

JEE MAIN STRUCTURE OF ATOM — ATOMIC SPECTRA AND HYDROGEN SPECTRUM — PYQS

Max. Marks: 32
Questions: 8

Section A (MCQ) — 7 questions

- Q.1** If shortest wavelength of hydrogen atom in Lyman series is x , then longest wavelength in Balmer series of He^+ is:

[JEE Main 2026 (Online) 6th April Morning Shift]

- (1) $\frac{9x}{5}$ (2) $\frac{36x}{5}$ (3) $\frac{x}{4}$ (4) $\frac{5x}{9}$

Scan or tap for the full solution



- Q.2** What is the ratio of wave number of first line (lowest energy line) of Balmer series of H atomic spectrum to first line of its Brackett series?

[JEE Main 2026 (Online) 4th April Morning Shift]

- (1) 5 : 1 (2) 5 : 0.81 (3) 5 : 1.75 (4) 5 : 27

Scan or tap for the full solution



- Q.3** The wave numbers of three spectral lines of H atom are considered. Identify the set of spectral lines belonging to Balmer series.

(R = Rydberg constant)

[JEE Main 2026 (Online) 28th January Morning Shift]

- (1) $\frac{5R}{36}, \frac{3R}{16}, \frac{21R}{100}$ (2) $\frac{7R}{144}, \frac{3R}{16}, \frac{16R}{255}$
 (3) $\frac{3R}{4}, \frac{3R}{16}, \frac{7R}{144}$ (4) $\frac{5R}{36}, \frac{8R}{9}, \frac{15R}{16}$

Scan or tap for the full solution



- Q.4** The wavelength of spectral line obtained in the spectrum of Li^{2+} ion, when the transition takes place between two levels whose sum is 4 and difference is 2, is

[JEE Main 2026 (Online) 24th January Evening Shift]

- (1) $1.14 \times 10^{-6} \text{ cm}$ (2) $2.28 \times 10^{-6} \text{ cm}$
 (3) $1.14 \times 10^{-7} \text{ cm}$ (4) $2.28 \times 10^{-7} \text{ cm}$

Scan or tap for the full solution



- Q.5** The energy of first (lowest) Balmer line of H atom is x J. The energy (in J) of second Balmer line of H atom is :

[JEE Main 2026 (Online) 22nd January Evening Shift]

- (1) $\frac{x}{1.35}$ (2) $1.35x$ (3) x^2 (4) $2x$

Scan or tap for the full solution



- Q.6** Given below are two statements :

Statement-I: When an electric discharge is passed through gaseous hydrogen, the hydrogen molecules dissociate and the energetically excited hydrogen atoms produce electromagnetic radiation of discrete frequencies.

Statement-II: The frequency of second line of Balmer series obtained from He^+ is equal to that of first line of Lyman series obtained from hydrogen atom.

In the light of the above statements, choose the correct answer from the options given below :

[JEE Main 2026 (Online) 21st January Morning Shift]

- (1) Both Statement-I and Statement-II are true
 (2) Statement-I is true but Statement-II is false
 (3) Statement-I is false but Statement-II is true
 (4) Both Statement-I and Statement-II are false

Scan or tap for the full solution



- Q.7** Consider the following spectral lines for atomic hydrogen :

The correct arrangement of the above lines in ascending order of energy is :

- A. First line of Paschen series
 B. Second line of Balmer series
 C. Third line of Paschen series
 D. Fourth line of Brackett series

[JEE Main 2026 (Online) 21st January Evening Shift]

- (1) $D < C < A < B$ (2) $A < B < C < D$
 (3) $D < A < C < B$ (4) $C < D < B < A$

Scan or tap for the full solution



Section B (Numerical) — 1 question

- Q.8** The hydrogen spectrum consists of several spectral lines in Lyman series ($L_1, L_2, L_3, \dots$; L_1 has lowest energy among Lyman series). Similarly it consists of several spectral lines in Balmer series ($B_1, B_2, B_3, \dots$; B_1 has lowest energy among Balmer lines). The energy of L_1 is x times the energy of B_1 . The value of x is $______ \times 10^{-1}$. (Nearest integer)

[JEE Main 2026 (Online) 24th January Morning Shift]

Scan or tap for the full solution

**ANSWER KEY****Section A (MCQ) — 7 questions**

Ques.	1	2	3	4	5	6	7				
Ans.	1	2	1	1	2	1	3				

Section B (Numerical) — 1 question

Ques.	8										
Ans.	54										