CHAPTER 2

2.8 *Allowed values for the quantum numbers of electrons are as follows:*

$$n = 1, 2, 3, \ldots$$

$$l = 0, 1, 2, 3, \ldots, n-1$$

$$m_l = 0, \pm 1, \pm 2, \pm 3, \ldots, \pm l$$

$$m_s = \pm \frac{1}{2}$$

*The relationships between n and the shell designations are noted in Table 2.1. Relative to the subshells,*

$l = 0$ *corresponds to an s subshell*

$l = 1$ *corresponds to a p subshell*

$l = 2$ *corresponds to a d subshell*

$l = 3$ *corresponds to an f subshell*

*For the K shell, the four quantum numbers for each of the two electrons in the 1s state, in the order of* $nlm_lm_s$, *are* $100(\frac{1}{2})$ *and* $100(-\frac{1}{2})$. *Write the four quantum numbers for all of the electrons in the L and M shells, and note which correspond to the s, p, and d subshells.*

2.9 *Give the electron configurations for the following ions:* $Fe^{2+}$, $Al^{3+}$, $Cu^{+}$, $Ba^{2+}$, $Br^{-}$, *and* $O^{2-}$.

2.18 *The net potential energy between two adjacent ions,* $E_N$, *may be represented by the sum of Equations 2.9 and 2.11; that is,*

$$E_N = -\frac{A}{r} + \frac{B}{r^n} \qquad (2.17)$$

*Calculate the bonding energy* $E_0$ *in terms of the parameters A, B, and n using the following procedure:*

*1. Differentiate* $E_N$ *with respect to r, and then set the resulting expression equal to zero, since the curve of* $E_N$ *versus r is a minimum at* $E_0$.

*2. Solve for r in terms of A, B, and n, which yields* $r_0$, *the equilibrium interionic spacing.*

*3. Determine the expression for* $E_0$ *by substitution of* $r_0$ *into Equation 2.17.*

2.25 *Compute the %IC of the interatomic bond for each of the following compounds: MgO, GaP, CsF, CdS, and FeO.*