DIVISION OF ELEMENTS INTO BLOCKS

Classification Of Elements

s-Block Elements

(a) Elements belonging to the periodic table, where the last electron occupies the s-orbital, are referred to as s-block elements.
(b) The s-orbital can hold a maximum of two electrons.
(c) Their general formulas are ns^1 and ns^2, respectively, where n = (1 to 7).
(d) Group IA elements are termed alkali metals as they react with water to produce alkali. Group IIA elements are known as alkaline earth metals because their oxides react with water to form alkali, and these are present in the soil or earth.
(e) The total number of s-block elements is 14.
(f) Fr^{57} and Ra^{88} are radioactive elements, whereas H and He are gaseous elements.
(g) Cs and Fr are liquid elements categorized under the s-block.

p-Block Elements

(a) Elements found in the periodic table where the last electron is filled in the p-orbital are referred to as p-block elements.
(b) The p-orbital has the capacity to hold a maximum of six electrons. Consequently, p-block elements are categorized into six groups: III A, IV A, V A, VI A, VII A, and the zero group.
(c) The general formula for p-block elements is $ns^2\ p^{1\text{-}6}$, where n = 2 to 6.
(d) The zero group elements, with a general formula of ns^2p^6, are inert due to their fully filled energy levels.
(e) The total number of p-block elements in the periodic table is 30 (excluding He).
(f) There are nine gaseous elements (Ne, Ar, Kr, Xe, Rn, F_2, Cl_2, O_2, and N_2) belonging to the p-block. Gallium (Ga) and bromine (Br) exist in liquid states.
(g) The step-like thick lines drawn in the periodic table within the p-block section separate elements into metals, nonmetals, and metalloids.

d-Block Elements

(a) Elements found in the periodic table where the last electron is filled in the d-orbital are referred to as d-block elements.
(b) D-block elements are categorized into groups named III, IV B, V B, VI B, VII B, VIII, I B, and II B.
(c) In d-block elements, the electron is filled in the d-orbital of the penultimate shell.
(d) D-block elements are situated between s and p-block elements.
(e) The general formula for these elements is $(n-1)s^2$, p^6, $d^{1-10}\ ns^{1-2}$, where n = 4 to 7.
(f) All of these elements exhibit metallic properties.
(g) Among all the d-block elements, mercury is the sole liquid element.

f-Block Elements

(a) Elements situated in the periodic table where the last electron is filled in the f-orbital are referred to as f-block elements.
(b) F-block elements encompass atomic numbers 58 to 71 and 90 to 103.
(c) Lanthanides, found in nature in limited quantities, are termed rare earth elements.
(d) There are a total of 28 f-block elements in the periodic table.
(e) Elements with atomic numbers 58 to 71 are termed lanthanides, succeeding lanthanum (57), while those with atomic numbers 90 to 103 are referred to as actinides, succeeding actinium (89).
(f) All actinide elements exhibit radioactive properties.
(g) All elements beyond atomic number 92 (i.e., U^{92}) are classified as transuranic elements.

(h) The general formula for these elements is $(n-2)\ s^2\ p^6\ d^{10}\ f(1\text{-}14)\ (n-1)\ s^2\ p^6\ d^{0\text{-}1}\ ns^2$, where n = 6 & 7.

Ex. Elements A, B, C, D and E have the following electronic configurations:

A: $1s^2\ 2s^2\ 2p^1$ B: $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^1$

C: $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^3$ D: $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$

E: $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2$

Which among these will belong to the same group in the periodic table?

Sol. Out of these, elements A and B will belong to the same group of the periodic table because they have same outer electronic configuration, $ns^2\ np^1$.