9:30am form A quiz # _____

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

Please show work for full credit and to get partial credit. ($P_{total} = P_A + P_B + P_C + \ldots$)
(χ = mole fraction = $P_A / P_{total} = n_A / n_{total}$)

1. If the total pressure inside a cylinder is 1.2 atm and the pressure of the water vapor is 0.5 atm, what is the pressure of the only other gas in the cylinder, hydrogen ? Show work. (4 pts)

$P_{total} = 1.2\,atm \quad P_{H_2O} = 0.5\,atm$

$P_{total} = P_{H_2O} + P_{H_2}$

$1.2 = 0.5\,atm + P_{H_2}$

$P_{H_2} = 1.2 - 0.5 = 0.7\,atm$

attempt −2
math algebra −½

2. a. If the principal quantum number (n) is 4, what is the equation of the allowed possible angular momentum quantum number (ℓ) (2 pts)

$\ell =$ 0, ... n−1 or 0, ... (4−1)

0 to 4 −½
−4 to +4 (−1½)

b. How many orbitals are in the **p** subshell ? (**p** is the angular momentum quantum number $\ell = 1$)

[(0) (1) (3) (5)] (circle one) (2 pts) −1, 0, +1

said +5 just −1

c. How many maximum number of electrons are allowed in the **p** subshell?

[(2) (6) (10) (14)] (circle one) (2 pts) 2 per orbital x 3 = 6 e⁻

3. Give the electron configuration for the element **Si** using the notation ($1s^2, 2s^2, \ldots$). Show all electrons starting from the lowest energy levels. (10 pts)

$1s^2, 2s^2, 2p^6, 3s^2, 3p^2$ (2 pt each)

ex two wrong −1

Extra credit: a. What is the valence electron configuration for the above element ? use same notation as above (2 pts)

$3s^2, 3p^2$ (1 pt each)

not valence −1

b. Give the electron configuration diagram for **the valence electrons** for the same element. (2 pts) (use the notation ↑↓)

1s 2s

↑↓ ↑ ↑ —

3s 3p

Consistent w above OK.

Incorrect orbital 2s — −1

Hund violation −½

did not show orbitals −1

Quiz V General Chemistry I Lecture Fall 14 Dr. Hahn 20 pts 10/29 W 9:30am form B quiz # _____

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

Please show work for full credit and to get partial credit. ($P_{total} = P_A + P_B + P_C + \ldots$)
(χ = mole fraction = $P_A / P_{total} = n_A / n_{total}$)

1. If the pressure of nitrogen is 760 mm Hg and the pressure of the helium is 20 mm Hg, what is the total pressure the gases inside a cylinder containing the two gases ? Show work. (4 pts)

$P_{total} = P_{N_2} + P_{He}$

$P_{total} = 760\ mmHg + 20\ mmHg = 780\ mmHg$

2. a. If the angular momentum quantum number (ℓ) is 2, what is the equation of the allowed possible magnetic quantum number (m_ℓ) (2 pts)

$m_\ell = (-\ell \ldots 0, \ldots +\ell)$ or $-2, -1, 0, +1, +2$

b. How many orbitals are in the d subshell ? (d is the angular momentum quantum number of $\ell = 2$)

[(0) (1) (3) (5)] (circle one) (2 pts) $-2, -1, 0, +1, +2$ or 5

c. How many maximum number of electrons are allowed in the d subshell?

[(2) (6) (10) (14)] (circle one) (2 pts) $5 \times 2 = 10\bar{e}$

3. Give the electron configuration for the element **Br** using the notation ($1s^2, 2s^2, \ldots$). Show all electrons starting from the lowest energy levels. (10 pts)

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

Extra credit: a. What is the valence electron configuration for the above element ? use same notation as above (2 pts)

$4s^2,\ 4p^5$

b. Give the electron configuration diagram for **the valence electrons** for the same element (2 pts)
(use the notation $\underline{\uparrow\downarrow}$ $\underline{\uparrow\downarrow}$)
1s 2s

$\underline{1\downarrow}$ $\underline{1\downarrow}$ $\underline{1}$
4s 4p

Quiz V General Chemistry I Lecture Fall 14 Dr. Hahn 20 pts 10/29 W 10:30am form A quiz # _____

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

Please show work for full credit and to get partial credit. ($P_{total} = P_A + P_B + P_C + \ldots$)
(χ = mole fraction = $P_A / P_{total} = n_A / n_{total}$)

1. If a mixture of gases has a total pressure of 0.955 atm and the oxygen part of the mixture of gases is 0.150 atm, what is the mole fraction of the oxygen in the mixture of gases ? Show work. (4 pts)

