-------------------Chapter 9-------------------

1. Angular momentum, L = ?

Hints: n = integer, h = Planck Constant

1. L = (ans.)
2. L =
3. L =
4. L =

Prove:

Electrons in atoms can rotate in certain orbits around the nucleus where the angular velocity of the electron L is the product of a integer n and .

Means, L =

1. The speed of the atom from the bore's atom model, vn = ?

Hints: e = charge, m = Mass of electrons, rn = Electron radius, ϵ0 = Vacuum permittivity

1. vn = (ans.)
2. vn =
3. vn =
4. vn =

Prove:

We know, Fc =

Fe =

Since it is this stationary electric force that provides the centrifugal force, so

Fc = Fe

or,

or,

or, … …(i)

now, considering the electron in the n orbit, equation (i) stands,

vn =

1. The radius of the atom from the bore's atom model, rn = ?

Hints: h = Planck Constant, ϵ0 = Vacuum permittivity, m = mass of electrons, e = charge

1. rn = (ans.)
2. rn =
3. rn =
4. rn =

Prove:

= and,

vn = … …putting the = in equation (i) we get,

or,

or,

1. The total kinetic energy of electrons from the bore's atom model,

Hints: m = mass of electrons, e = charge, h = Planck Constant, ϵ0 = Vacuum permittivity

1. (ans.)

Prove:

We know, rn = … …(i)

and

or, … …(ii)

so,

therefore, … …(iii)

By putting rn = in equation (iii),

or,

1. Which is the radioactive conversion equation?

Hints: λ = Radioactive Decay constant, = Number of atoms intact in radioactive substances at (t = 0) time, N = Number of intact atoms left at the t time

1. N = (ans.)
2. N =
3. N =
4. N =

Prove:

Here, or,

Suppose, at the beginning i.e. t = 0, then the number of atoms N = N0 and at some time t = t where N = N. So we get by adding the above equation to this limit,

or,

or,

or, or,

therefore, N =

1. Mass Defect, Δm = ?

Hints: M = Actual mass of nucleus, Z = Proton Number, N = Neutron Number, mp = Mass of a proton, mn = Mass of a neutron

1. Δm = (Zmp + Nmn) - M (ans.)
2. Δm = (Zmp + Nmn) + M
3. Δm =
4. Δm = (Zmp - Nmn) + M

Prove:

1. Binding Energy, B. E = ?

Hints: M = Actual mass of nucleus, Δm = Mass error, c = speed of light, Z = proton number, N = Neutron Number, mp = Mass of a proton, mn = Mass of a neutron

1. B. E = (ans.)
2. B. E =
3. B. E =
4. B. E =

Prove:

From Einstein’s mass power relation we get -

Binding Energy, B. E = Δmc2

or, Binding Energy, B. E =

1. Binding Energy, B. E = ?

Hints: c = speed of light

1. B. E = Δmc2 (ans.)
2. B. E =
3. B. E =
4. B. E = mc2

Prove: