CHAPTER 2: ATOMIC STRUCTURE

1. What is the wavelength, λ of the fourth line in the Balmer's series? [Rydberg constant, $R_H = 1.0971 \times 10^7\ m^{-1}$]

   A. 410nm C. 486nm

   B. 432nm D. 654nm

2. Calculate the energy required to excite an electron from n =2 to n=4.

   A. 4.09×10^{-19} J C. 2.05×10^{6} J

   B. 5.45×10^{-19} J D. 2.74×10^{6} J

3. What is the frequency, in s^{-1}, of a radiation with energy of 3.37×10^{-19} J per photon?

   A. $5.08 \times 10^{-54}\ s^{-1}$ C. $5.08 \times 10^{-15}\ s^{-1}$

   B. $5.08 \times 10^{14}\ s^{-1}$ D. $5.08 \times 10^{15}\ s^{-1}$

4. Calculate the wavelength of the second line in Lyman series.

   A. 1.30×10^{-7} m C. 2.45×10^{-7} m

   B. 1.23×10^{-7} m D. 1.03×10^{-7} m

5. What is the minimum amount of ionization energy of hydrogen atom at ground state?

   A. 1312.36 kJ mol^{-1}

   B. 2.18×10^{-18} J

   C. 2.18×10^{-18} J mol^{-1}

   D. 1312.36 J mol^{-1}

6. Calculate the frequency of the second line in Lyman series.

   A. $1.91 \times 10^{14}\ s^{-1}$ C. $3.23 \times 10^{14}\ s^{-1}$

   B. $2.91 \times 10^{15}\ s^{-1}$ D. $1.65 \times 10^{15}\ s^{-1}$

7. Calculate the wavelength of the third line in the Balmer series.

   A. 810 nm C. 434 nm

   B. 343 nm D. 520 nm

8. FIGURE 1 shows the first four lines in the Brackett series of hydrogen emission spectrum.

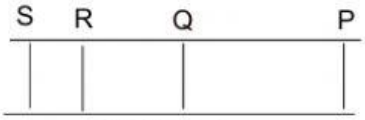

FIGURE 1

   Calculate the wavelength of the radiation that produces the fourth line.

   A. 5.56×10^{-6} m C. 1.94×10^{-5} m

   B. 2.34×10^{-5} m D. 1.94×10^{-6} m

9. In the hydrogen atom, an electron transit from a higher to a lower energy level emits a photon with a wavelength of 1282 nm in Paschen series. Determine the energy level of the excited state for this transition.

   A. n = 3 C. n =6

   B. n = 4 D. n = 5

10. A line with wavelength of 434 nm was observed in the Balmer series of the emission spectrum of hydrogen. Calculate its frequency.

    A. $5.91 \times 10^{14}\ s^{-1}$ C. $6.19 \times 10^{14}\ s^{-1}$

    B. $7.19 \times 10^{14}\ s^{-1}$ D. $6.91 \times 10^{14}\ s^{-1}$

11. Calculate the energy of the photon emitted to produced second line in the Paschen series.

    A. 2.55×10^{-19} J C. 1.51×10^{-19} J

    B. 1.45×10^{-19} J D. 1.55×10^{-19} J