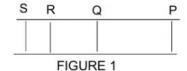
CHAPTER 2: ATOMIC STRUCTURE

- 1. What is the wavelength, λ of the fourth line in the Balmer's series? [Rydberg constant, $R_H = 1.0971 \times 10^7 \text{ m}^{-1}$
 - 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 x 10⁻¹⁹ J
- C. 2.05 x 10⁶ J
- B. 5.45 x 10⁻¹⁹ J
- D. 2.74 x 10⁶ J
- 3. What is the frequency, in s-1, of a radiation with energy of 3.37 x 10-19 J per photon?
 - A. 5.08 x 10⁻⁵⁴ s⁻¹
 - C. 5.08 x 10⁻¹⁵ s⁻¹
 - B. 5.08 x 10¹⁴ s⁻¹
- D. 5.08 x 10¹⁵ s⁻¹
- 4. Calculate the wavelength of the second line in Lyman series.
 - A. 1.30 x10⁻⁷ m
- C. 2.45 x10⁻⁷ m
- B. 1.23 x 10⁻⁷ m
- D. 1.03 x10⁻⁷ 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 x 10⁻¹⁸ J
 - C. 2.18 x 10⁻¹⁸J mol⁻¹
 - D. 1312.36 J mol⁻¹
- 6. Calculate the frequency of the second line in Lyman series.
 - A. 1.91 x 10¹⁴ s⁻¹
- C. 3.23 x 1014 s-1
- B. 2.91 x 10¹⁵ s⁻¹
- D. 1.65 x 10¹⁵ 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.



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

- A. 5.56 x 10⁻⁶ m
- C. 1.94 x 10⁻⁵ m
- B. 2.34 x 10⁻⁵ m
- D. 1.94 x 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 spectrum of hydrogen. emission Calculate its frequency.
 - A. $5.91 \times 10^{14} \,\mathrm{s}^{-1}$
- C. 6.19 x 10¹⁴ s⁻¹
- B. 7.19 x 10¹⁴ s⁻¹
- D. 6.91 x 10¹⁴ s⁻¹
- 11. Calculate the energy of the photon emitted to produced second line in the Paschen series.
 - A. 2.55 x 10⁻¹⁹ J C. 1.51 x 10⁻¹⁹ J
 - B. 1.45 x 10⁻¹⁹ J D. 1.55 x 10⁻¹⁹ J