-: TYPES OF LATTICES :-

The no. of point groups in two and three dimensions are 10 and 32 respectively. These point groups form the basis for construction of different types of lattices. only those lattices are permissible, which are consistent with the point group operations. Such lattices are called Bravais lattices. It can be stated that 10 and 32 groups in two and three dimensions produce only 5 and 14 distinct Bravais lattice respectively. These Bravais lattices further become parts of 4 and 7 distinct crystal systems respectively and are separately.

(i) Two-Dimensional lattices :-

The four crystal systems of 2-D space are oblique, rectangular, square and hexagonal. The rectangular crystal system has two Bravais lattices, namely rectangular primitive and rectangular centred.

S.No	Crystal system	Characteristic point group symmetry	Bravais lattice	Conventional unit cell	Unit cell characteristics
01.	Oblique	1, 2	oblique	Parallelogram	$a \neq b$, $\gamma \neq 90^\circ$
02.	Rectangular	1m, 2mm	1. Rectangular Primitive 2. Rectangular Centred	Rectangle	$a \neq b$, $\gamma = 90^\circ$
03.	square	4, 4mm	square	square	$a = b$, $\gamma = 90^\circ$
04.	Hexagonal	3, 3m, 6, 6mm	Hexagonal	60°. Rhombus	$a = b$, $\gamma = 120^\circ$

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Page No. .....

(ii) Three-Dimensional lattices :—

All the seven crystal systems of 3-D space and the corresponding Bravais lattices. The crystallographic axes a, b, c are size and shape of unit cell.
The lengths a, b, c and angles α, β & γ are collectively known as lattice parameters or lattice constants of a unit cell

Sl.No	Crystal System	Lattice parameters	Bravais lattice	Common abbreviation	Lattice symbol	Examples
01.	Cubic	$a=b=c$ $\alpha=\beta=\gamma=90^\circ$	Simple Body centred Face centred	SC Bcc Fcc	P I F	Cu, Ag, Fe Na, NaCl CsCl
02.	Tetragonal	$a=b\neq c$ $\alpha=\beta=\gamma=90^\circ$	Simple Body centred	St bct	P I	β-Sn TiO_2
03.	Orthorhombic	$a\neq b\neq c$ $\alpha=\beta=\gamma=90^\circ$	Simple Body centred End-centred Face centred	SO bco eco fco	P I C F	Ga Fe_2C cementite
04.	Rhombohedral or Trigonal	$a=b=c$ $\alpha=\beta=\gamma\neq90^\circ$	Simple	—	P (or R)	As, Sb, Bi
05.	Hexagonal	$a=b\neq c$ $\alpha=\beta=90^\circ$, $\gamma=120^\circ$	Simple	—	P	Mg, Zn, Cd.
06.	Monoclinic	$a\neq b\neq c$ $\alpha=\gamma=90^\circ\neq\beta$	Simple End-centred	— —	P C	$CaSO_4, 2H_2O$ (Gypsum)
07.	Triclinic	$a\neq b\neq c$ $\alpha\neq\beta\neq\gamma\neq90^\circ$	Simple	—	P	$K_2Cr_2O_7$.

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