

# PYQSide

## JEE MAIN STRUCTURE OF ATOM — BOHR MODEL FOR HYDROGEN ATOM — PYQS

Max. Marks: 32

Questions: 8

### Section A (MCQ)

**Q.1** The Bohr radius of a hydrogen like species is 70.53 pm. The species and the stationary state (n) are respectively

(Given : Hydrogen atom Bohr radius is 52.9 pm)

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

- (1)  $\text{Li}^{2+}$ , 3    (2)  $\text{He}^+$ , 3    (3)  $\text{He}^+$ , 2    (4)  $\text{Li}^{2+}$ , 2

Scan or tap for the full solution



**Q.2** The species having identical radii according to the Bohr's theory are :

- A. H (first orbit)                      B.  $\text{He}^+$  (first orbit)  
C.  $\text{He}^+$  (Second orbit)              D.  $\text{Li}^{2+}$  (first orbit)  
E.  $\text{Be}^{3+}$  (Second orbit)

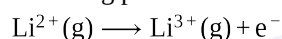
Choose the correct answer from the options given below : [JEE Main 2026 (Online) 4th April Evening Shift]

- (1) A and C Only                      (2) A and E Only  
(3) B and E Only                      (4) C and D Only

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**Q.3** What is the energy (in  $\text{J atom}^{-1}$ ) required for the following process ?



(Take the ionization energy for the H atom in the ground state as  $2.18 \times 10^{-18} \text{ J atom}^{-1}$ )

[JEE Main 2026 (Online) 2nd April Morning Shift]

- (1)  $8.72 \times 10^{-18}$                       (2)  $1.962 \times 10^{-18}$   
(3)  $1.962 \times 10^{-17}$                       (4)  $6.54 \times 10^{-17}$

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**Q.4** Which of the following statements regarding the energy of the stationary state is true in the following one-electron systems ?

[JEE Main 2026 (Online) 23rd January Morning Shift]

- (1)  $+2.18 \times 10^{-18} \text{ J}$  for second orbit of  $\text{He}^+$  ion  
(2)  $+8.72 \times 10^{-18} \text{ J}$  for first orbit of  $\text{He}^+$  ion  
(3)  $-1.09 \times 10^{-18} \text{ J}$  for second orbit of H atom.  
(4)  $-2.18 \times 10^{-18} \text{ J}$  for third orbit of  $\text{Li}^{2+}$  ion

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**Q.5** The energy required by electrons, present in the first Bohr orbit of hydrogen atom to be excited to second Bohr orbit is \_\_\_\_\_  $\text{J mol}^{-1}$ .

Given:  $R_H = 2.18 \times 10^{-11} \text{ ergs}$ .

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

- (1)  $9.835 \times 10^{12}$                       (2)  $1.635 \times 10^{-11}$   
(3)  $1.635 \times 10^{-18}$                       (4)  $9.835 \times 10^5$

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**Q.6** Which of the following postulate of Bohr's model of hydrogen atom is not in agreement with quantum mechanical model of an atom?

[JEE Main 2025 (Online) 3rd April Morning Shift]

- (1) The electron in a H atom's stationary state moves in a circle around the nucleus.  
(2) An atom can take only certain distinct energies  $E_1, E_2, E_3$ , etc. These allowed states of constant energy are called the stationary states of atom.  
(3) An atom in a stationary state does not emit electromagnetic radiation as long as it stays in the same state.  
(4) When an electron makes a transition from a higher energy stationary state to a lower energy stationary state, then it emits a photon of light.

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**Q.7** According to Bohr's model of hydrogen atom, which of the following statement is incorrect?

[JEE Main 2025 (Online) 2nd April Morning Shift]

- (1) Radius of 4<sup>th</sup> orbit is four times larger than that of 2<sup>nd</sup> orbit  
(2) Radius of 8<sup>th</sup> orbit is four times larger than that of 4<sup>th</sup> orbit  
(3) Radius of 6<sup>th</sup> orbit is three times larger than that of 4<sup>th</sup> orbit  
(4) Radius of 3<sup>rd</sup> orbit is nine times larger than that of 1<sup>st</sup> orbit

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**Section B (Numerical)**

**Q.8** The energy of an electron in the first Bohr orbit of the H-atom is  $-13.6$  eV.

The magnitude of energy value of an electron in the first excited state of  $\text{Be}^{3+}$  is \_\_\_\_\_ eV (nearest integer value).

[JEE Main 2025 (Online) 8th April Evening Shift]

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full solution

**ANSWER KEY****Section A (MCQ)**

|              |   |   |   |   |   |   |   |  |  |  |  |
|--------------|---|---|---|---|---|---|---|--|--|--|--|
| <b>Ques.</b> | 1 | 2 | 3 | 4 | 5 | 6 | 7 |  |  |  |  |
| <b>Ans.</b>  | 4 | 2 | 3 | 4 | 4 | 1 | 3 |  |  |  |  |

**Section B (Numerical)**

|              |    |  |  |  |  |  |  |  |  |  |  |
|--------------|----|--|--|--|--|--|--|--|--|--|--|
| <b>Ques.</b> | 8  |  |  |  |  |  |  |  |  |  |  |
| <b>Ans.</b>  | 54 |  |  |  |  |  |  |  |  |  |  |