$P_{total} = 0.955 atm$ $P_{O_2} = 0.150 atm$ attempt -2

$\chi_{O_2} = \frac{0.150 atm}{0.955 atm} = 0.157$ algebra/math -½

2. a. If the principal quantum number (n) is 3, what are the possible values of the angular momentum quantum number ℓ (2 pts) 0, 1, 2 ($n-1 = 3-1 = 2$) gave -3, 0, +3 -½

b. How many orbitals are in the **f** subshell ? (f is the angular momentum quantum number of $\ell = 3$)

[(0) (1) (3) (5) (7)] (circle one) (2 pts) -3, -2, -1, 0, +1, +2, +7

gave 0 to 3 -1

c. How many maximum number of electrons are allowed in the **f** subshell?

[(2) (6) (10) (14)] (circle one) (2 pts) $2 \times 7 = 14$

just 2 -1

3. Give the electron configuration for the element **Sr** using the notation ($1s^2, 2s^2, \ldots$). Show all electrons starting from the lowest energy levels. (10 pts)

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

2pt 1pt rest

Extra credit: a. What is the valence electron configuration for the above element ? use same notation as above (2 pts)

$5s^2$ not valence -1

gave 4p6 -1

b. Give the electron configuration diagram for ~~the valence electrons~~ for the same element. (2 pts)
(use the notation ___1↓___ ___1↓___)
1s 2s

1↓ 5s

Consistent w above Ok

Violates Hund -½

incorrect orbitals such as -1
2s – –

Quiz V General Chemistry I Lecture Fall 14 Dr. Hahn 20 pts 10/29 W 10:30am form B quiz # ____

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

Please show work for full credit and to get partial credit. ($P_{total} = P_A + P_B + P_C + \ldots$)

(χ = mole fraction = $P_A / P_{total} = n_A / n_{total}$)

1. If water vapor is 0.12 atm and the total pressure of the gases collected over water is 1.23 atm, what is the mole fraction of the water vapor ? Show work. (4 pts)

$P_{H_2O} = 0.12 atm$ $P_{total} = 1.23 atm$ Attempt -2

$X_{H_2O} = \frac{0.12 atm}{1.23 atm} = 0.0976$ algebra math -1/2

2. a If the angular momentum quantum number (ℓ) is 2, what are the possible values of the magnetic quantum number m_ℓ = -2, -1, 0, +1, +2 (2 pts)

gave 0,1,2 or 0,1 -1/2

b. How many orbitals are in the s subshell ? (s is the angular momentum quantum number of $\ell = 0$)

[(0) (1) (3) (5)] (circle one) (2 pts) $\ell = 0$, $m_\ell = 0$

c. How many maximum number of electrons are allowed in the s subshell?

[(2) (6) (10) (14)] (circle one) (2 pts) $2\bar{e}$ per orbital = $2\bar{e}$

Just 2 -1

3. Give the electron configuration for the element N using the notation ($1s^2, 2s^2, \ldots$). Show all electrons starting from the lowest energy levels. (10 pts)

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

4pt 3pt 3pt

Extra credit: a. What is the valence electron configuration for the above element ? use same notation as above (2 pts)

$2s^2, 2p^3$ Not valence -1

b. Give the electron configuration diagram for **the valence electrons** for the same element. (2 pts)

(use the notation $\underset{1s}{\uparrow\downarrow}$ $\underset{2s}{\uparrow\downarrow}$)

$\underset{2s}{\uparrow\downarrow}$ $\underset{2p}{\uparrow}$ $\uparrow$ $\uparrow$ Consistent OK

with above

violate Hund -1/2

-1 incorrect orbitals such as 2s — —

Quiz V General Chemistry I Lecture Fall 14 Dr. Hahn 20 pts 10/29 W 9:30am form A quiz # _____

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

Please show work for full credit and to get partial credit. ($P_{total} = P_A + P_B + P_C + \ldots$)
(χ = mole fraction = $P_A / P_{total} = n_A / n_{total}$)

1. If the total pressure inside a cylinder is 1.2 atm and the pressure of the water vapor is 0.5 atm, what is the pressure of the only other gas in the cylinder, hydrogen ? Show work. (4 pts)

2. a. If the principal quantum number (n) is 4, what is the equation of the allowed possible angular momentum quantum number (ℓ) (2 pts)

ℓ = _____

b. How many orbitals are in the **p** subshell ? (p is the angular momentum quantum number $\ell = 1$)

[(0) (1) (3) (5)] (circle one) (2 pts)

c. How many maximum number of electrons are allowed in the **p** subshell?

