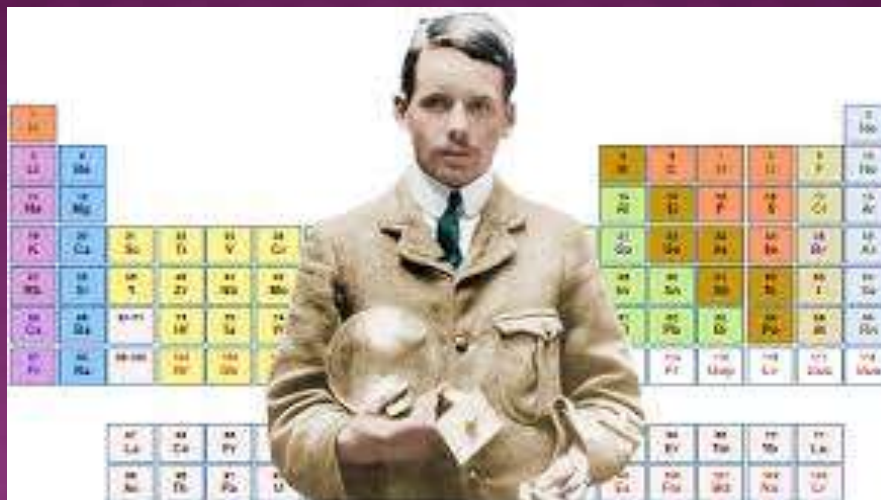


MODERN PERIODIC TABLE

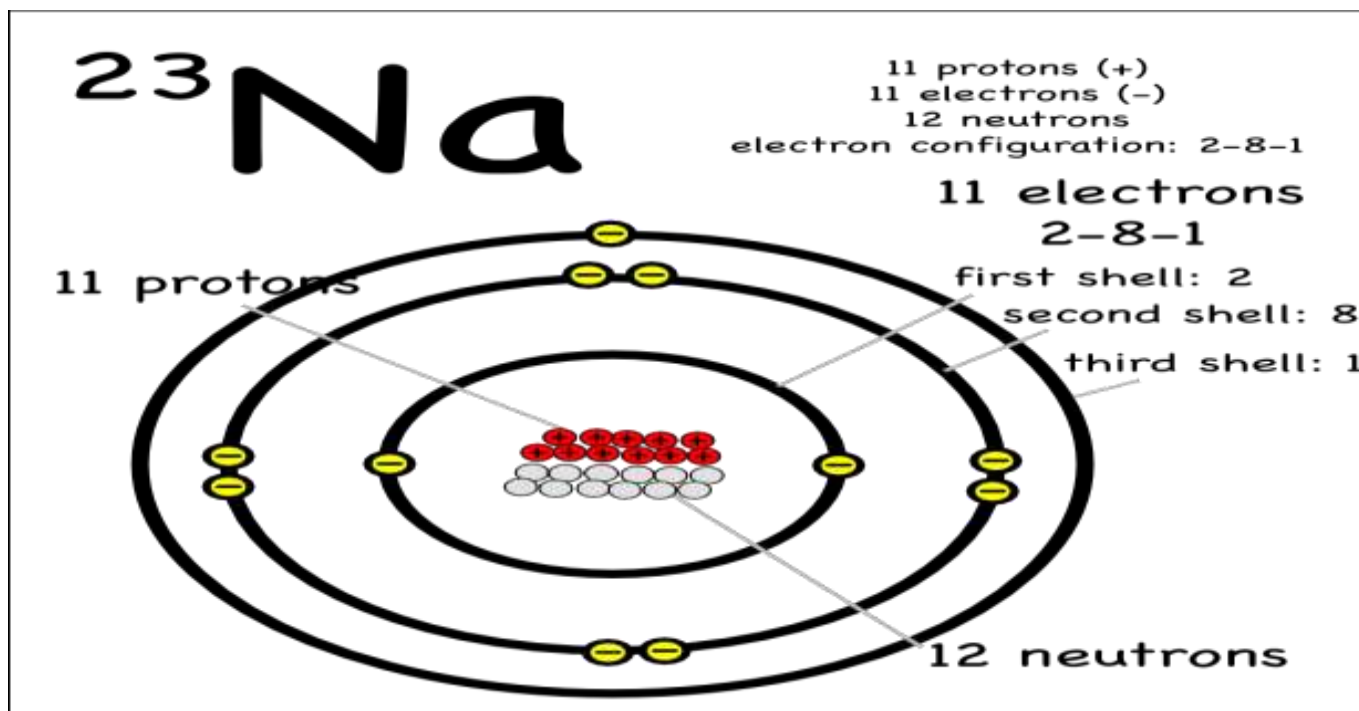


- In 1913, Henry Moseley showed that atomic number of element was more fundamental property than atomic mass.

MODERN PERIODIC LAW

- It states that properties of elements are periodic function of their atomic numbers.

- ❖ Atomic number = Number of protons present in an atom, which is also equal to the number of electrons present in an atom.



- ❖ An atom is electrically neutral.

Periodic Table of Elements

Periodic Table of the Elements

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58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

+ Actinide Series

❖ • Explanation of the Anomalies by Modern Periodic Table

Explanation for the position of isotopes (Same atomic number put at one place in the same group).

Cobalt with atomic number 27 came first and nickel (28) should come later.

Unlike atomic masses, atomic number is always a whole number, so there is no element between hydrogen and helium.

Position of noble gases in the periodic table

Atomic Number: It is denoted by Z and equal to the number of protons in the nucleus of an atom.

→ Modern Periodic table has 18 vertical columns known as 'groups' and 7 horizontal rows known as 'periods'.

→ Elements with same number of valence electrons are placed in the same group.

Example:

Li : 2, 1

Na : 2, 8, 1

K : 2, 8, 8, 1

Group I The Alkali Metals

		Electronic configuration
Li	Lithium	2,1
Na	Sodium	2,8,1
K	Potassium	2,8,8,1
Rb	Rubidium	2,8,8,18,1
Cs	Cesium	2,8,8,18,18,1
Fr	Francium	2,8,8,18,18,32,1



Outermost or valence shell in all the three contains 1 electron. These elements have been placed in the same group.

→ Number of shells increases as we go down the group.

→ Elements with same number of occupied shells are placed in same period.

