

Thus, the maximum number of electrons in the first orbit is 2, in the second 8, in the third 18 and in the fourth 32. However, the outermost orbit of an electrically neutral atom cannot have more than 8 electrons.

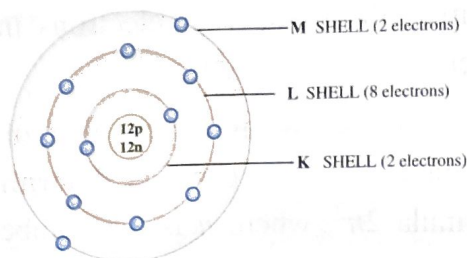


Fig. 4.12 The arrangement of electrons in a magnesium atom.

This is called **octet rule**. If the atom has only one shell, as in case of hydrogen and helium, the outermost (single shell) can have only 2 electrons, called as **duplet rule**.

The rules of electronic distribution can be better understood by the following examples.

- A helium atom has 2 electrons. They occupy the first and the only shell of the atom.
- A lithium atom has 3 electrons, 2 of which occupy the first shell and the third electron occupy the second shell.
- A neon atom has 10 electrons. The first shell takes up 2 electrons while the second shell 8 electrons.
- A potassium atom has 19 electrons. The first shell takes up 2 electrons, second shell takes up 8 electrons, that leaves 9 electrons, which should occupy the third shell. According to the scheme $2n^2$, third shell can accommodate upto 18 electrons but according to the octet rule, the outer most shell cannot have more than 8 electrons, hence the third shell

takes up only 8 electrons and the fourth shell takes up the last electron. Therefore the electronic configuration of potassium is

K L M N
2 8 8 1

Taking help from the above examples, write the electronic configuration of the following elements. Sodium (Na), **Magnesium (Mg)**, Aluminium (Al), Silicon (Si), Phosphorus (P), Sulphur (S), Chlorine (Cl), Argon (Ar) and Calcium (Ca).

VALENCE SHELL, VALENCE ELECTRONS AND VALENCY

Valence shell : The outermost shell of an atom is known as its valence shell or valence orbit.

Valence electrons : The electrons present in the valence shell of an atom are called valence electrons. The number of valence electrons varies from 1 to 8 for the atoms of the different elements. The valence electrons of an atom determine the valency of that element.

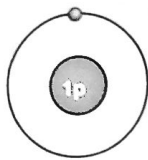
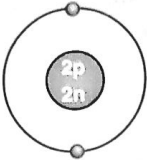
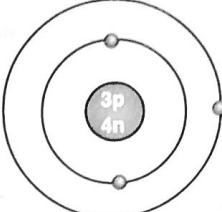
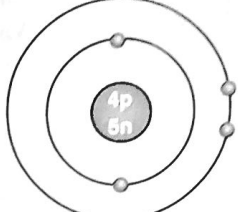
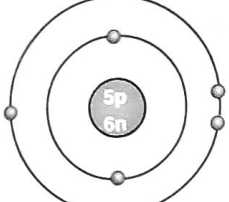
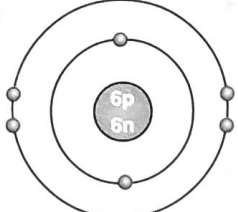
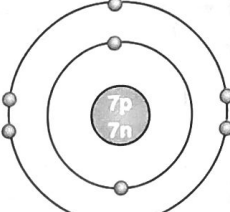
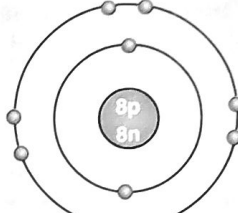
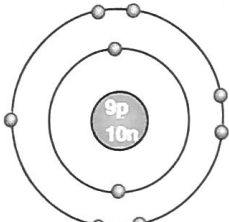
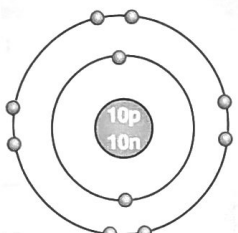
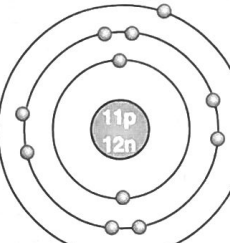
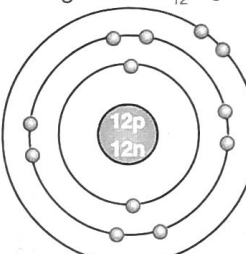
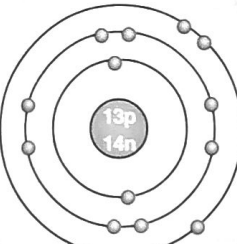
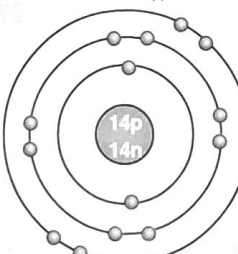
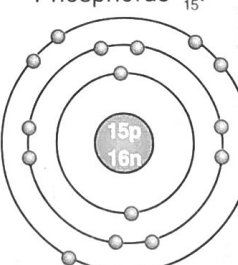
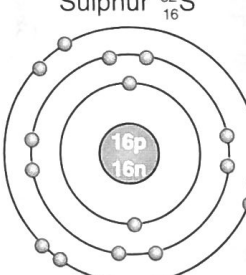
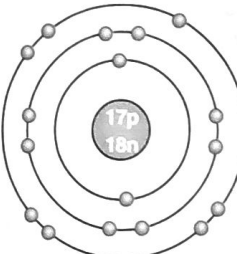
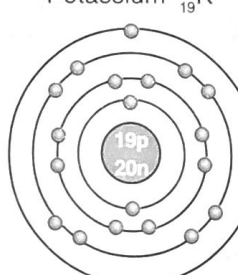
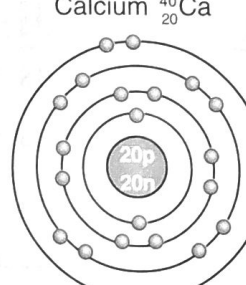
The knowledge of atom can be applied to understand how molecules of elements and compounds are formed.

