MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) The photoelectric effect is __________.
   A) the total reflection of light by metals giving them their typical luster
   B) the darkening of photographic film when exposed to an electric field
   C) a relativistic effect
   D) the production of current by silicon solar cells when exposed to sunlight
   E) the ejection of electrons by a metal when struck with light of sufficient energy
   Right Answer

2) In the Bohr model of the atom, __________.
   A) electron paths are controlled by probability
   B) electrons travel in circular paths called orbitals
   C) electrons can have any energy
   D) electron energies are quantized
   Right answer
   E) both A and C

3) According to the Heisenberg Uncertainty Principle, it is impossible to know precisely both the position and the __________ of an electron.
   A) color
   B) shape
   C) mass
   D) velocity
   E) momentum
   Right Answer

4) Which one of the following conditions would always result in an increase in the internal energy of a system?
   A) The system loses heat and does work on the surroundings.
   B) The system loses heat and has work done on it by the surroundings.
   C) The system gains heat and has work done on it by the surroundings.
   Right Answer
   D) The system gains heat and does work on the surroundings.
   E) None of the above is correct.
5) An electron cannot have the quantum numbers \( n = \_\_\_, l = \_\_\_, m_l = \_\_. \)  
A) 3, 1, -1  
B) 3, 2, 1  
C) 2, 1, -1  
D) 2, 0, 0  
E) 1, 1, 1 
**Right answer**

6) Which one of the following is an incorrect subshell notation?  
A) 2p  
B) 3d  
C) 4f  
D) 2d **right answer**  
E) 3s  

7) Which set of three quantum numbers \( (n, l, m_l) \) corresponds to a 3d orbital?  
A) 3, 2, 2 **right answer**  
B) 2, 1, 0  
C) 3, 2, 3  
D) 2, 3, 3  
E) 3, 3, 2
8) Which electron configuration denotes an atom in its ground state?

A) 

\[
\begin{array}{ccc}
1s & 2s & 2p \\
\uparrow \downarrow & \uparrow \downarrow & \uparrow \downarrow \\
\end{array}
\]

B) 

\[
\begin{array}{ccc}
1s & 2s & 2p \\
\uparrow \downarrow & \uparrow \downarrow & \uparrow \uparrow \\
\end{array}
\]

Right answer

C) 

\[
\begin{array}{ccc}
1s & 2s & 2p \\
\uparrow \uparrow & \uparrow \downarrow & \big| & \big| \\
\end{array}
\]

D) 

\[
\begin{array}{ccc}
1s & 2s & 2p \\
\uparrow & \uparrow \downarrow & \big| & \big| \\
\end{array}
\]

E) 

\[
\begin{array}{ccc}
1s & 2s & 2p \\
\uparrow & \uparrow & \uparrow \downarrow \uparrow \\
\end{array}
\]
Answer Key
Testname: TEST 3

1) E
2) D
3) E
4) C
5) E
6) D
7) A
8) B