General Chemistry Multiple Choice Questions Chapter 3

1 Which of these is not allowed? **3.1**

a 2s **b** 2f
c 3p **d** 4d

2 Which order of energies of orbitals is correct in a many-electron atom? **3.1**

a 2s = 2p **b** 3s < 3p
c 3d < 2s **d** 4s > 5s

3 Which of the following is the electron configuration of nitrogen in its ground state? **3.1**

a $1s^2 2s^2 2p^2$ **b** $1s^2 2s^2 2p^3$
c $1s^2 2s^2 2p^4$ **d** $1s^2 2p^5$

4 Which of the following is the electronic configuration of Ni in its ground state? **3.1**

a $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8 4s^2$ **b** $1s^2 2s^2 2p^6 3s^2 3p^6 3d^9 4s^1$
c $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 4p^6 5s^2$ **d** $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^2 4p^2$

5 What element has the electron configuration $1s^2 2s^2 2p^6 3s^2 3p^2$? **3.1**

a C **b** Si
c N **d** P

6 Which of these is the electron configuration of an excited atom that is likely to emit a quantum of energy? **3.1**

a $1s^2 2s^2 2p^6 3s^2 3p^1$ **b** $1s^2 2s^2 2p^6 3s^2 3p^5$
c $1s^2 2s^2 2p^6 3s^2$ **d** $1s^2 2s^2 2p^6 3s^1$
e $1s^2 2s^2 2p^6 3s^1 3p^1$

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1 What is the electron configuration of Ni^{2+}?

a $[Ar]3d^6 4s^2$ **b** $[Ar]3d^8$

c $[Ar]3d^5 4s^1$ **d** $[Ar]3d^4 4s^2$

	3.2

2 What is the electron configuration of F^-?

a $1s^2 2s^2 2p^5$ **b** $1s^2 2s^2 2p^6$

c $1s^2 2s^2 2p^4$ **d** None of the above

	3.2

3 What is the electron configuration of Fe^{2+}?

a $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$ **b** $1s^2 2s^2 2p^6 3s^2 3p^6 3d^4$

c $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^4$ **d** $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6$

	3.2

4 Which of the following ions has the following electron configuration?
$1s^2 2s^2 2p^6 3s^2 3p^6$

a V^{2+} **b** Ca^+

c S^{3-} **d** K^+

	3.2

5 Which of the following ions has the following electron configuration?
$1s^2 2s^2 2p^6 3s^2 3p^6$

a Cl^- **b** P^{2-}

c Ca^{2-} **d** K^-

	3.2

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1 In the Bohr model of the hydrogen atom, which of the following statements is correct?

a When n = inf, the electron is in the ground state
b When n = 1, the electron is in an excited state
c The transition n = 2 to n = 4 represents emmission
d The transition n = 1 to n = 3 represents absorption

	3.3

2 What are the possible values for m_l for l = 3

a 3, -3
b 3, 0, 3
c 3, 2, 1, -1, -2, -3
d 3, 2, 1, 0, -1, -2, -3

	3.3

3 Which set of quantum numbers for an electron in an atom is *not* allowed?

a n = 2, l = 1, m_l = 0, m_s = -1/2
b n = 3, l = 2, m_l = 1, m_s = +1/2
c n = 3, l = 3, m_l = 2, m_s = +1/2
d n = 1, l = 10, m_l = 0, m_s = +1/2

	3.3

4 Which electron has the label *3d* ?

a n = 3, l = 2, m_l = 1
b n = 3, l = 1, m_l = 0
c n = 3, l = 0, m_l = 0
d n = 3, l = 3, m_l = 2

	3.3

5 Which hydrogen electron is *not* in an excited state?

a $1s^1$
b $2s^1$
c $3p^1$
d $4s^1$

	3.3

6 What is the maximum number of electrons that occupy the n = 4 energy level?

a n = 4
b 2n = 8
c $n^2 = 16$
d $2n^2 = 32$

	3.3

7 What is the value of *l* for a 5d electron?

a l = 0
b l = 1
c l = 2
d l = 3

	3.3

8 What are the possible m_l values for a 4p electron?

a 4, 3, 2, 1, 0, -1, -2, -3, -4
b 3, 2, 1, 0, -1, -2, -3
c 2, 1, 0, -1, -2
d 1, 0, -1

	3.3