For example, Li (2, 1); Be (2, 2); B (2, 3), C (2, 4), N(2, 5). These elements have same number of shells (two).

→ Each period marks a new electronic shell getting filled.

→ Number of elements placed in a particular period depends upon the fact that how electrons are filled into various shell.

The electronic structure of the first 20 elements of the periodic table

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 0
H 1							He 2
Li 3	Be 4	B 5	C 6	N 7	O 8	F 9	Ne 10
Na 11	Mg 12	Al 13	Si 14	P 15	S 16	Cl 17	Ar 18
K 19	Ca 20	no elements here					

● nucleus ● electron

chemical symbol and atomic/proton number

this gap is filled with the series of transition metals

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→ Maximum number of electrons that can be filled in a shell is given by $2n^2$ where n is shell number.

Example:

K shell $n = 1$ or $2n^2 = 2(1)^2 = 2$ (First period has 2 elements.)

L shell $n = 2$ or $2n^2 = 2(2)^2 = 8$ (Second period has 8 elements.)

→ Position of an element in the periodic table tells us its chemical reactivity.

→ Valence electron determine the kind and number of bonds formed by the element.

Elements of group IIA and their atomic numbers and electronic configuration.

Group IIA consists of alkaline earth metals, they are as follows with their atomic numbers and their electronic configuration.

Group IIA Elements	Z	Electronic configuration
Beryllium (Be)	4	2,2
Magnesium (Mg)	12	2, 8, 2
Calcium (Ca)	20	2, 8, 8, 2
Strontium (Sr)	38	2, 8, 18, 8, 2
Barium (Ba)	56	2, 8, 18, 18, 8, 2
Radium (Ra)	88	2, 8, 18, 32, 18, 8, 2

In the atoms of elements of Group IIA, only the outermost shell is incomplete with two electron.



Beryllium (Be) Atom



Magnesium (Mg) Atom

Valency : In the elements of Group IIA, have 2 electrons in their valence shell, hence they are divalent.

Exp. MgH_2 , CaH_2

