Page No 195 Answers
Solution 74
(a) Mass number
(b) Atomic number
(c) No. of protons = 4
(d) No. of neutrons = 9 - 4 = 5
(e) No. of electrons = 4
(f) Electrons in outermost orbit = 2
(g) X^{2+}
Solution 75
(a) Atomic no. = 18
(b) Element Z is non-metal
(c) As the outermost shell of element Z is completely filled so, it will not form any ion.
(d) Outermost electronic shell is completely filled with electrons.
(e) Name of element 'Z' = Argon Symbol is Ar
(f) Z belongs to the group 'Noble gases'.

Page No 210
Solution 01
E.C of Nitrogen = 2, 5
So, no. of valence electrons in Nitrogen atom = 5
Solution 02
Noble gases
Solution 03
Helium has less than 8 electrons in the valence shell of an atom. Its atomic no. is 2
Solution 04
Radioactive isotopes are used in the treatment of cancer.
One such isotope is Cobalt-60.
Solution 05
Uranium-235 isotope is used as a fuel in the reactors of nuclear power plants for generating electricity.
Solution 06
Cobalt-60 radioisotope is used in the treatment of cancer.
Solution 07
Iodine-131 radioisotope is used to determine the activity of thyroid gland.
Solution 08
Radioactive isotopes are used in industry to detect the leakage in underground oil pipelines, gas pipelines and water pipes.
Solution 09
The given statement is false.
Solution 10
Atoms containing same number of protons and electrons but different number of neutrons are called ISOTOPES.
Solution 11
Isotopes
Solution 12
The given pair are isotopes.
Solution 13
Radioactive isotopes have unstable nuclei and emit various types of radiations.
Solution 14

Number of protons	Number of neutrons	Mass number	Atomic number	Number of electrons	Valence
11	**12**	23	11	11	1

Solution 15
(a) M
(b) 3
(c) neutrons
(d) isotopes
Solution 16
(a) Atomic no. = 5
(b) Mass no. = 6 + 5 = 11
(c) No. of electrons = 5
(d) No. of valence electrons, per atom = 3
Solution 17
Atomic No. = 17
E.C. = (2, 8, 7)
Valency = 8 - no. of valence electrons = 8 - 7 = 1
Solution 18
Atomic No. of X = 16
E.C. of X = (2, 8, 6)
Valency of X = 8 - no. of valence electrons = 8 - 6 = 2

Page No 211
Solution 19
Valency shown by A (atomic no. 2) - 0
Valency shown by B (atomic no. 4) - 2
Valency shown by C (atomic no. 8) - 2
Valency shown by D (atomic no. 10) - 0
Valency shown by E (atomic no. 13) - 3
Solution 20
Uranium-235 : This isotope is used as a fuel in the reactors of nuclear power plants for generating electricity.
Cobalt-60 : This is used in the treatment of cancer.
Solution 21

$^{3}H_{1}$ and $^{3}He_{2}$ are not considered as isotopes because they do not have same atomic number.

Solution 22
The difference in the masses of isotopes of an element is due to different number of neutrons in their nuclei.
Solution 23
Because all the isotopes of an element have identical atomic configuration containing same number of valence electrons, therefore, all the isotopes of an element show identical chemical properties.
For example- Cl-35 and Cl-37, show identical chemical properties as they have same no. of 7 valence electrons.
Solution 24
Due to slight difference in the masses of the isotopes of an element, the physical properties of the isotopes are slightly different.
Solution 25
The fractional atomic masses of elements are due to the existence of their isotopes having different masses.
Solution 26
Deuterium, Protium and Tritium are isotopes.
Argon and Calcium are isobars.
Solution 27
(i) Due to identical electronic configuration containing the same no. of valence electrons, these isotopes have almost identical chemical properties.
(ii) All of them have 1 electron and 1 proton, so, they are electrically neutral.
Solution 28

$$\text{Atomic mass} = \Sigma\text{Mass no.} \times \%\text{ of that isotope}$$
$$= 20 \times \frac{90}{100} + 22 \times \frac{10}{100}$$
$$= 20.2\,u$$

