

34. (a) The energy level corresponding to the probability density distribution shown in Fig. 40-20 is the  $n = 2$  level. Its energy is given by

$$E_2 = -\frac{13.6 \text{ eV}}{2^2} = -3.4 \text{ eV} .$$

- (b) As the electron is removed from the hydrogen atom the final energy of the proton-electron system is zero. Therefore, one needs to supply at least 3.4 eV of energy to the system in order to bring its energy up from  $E_2 = -3.4 \text{ eV}$  to zero. (If more energy is supplied, then the electron will retain some kinetic energy after it is removed from the atom.)