[(2) (6) (10) (14)] (circle one) (2 pts)

3. Give the electron configuration for the element **Si** using the notation ($1s^2$, $2s^2$,.....). Show all electrons starting from the lowest energy levels. (10 pts)

Extra credit: a. What is the valence electron configuration for the above element ? use same notation as above (2 pts)

b. Give the electron configuration diagram for **the valence electrons** for the same element. (2 pts)
(use the notation _____)
1s 2s

Quiz V General Chemistry I Lecture Fall 14 Dr. Hahn 20 pts 10/29 W 9:30am form B quiz # _____

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

Please show work for full credit and to get partial credit. ($P_{total} = P_A + P_B + P_C + \ldots$)
(χ = mole fraction = $P_A / P_{total} = n_A / n_{total}$)

1. If the pressure of nitrogen is 760 mm Hg and the pressure of the helium is 20 mm Hg, what is the total pressure the gases inside a cylinder containing the two gases ? Show work. (4 pts)

2. a. If the angular momentum quantum number (ℓ) is 2, what is the equation of the allowed possible magnetic quantum number (m_ℓ) (2 pts)

ℓ = _____

b. How many orbitals are in the **d** subshell ? (d is the angular momentum quantum number of $\ell = 2$)

[(0) (1) (3) (5)] (circle one) (2 pts)

c. How many maximum number of electrons are allowed in the **d** subshell?

[(2) (6) (10) (14)] (circle one) (2 pts)

3. Give the electron configuration for the element **Br** using the notation ($1s^2$, $2s^2$,.....). Show all electrons starting from the lowest energy levels. (10 pts)

Extra credit: a. What is the valence electron configuration for the above element ? use same notation as above (2 pts)

b. Give the electron configuration diagram for **the valence electrons** for the same element. (2 pts)
(use the notation _____ _____)
1s 2s

Quiz V General Chemistry I Lecture Fall 14 Dr. Hahn 20 pts 10/29 W 10:30am form A quiz # ____

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

Please show work for full credit and to get partial credit. ($P_{total} = P_A + P_B + P_C + \ldots$)
(χ = mole fraction = $P_A / P_{total} = n_A / n_{total}$)

1. If a mixture of gases has a total pressure of 0.955 atm and the oxygen part of the mixture of gases is 0.150 atm, what is the mole fraction of the oxygen in the mixture of gases ? Show work. (4 pts)

2. a. If the principal quantum number (n) is 3, what are the possible values of the angular momentum quantum number ℓ (2 pts) _____

b. How many orbitals are in the **f** subshell ? (f is the angular momentum quantum number of $\ell = 3$)

[(0) (1) (3) (5) (7)] (circle one) (2 pts)

c. How many maximum number of electrons are allowed in the **f** subshell?

[(2) (6) (10) (14)] (circle one) (2 pts)

3. Give the electron configuration for the element **Sr** using the notation ($1s^2$, $2s^2$,.....). Show all electrons starting from the lowest energy levels. (10 pts)

Extra credit: a. What is the valence electron configuration for the above element ? use same notation as above (2 pts)

b. Give the electron configuration diagram for **the valence electrons** for the same element. (2 pts)
(use the notation ↑↓ ↑↓)
1s 2s

Quiz V General Chemistry I Lecture Fall 14 Dr. Hahn 20 pts 10/29 W 10:30am form B quiz # _____

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

Please show work for full credit and to get partial credit. ($P_{total} = P_A + P_B + P_C + \ldots$)
(χ = mole fraction = $P_A / P_{total} = n_A / n_{total}$)

1. If water vapor is 0.12 atm and the total pressure of the gases collected over water is 1.23 atm, what is the mole fraction of the water vapor ? Show work. (4 pts)

2. a If the angular momentum quantum number (ℓ) is 2, what are the possible values of the magnetic quantum number m_ℓ _____ (2 pts)

b. How many orbitals are in the **s** subshell ? (s is the angular momentum quantum number of $\ell = 0$)

[(0) (1) (3) (5)] (circle one) (2 pts)

c. How many maximum number of electrons are allowed in the **s** subshell?

[(2) (6) (10) (14)] (circle one) (2 pts)

3. Give the electron configuration for the element **N** using the notation ($1s^2$, $2s^2$,.....). Show all electrons starting from the lowest energy levels. (10 pts)

Extra credit: a. What is the valence electron configuration for the above element ? use same notation as above (2 pts)

b. Give the electron configuration diagram for **<u>the valence electrons</u>** for the same element. (2 pts)
(use the notation ↑↓ ↑↓)
1s 2s