Chemistry

Class-9

Chapter-4

Periodic Table

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Work sheet & Lecture note-2

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Modern Periodic Law:

When the elements are arranged according to **their atomic numbers,** their properties change gradually and after a certain time/interval the propertiesare repeated.

Properties / Periodicity:

1. The elements are listed in order of increasing their atomic numbers.
2. The periodic table divides the elements into periods and groups.
3. There are **7 periods** of elements in the PT. A period is a horizontal row of elementsrunning from left to the right hand side.
4. There are **18 groups** of elementsnumbered from 1 to 18. A group is a vertical column ofelements.
5. Theelements which have the same number of electrons in their outermost shells,fall into the same group in the Periodic Table.
6 Theelements which have same number

of ‘electron shell’, fall into the same period in the PT.

7. In the PT, atomic size of the elements increases down the group, as the number ofelectron-shells in the atoms increases.
8 Chemical properties of all the elements in a group are similar, varying in vigor.
9. In a period, properties of the elements change gradually from left to the right hand side.
10. There is an imaginery stair-case line(starts just below BORON) across the PT dividing it into metals and non metals.
11. Metals are found on the left hand side of the staircase line andnon-metals are found on the right-hand side of the staircase line.
12. The elements, which are very close to the staircase line, have both metallic and non-metallic properties and are known as metalloids.
13. The elements between Group 2 and Group 13 are known as **transition elements.**
14. The reactivity of metals increases down the group, whereas that of the non-metals decreases down the group.
15. Some special names are given to

some of the groups of the PT. Group 1 elementsare known as alkali metals. Group 2, group 7 and group 18 elements are known as alkaline earth metals, halogens and noble or inert gases respectively.

Determining position of an element in the PT:

The position of an element in the periodic table can be determined from its electronic configuration.

- The number of **valence electrons** indicates group number and
- The number of electron-shells indicates period number in the periodic table.

For example,
The electron configuration of sodium is,
$_{11}Na$ = 2,8,1
The number of outermost electron of sodiumis 1, so it belongs to group 1 and the number
electron-shells is 3, so it belongs to period 3

Worksheet on the "**Periodic Table**"

1. State and explain the position of calcium in the P.T.[Ca = 2, 8, 8, 2]
2. Mention modern periodic law.
3. Mention the main characteristics of

modern periodic table.

4. Use the periodic Table to help you answer the following questions.

(a) The relative atomic mass of barium is ……

(b) The number of protons in an atom of potassium is ……

(c) The number of electrons in the outer shell of an atom of bromine……
(d) The number of electrons needed by an atom of silicon to completeits outer shell is .…….
(e)The Periodic Table is an arrangement of elements in order of their …… number.
(f) Elements on the left hand side of the periodic table …… electrons to from …… ions known as cations.
(g) In the Periodic table the vertical columns are known as ..…… and the horizontal rows are known as……
(h) The elements from scandium to zinc in the centre of the Periodic table are known as ……metals.
(i) The fourth member of Group 2 elements

is……
(j) Electrons in the outer shell of selenium……
(k) The least reactive metal in group 1 is ..……
(l) The transition metal with the atomic number 27 is ……
(n) the element in Group 16 that is a gas at room temperature and atmosphericpressure..……..…
(o) an element whose relative atomic mass is not a whole number. ..……

5.

(i) An element that has electron configuration: 2, 8 is……

(ii) An element that has atomic number 128 is……

(iii) An element of Group 1 which not a metal is ….……

(iv) The most reactive metal is ……

(v) The most reactive halogen is ……

(vi) An element that has no neutron ……

6.
(i). The elements characterized as nonmetals are located in the periodic table at the
(A) far left (B) bottom (C) center (D) top right.
(ii) Elements that have properties of both metals and nonmetals are called
(A) metalloids (B) halogens (C) alkali metals (D) transition elements.
(iii) Which is the atomic number of an alkali metal?
(A) 10 (B) 11 (C) 12 (D) 13.
(iv) Which element is a halogen?
(A) iron; (B) nitrogen; (C) iodine; (D) neon.
(vi) The element in Period 3 with the most metallic character is
(A) sodium; (B) aluminum; (C) silicon; (D) phosphorus.
(ix) Which element will form a +2 ion the easiest?
(A) calcium; (B) oxygen; (C) sodium; (D) magnesium
(x) The elements known as the alkali metals are found in Group
(A) 1 (B) 2 (C) 7 (D) 8

(xi) Which of the Group 17 elements listed below has the greatest nuclear charge?
(A) F (B) Cl (C) Br (D) I

(xii) Which element in Period 3 has both metallic and nonmetallic properties?
(A) Na (B) Mg (C) Si (D) Ar

(xiii) Which electron configuration represents an atom of an element having a completed thirdenergy level?
(A) 2-8-2 (B) 2-8-6-2 (C) 2-8-10-2 (D) 2-8-18-2.

7. Complete these definitions:

Protons/ Increases/ electrons/ neutrons/ nucleas/ neutral/ zero/ one/ element/ compound/ isotopes

(a) The atomic number of an element is the number of…….in its nucleas which is equal to the number of…… ,
(b) The mass or nucleon number of an element is the sum of the number of …… and ……
(c) The……..is a positively charged particle foundin the……..of an atom.
(d) The neutron is a……..particle which has a mass equal to that of a ……
(e) The……..is a negatively charged particle, with a mass which is assumed to be…….

(f) Atoms of the same……..which have differentmasses are called ……..
They have varying numbers of……