## Atomic models and Planck's quantum theory

**63.** The ratio between kinetic energy and the total energy of the electrons of hydrogen atom according to Bohr's model is

(a) 2 : 1 (b) 1 : 1
(c) 1 : – 1 (d) 1 : 2

**64.** Energy of the electron in Hydrogen atom is given by

(a) $E_n = -\frac{131.38}{n^2} kJmol^{-1}$

(b) $E_n = -\frac{131.33}{n} kJmol^{-1}$

(c) $E_n = -\frac{1313.3}{n^2} kJmol^{-1}$

(d) $E_n = -\frac{313.13}{n^2} kJmol^{-1}$

**65.** Ratio of radii of second and first Bohr orbits of *H* atom

(a) 2 (b) 4
(c) 3 (d) 5

**66.** The frequency corresponding to transition $n = 2$ to $n = 1$ in hydrogen atom is]

(a) $15.66 \times 10^{10} Hz$
(b) $24.66 \times 10^{14} Hz$
(c) $30.57 \times 10^{14} Hz$
(d) $40.57 \times 10^{24} Hz$

**67.** The mass of a photon with a wavelength equal to $1.54 \times 10^{-8} cm$ is

(a) $0.8268 \times 10^{-34} kg$
(b) $1.2876 \times 10^{-33} kg$
(c) $1.4285 \times 10^{-32} kg$
(d) $1.8884 \times 10^{-32} kg$

**68.** Splitting of spectral lines under the influence of magnetic field is called

(a) Zeeman effect
(b) Stark effect
(c) Photoelectric effect
(d) None of these

**69.** The radius of electron in the first excited state of hydrogen atom is

(a) $a_0$ (b) $4a_0$
(c) $2a_0$ (d) $8a_0$

**70.** The ratio of area covered by second orbital to the first orbital is

(a) 1 : 2 (b) 1 : 16
(c) 8 : 1 (d) 16 : 1

**71.** Time taken for an electron to complete one revolution in the Bohr orbit of hydrogen atom is

(a) $\frac{4\pi^2 mr^2}{nh}$ (b) $\frac{nh}{4\pi^2 mr}$

(c) $\frac{nh}{4\pi^2 mr^2}$ (d) $\frac{h}{2\pi mr}$

**72.** The radius of which of the following orbit is same as that of the first Bohr's orbit of hydrogen atom

(a) $He^+ (n = 2)$

(b) $Li^{2+}(n=2)$
(c) $Li^{2+}(n=3)$
(d) $Be^{3+}(n=2)$

**73.** The frequency of radiation emitted when the electron falls from $n=4$ to $n=1$ in a hydrogen atom will be (Given ionization energy of $H = 2.18 \times 10^{-18} J atom^{-1}$ and $h = 6.625 \times 10^{-34} Js$)
(a) $3.08 \times 10^{15} s^{-1}$
(b) $2.00 \times 10^{15} s^{-1}$
(c) $1.54 \times 10^{15} s^{-1}$
(d) $1.03 \times 10^{15} s^{-1}$

**74.** The wavelength of the radiation emitted, when in a hydrogen atom electron falls from infinity to stationary state 1, would be (Rydberg constant = $1.097 \times 10^{7} m^{-1}$)
(a) 406 *nm*
(b) 192 *nm*
(c) 91 *nm*
(d) $9.1 \times 10^{-8} nm$

**75.** In Bohr's model, atomic radius of the first orbit is $\gamma$, the radius of the 3rd orbit, is
(a) $\gamma/3$ (b) $\gamma$
(c) $3\gamma$ (d) $9\gamma$

**76.** According to Bohr's principle, the relation between principle quantum number $(n)$ and radius of orbit is
(a) $r \propto n$ (b) $r \propto n^2$
(c) $r \propto \frac{1}{n}$ (d) $r \propto \frac{1}{n^2}$

**77.** The ionisation potential of a hydrogen atom is –13.6 *eV*. What will be the energy of the atom corresponding to $n=2$
(a) –3.4 *eV* (b) –6.8 *eV*
(c) –1.7 *eV* (d) – 2.7 *eV*

**78.** The energy of electron in hydrogen atom in its grounds state is –13.6 eV. The energy of the level corresponding to the quantum number equal to 5 is
(a) –0.54 *eV* (b) – 0.85 *eV*
(c) – 0.64 *eV* (d) – 0.40 *eV*

**79.** The positive charge of an atom is
(a) Spread all over the atom
(b) Distributed around the nucleus
(c) Concentrated at the nucleus
(d) All of these

**80.** A metal surface is exposed to solar radiations
(a) The emitted electrons have energy less than a maximum value of energy depending upon frequency of incident radiations
(b) The emitted electrons have energy less than maximum value of energy depending upon intensity of incident radiation

(c) The emitted electrons have zero energy

(d) The emitted electrons have energy equal to energy of photos of incident light

**81.** Which of the following transitions have minimum wavelength

(a) $n_4 \to n_1$ (b) $n_2 \to n_1$

(c) $n_4 \to n_2$ (d) $n_3 \to n_1$