14th Aug, 2023

# CHAPTER : TWO
# ATOMIC STRUCTURE

## SELF-CHECK 2.1

**Qno:1** Calculate how much energy is required in order to remove electron of Hydrogen atom.

**Sol:** → **GIVEN**

$n_1 = 1$ $\quad$ $R = 2.18 \times 10^{-18} J$

$n_2 = \infty$ $\quad$ $\Delta E = ?$

→ **FORMULA**

$$\Delta E = R\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]$$

$$\Delta E = 2.18 \times 10^{-18} J \left[\frac{1}{(1)^2} - \frac{1}{(\infty)^2}\right]$$

$$= 2.18 \times 10^{-18} J \left[\frac{1}{1} - 0\right]$$

$$= 2.18 \times 10^{-18} J$$

→ **ANSWER / RESULT**

$\Delta E = 2.18 \times 10^{-18} J$

15th Sep, 2023 CW

# SELF-CHECK 2.1

**QNO 1** Convert this energy into $\nu$ & $\bar{\nu}$

**Sol.**

→ **GIVEN**

$\Delta E = 2.18 \times 10^{-18} J$

→ **FORMULA**

$\Delta E = h\nu$

$\nu = f\lambda$

$c = \nu\lambda$

$\bar{\nu} = \frac{1}{\lambda}$

→ **TO FIND**

$\nu = ?$

$\bar{\nu} = ?$

→ **SOLUTION**

As $\Delta E = h\nu$

$$\nu = \frac{\Delta E}{h} = \frac{2.18 \times 10^{-18}}{6.626 \times 10^{-34}} = 3.2900 \times 10^{15}\ s^{-1}$$

As,

$c = \nu\lambda$

$$\lambda = \frac{c}{\nu} = \frac{3 \times 10^{8}}{3.2900 \times 10^{15}} = 9.118 \times 10^{-8}\ m$$

As $\frac{1}{\lambda} = \bar{\nu}$

$$\bar{\nu} = \frac{1}{9.118 \times 10^{-8}} = 1.097 \times 10^{7}\ m^{-1}$$

→ **RESULT**

$\bar{\nu} = 1.097 \times 10^{7}\ m^{-1}$

$\nu = 3.2900 \times 10^{15}\ s^{-1}$

rays are negatively charged.

# SELF-CHECK 2.2

Electronic Configurations :-

(i) $_{20}Ca^{40}$

Sol: $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2$

(ii) $_{17}Cl^{35}$

Sol: $1s^2, 2s^2, 2p^6, 3s^2, 3p^5$

(iii) $_{13}Al^{27}$

Sol:- $1s^2, 2s^2, 2p^6, 3s^2, 3p^1$