You have already studied that, when the atoms of same element combine with one another, a molecule of that element is formed and when the atoms of different elements combine, a molecule of a compound is formed.

Example :

- Two atoms of oxygen combine to form one molecule of oxygen [O_2].
- Two atoms of hydrogen and one atom of oxygen combine to form one molecule of water which is a compound [H_2O].

Atomic diagrams of the atoms of the first twenty elements

<p>Hydrogen ${}^1_1\text{H}$</p>  <p>Elec. Config. 1</p>	<p>Helium ${}^4_2\text{He}$</p>  <p>Elec. Config. 2</p>	<p>Lithium ${}^7_3\text{Li}$</p>  <p>Elec. Config. 2, 1</p>	<p>Beryllium ${}^9_4\text{Be}$</p>  <p>Elec. Config. 2, 2</p>
<p>Boron ${}^{11}_5\text{B}$</p>  <p>Elec. Config. 2, 3</p>	<p>Carbon ${}^{12}_6\text{C}$</p>  <p>Elec. Config. 2, 4</p>	<p>Nitrogen ${}^{14}_7\text{N}$</p>  <p>Elec. Config. 2, 5</p>	<p>Oxygen ${}^{16}_8\text{O}$</p>  <p>Elec. Config. 2, 6</p>
<p>Fluorine ${}^{19}_9\text{F}$</p>  <p>Elec. Config. 2, 7</p>	<p>Neon ${}^{20}_{10}\text{Ne}$</p>  <p>Elec. Config. 2, 8</p>	<p>Sodium ${}^{23}_{11}\text{Na}$</p>  <p>Elec. Config. 2, 8, 1</p>	<p>Magnesium ${}^{24}_{12}\text{Mg}$</p>  <p>Elec. Config. 2, 8, 2</p>
<p>Aluminium ${}^{27}_{13}\text{Al}$</p>  <p>Elec. Config. 2, 8, 3</p>	<p>Silicon ${}^{28}_{14}\text{Si}$</p>  <p>Elec. Config. 2, 8, 4</p>	<p>Phosphorus ${}^{31}_{15}\text{P}$</p>  <p>Elec. Config. 2, 8, 5</p>	<p>Sulphur ${}^{32}_{16}\text{S}$</p>  <p>Elec. Config. 2, 8, 6</p>
<p>Chlorine ${}^{35}_{17}\text{Cl}$</p>  <p>Elec. Config. 2, 8, 7</p>	<p>Argon ${}^{40}_{18}\text{Ar}$</p>  <p>Elec. Config. 2, 8, 8</p>	<p>Potassium ${}^{39}_{19}\text{K}$</p>  <p>Elec. Config. 2, 8, 8, 1</p>	<p>Calcium ${}^{40}_{20}\text{Ca}$</p>  <p>Elec. Config. 2, 8, 8, 2</p>

09

2020 NOVEMBER

DAY 314 - 052 WEEK 46

MONDAY

November 2020						
Wk	M	T	W	T	F	S
44/49	30					1
45	2	3	4	5	6	7
46	9	10	11	12	13	14
47	16	17	18	19	20	21
48	23	24	25	26	27	28

APPOINTMENT / MEETING

Sub-Chemistry Date - 7-7-20

Class - VIII

8

Chapter - 4 Atomic Structure Part - 6

9

① What is valence shell?

10

② What are valence electrons?
Give eg.

