Solid-State

No. of Q. = 1, marks = 4

Any given Substance may exists in Solid, liquid & gaseous States on the basis of two opposite Universal Forces.

(i) Tendency to mutual Attraction. (Attraction Force)

(ii) Tendency to escape to each other. (Repulsion Force)

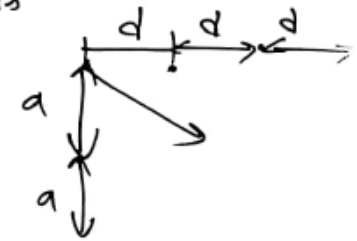
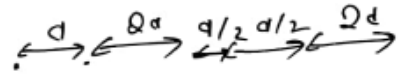
(a) A.F. >>> R.F. ⇒ Solid State/Phase

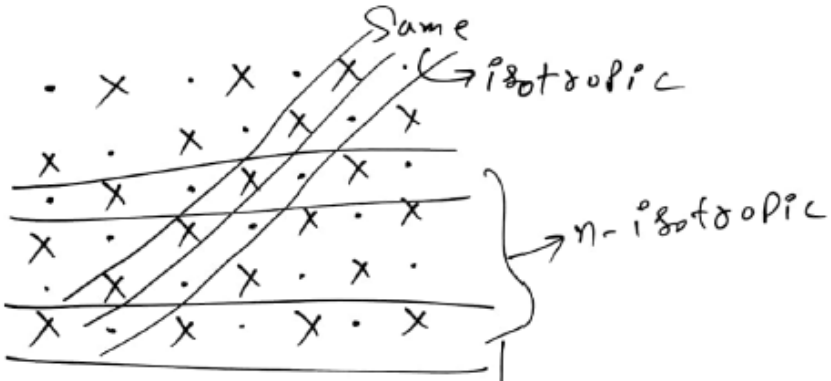
(b) A.F. > R.F. ⇒ liquid Phase/State

(c) A.F << R.F ⇒ Gaseous Phase/State

On the Basis of Arrangements of Particles Solids are also Classified in two Categories.

(a) Crystalline Solids (b) Amorphous Solids

Crystalline Solids	Amorphous Solids
Shape ÷ Definite & fixed Shape	does not definite & fixed Shape
Range of Arrangements ÷ long range order 	Short Range order 
Melting point ÷ Definite & Sharp	Gradually Soften at a large Range of Tem
Nature Pure/true Solids	Pseudo Solids
⇒ They are n-isotropic in nature, that is having different property in different direction	They are isotropic in nature, that is having same property in different direction



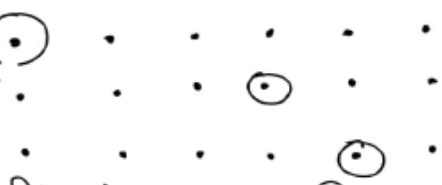
Ex÷ NaCl, CsCl, Zn, Ag, --- etc.

ex÷ Glass, plastic, Rubber... etc.

General Terms related to Crystalline Solids :-

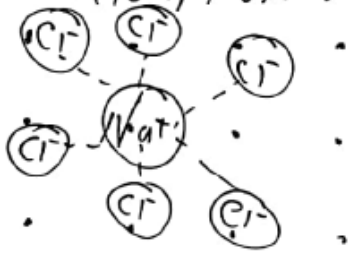
Space lattice :- Regular 3-D arrangements of points in space is known as space lattice.

Each point in space lattice is lattice point



lattice point should have same environment in entire lattice

Crystal lattice :- When all the points of space lattice are replaced by atom, molecules or ions are known as crystal lattice.



Unit cell: Smallest repeating unit in any crystal which on repetation again and again and generates all lattice in known as Unit cell. Unit cell has same property in entire lattice.

There are two types of Unit cell's

(a) Primitive Unit cell: Unit cell in which lattice (Simple Unit cell) point are only in corner.

(b) Non Primitive Unit cell: Unit cell in which lattice point are corner as well as

(i) Body centre in known as Body centre cubic U.C. (B.C.C.)

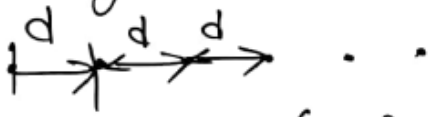
(ii) Face centre — " — Face centre cubic U.C. (F.C.C.)

(iii) Any two opposite face centre is known as End centre cubic U.C. (E.C.C.)

Different types of lattice

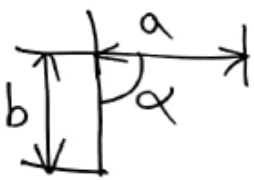
(1) 1-D lattice (along a line)

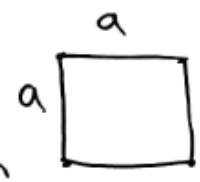
only one parameter required.



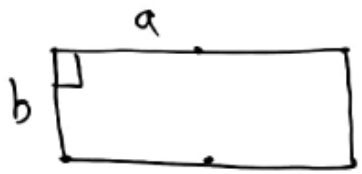
(2) 2-D-lattice (along a plane)

3-parameter required (2-distance & 1-angle)



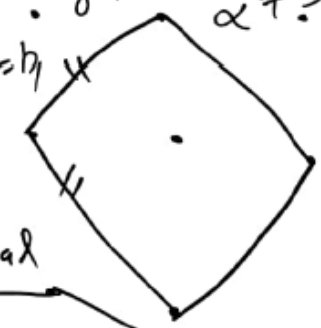


Square U.C.
$a=b, \alpha=90°$

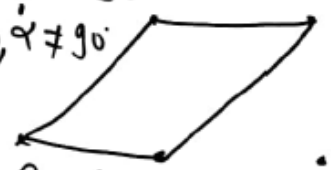


rectangle
$a \neq b, \alpha=90°$

rhombus
$\alpha \neq 90$
$a=b$

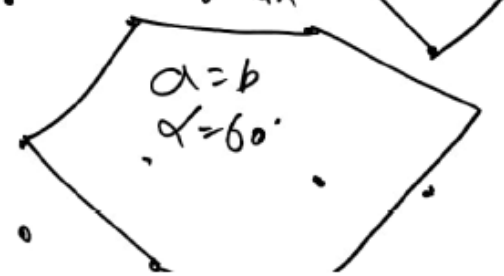


$a \neq b, \alpha \neq 90°$



Parallelogram

Hexagonal



$a=b$
$\alpha=60°$