* Parallel plane have same Miller indices.

Ankur Shaudilya

Interplaner spacing:-

(Distance between two consecutive parallel planes.)

It is defined as -

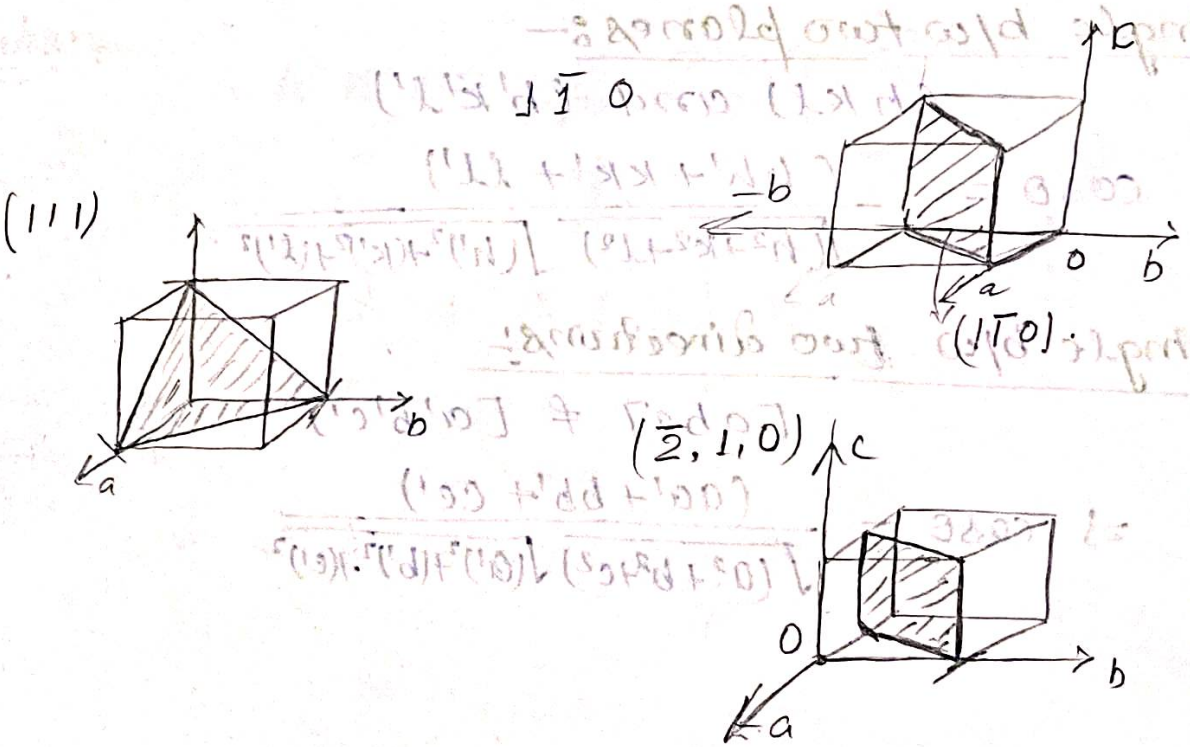
$$d_{hkl} = \frac{1}{\sqrt{(h/a)^2 + (k/b)^2 + (l/c)^2}}$$

This formulae is valid only for those crystal system for which $\alpha = \beta = \gamma = 90°$ (cubic, Tetragonal & orthorhombic).

So for cubic $a = b = c$.

$$d_{hkl} = \frac{a}{\sqrt{h^2 + k^2 + l^2}}$$

$\Rightarrow$ $d_{100} = a$ and $d_{200} = \frac{a}{2}$

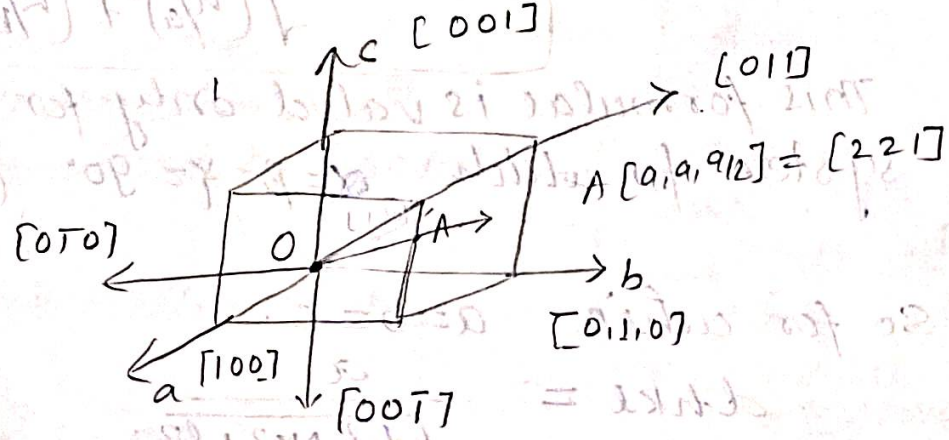


Note:- {100} ⇒ family of (100) plane.

i.e. (100) (010) (001) ($\bar{1}$00) (0$\bar{1}$0) (00$\bar{1}$)

** Direction Indices:⇒ (of lines)

Direction Indices represented by [abc] without commas, where a, b, c are whole numbers.



Note:- <100> = family of 100 direction

For cubic crystal direction indices perpendicular to the Miller indices i.e. plane.

* Angle b/w two planes:-

(hkl) and (h'k'l')

$$\cos\theta = \frac{(hh'+kk'+ll')}{\sqrt{(h^2+k^2+l^2)}\sqrt{(h')^2+(k')^2+(l')^2}}.$$

* Angle b/w two directions:-

[abc] & [a'b'c']

$$\Rightarrow \cos\theta = \frac{(aa'+bb'+cc')}{\sqrt{(a^2+b^2+c^2)}\sqrt{(a')^2+(b')^2+(c')^2}}$$