Solution 29
Isobars are the atoms of different elements having different atomic numbers but the same mass number (or same atomic mass).
Solution 30
H - 1 proton, 1 electron and no neutron.
D - 1 proton, 1 electron and 1 neutron.
T - 1 proton, 1 electron and 2 neutrons.
Solution 31
Atomic No. = 7
E.C = 2, 5
Valency of given element = 3
Given element is NITROGEN.
Solution 32
(a) The number of electrons present in the valence shell are called valence electrons.
Valence electrons are situated in the outermost shell.
(b) There are 3 valence electrons present in the element with atomic no. 13.
Valence shell of this atom is M.
Solution 33

(a). Isotopes are the atoms of the same element having the same atomic number but different mass numbers.
For example - $^{35}Cl_{17}$ and $^{37}Cl_{17}$ are isotopes of chlorine.

(b). Similarity - A pair of isotopes have same atomic number.
Difference - A pair of isotopes have different mass numbers.

(c). In $^{35}Cl_{17}$ - 17 protons, 17 electrons and 18 neutrons.

In $^{37}Cl_{17}$ - 17 protons, 17 electrons and 20 neutrons.

Solution 34
(a) The isotopes which are unstable due to presence of extra neutrons in their nuclei and emit various types of radiations, are called radioactive isotopes or radioisotopes.
For example: Carbon - 14 , Arsenic - 74
(b) Uses of isotopes-
(i) They are used in the treatment of cancer.
(ii) Radioactive isotopes are used as 'tracers' in medicine to detect the presence of tumors and blood clots in human body.

(c). Average atomic mass = 35.5 u
Let % amount of $^{35}Z_{17}$ be y, then amount of $^{37}Z_{17}$ is (100 - y).

Then-
$$35 \times \frac{y}{100} + 37 \times \frac{(100 - y)}{100} = 35.5$$
$$\text{So, } 35y + 3700 - 37y = 3550$$
$$\text{Hence, } y = 75$$
Thus, amount of $^{35}Z_{17}$ is 75% and amount of $^{37}Z_{17}$ is 25%.

Solution 35
(a) The capacity of an atom of an element to form chemical bonds is known as its valency.
Valency of an atom with atomic no. 14 is 4.
(b) The valency of an element is either equal to the number of valence electrons in its atom or equal to the number of electrons required to complete eight electrons in the valence shell.
Valency of metal = No. of valence electron in its atom
Valency of a non-metal = 8 - No. of valence electron in its atom
For example- Valency of sodium (metal) is 1 and that of chlorine (non-metal) is also 1.

Page No 212
Solution 52

(a). E.C of Na^+ = 2, 8

So, no. of valence electrons in sodium ion, Na^+ = 8

(b). E.C of O2- = 2,8

So, no. of valence electrons in oxide ion, O^{-2} = 8

Solution 53

Atom A - $^{209}A_{82}$

Atom B - $^{209}B_{83}$

(i). A has 82 protons.
(ii). B has 83 protons.
(iii). No, A and B are not isotopes.

Page No 213

Solution 54

(i). $^{58}A_{26}$ and $^{58}B_{28}$ - these are not isotopes because they have different atomic numbers.
(ii). $^{79}X_{35}$ and $^{80}Y_{35}$ - these are isotopes as they have same atomic number.

Solution 55

(i). Subscripts represent atomic number whereas superscripts represent atomic mass.

(ii). Number of neutrons is responsible for the change in the superscripts.

(iii). Isotopes is the usual name for the given atoms of the element.

(iv). Nuclear composition of $^{18}O_8$ is:-

No. of protons = 8

No. of neutrons = 18 - 8 = 10

Solution 56

A and B are the example of isobars. This is because they have same number of nucleons.

Solution 57

Mass no. of A and B is 40.
The two species are isobars.
A represents Argon (Atomic no. = 18) while B represents Calcium (Atomic no. = 20).

Solution 58

$^{58}A_{26}$ and $^{58}B_{28}$ are isobars because they have same number of nucleons.

Solution 59

A and D are isotopes as they have the same number of protons.

Solution 60

(i) Mass number of X = 8 + 8 = 16
(ii) Mass number of Y = 8 + 9 = 17
(iii) X and Y are isotopes.
(iv) X and Y represent Oxygen.

********** END **********