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JEE Mains 2020 Jan Chapter wise Question Bank

Atomic Structure

Q1

$n = 5, m_s = +\frac{1}{2}$ How many orbitals are possible:

$n = 5, m_s = +\frac{1}{2}$ के लिए कितने कक्षक सम्भव है ?

(1) 25 (2) 30 (3) 50 (4) 35

7th Jan Morning

Sol

(1)

Q2

Amongst the following which is not a postulate of Dalton's atomic theory
(1) Matter is formed of indivisible atoms
(2) Under identical conditions of pressure and temperature gases combines and give gaseous products in simple volume ratio.
(3) During chemical reactions atoms remains conserved and only pass through rearrangement
(4) Some atoms have same properties including atomic mass

7th Jan Morning

Sol

(2)
Refer Notes

Q3

Given, for H-atom

$$\overline{\nu} = R_H\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]$$

Select the correct options regarding this formula for Balmer series.
(A) $n_1 = 2$
(B) Ionization energy of H atom can be calculated from above formula.
(C) $\lambda_{maximum}$ is for $n_2 = 3$.
(D) If λ decreases then spectrum lines will converse.

8th Jan Morning

Sol

(3)
Theory based.

Q4

Determine Bohr's radius of Li^{2+} ion for n = 2. Given (Bohr's radius of H-atom = a_0)
n = 2 के लिए Li^{2+} आयन की बोहर ऊर्जा का निर्धारण कीजिए। दिया है (H-परमाणु की बोहर त्रिज्या = a_0)

(1) $\frac{3a_0}{4}$ (2) $\frac{4a_0}{3}$ (3) $\frac{a_0}{3}$ (4) $\frac{16a_0}{9}$

8th Jan Evening

Sol

(2)

$r = \frac{a_0 n^2}{Z}$

For Li^{2+} के लिए $r = \frac{a_0(2)^2}{3} = \frac{4a_0}{3}$

Q5

Determine wavelength of electron in 4th Bohr's orbit ?
4th बोहर कक्षा में इलेक्ट्रॉन की तरंगद्वैर्ध्य का निर्धारण कीजिए ?

(1) $4\pi a_0$ (2) $2\pi a_0$ (3) $8\pi a_0$ (4) $6\pi a_0$

9th Jan Morning

Sol

(3)

$2\pi r = n\lambda$

$2\pi \times \frac{n^2}{Z} a_0 = n\lambda$

$2\pi \times \frac{4^2}{1} a_0 = n\lambda$

$\lambda = 8\pi a_0$

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