11

③ Draw the structure of the atoms from atomic no. 1 to 20

1

2

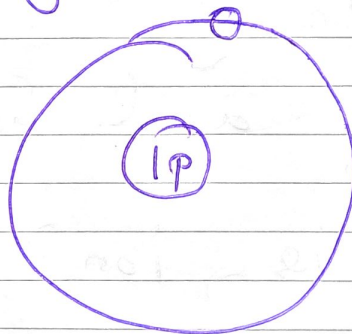
For eg. Hydrogen: H

3

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6



NOTES

Electronic Configuration I

NOTES

11

2020 NOVEMBER

DAY 316 - 050 WEEK 46

WEDNESDAY

November 2020							
Wk	M	T	W	T	F	S	S
44/49	30						1
45	2	3	4	5	6	7	8
46	9	10	11	12	13	14	15
47	16	17	18	19	20	21	22
48	23	24	25	26	27	28	29

APPOINTMENT / MEETING

Calcium $^{40}_{20}\text{Ca}$

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12

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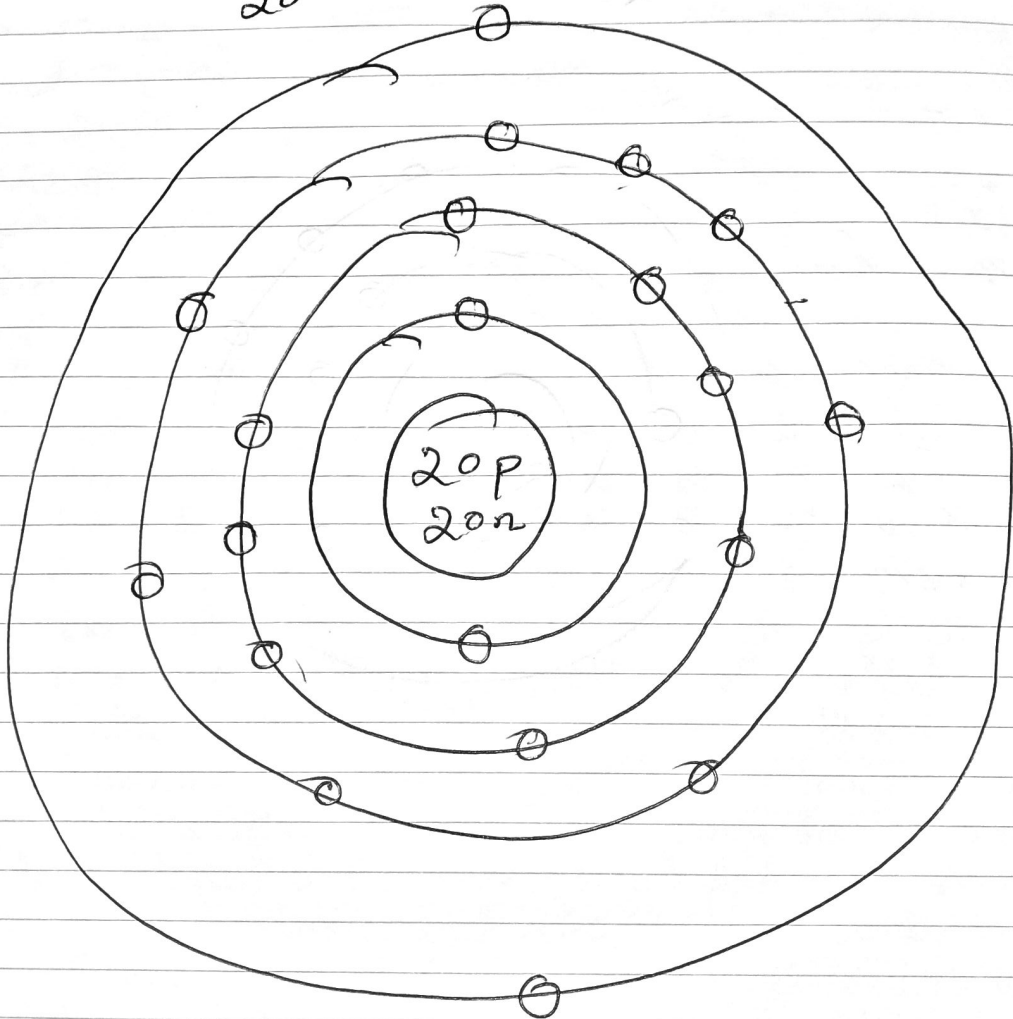
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Electronic Configuration 2, 8, 8, 2

NOTES

H.W

Rest of them home work.

November 2020			
Wk	M	T	W
49	1	2	3
50	7	8	9
51	14	15	16
52	21	22	23
53	28	29	30

APPOINTMENT

8

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NOTES