O-I 25-28 S-I

(25) α — BCC — P

γ — FCC ⇒ ?

$$d = \frac{Z \times M/N_A}{a^3}$$

$$PF = \frac{Z \times 4/3 \pi r^3}{a^3}$$

$$\frac{d}{PF} = \text{Const}$$

for a given element

$$\frac{d_1}{d_2} = \frac{PF_1}{PF_2}$$

$$\frac{d_1}{PF_1} = \frac{d_2}{PF_2}$$

$$\frac{d_{BCC}}{0.68} = \frac{d_{FCC}}{0.74}$$

(26) (15)

$\frac{88}{200} \frac{44}{100} = 0.44$

$0.414 - 0.732$

0.44

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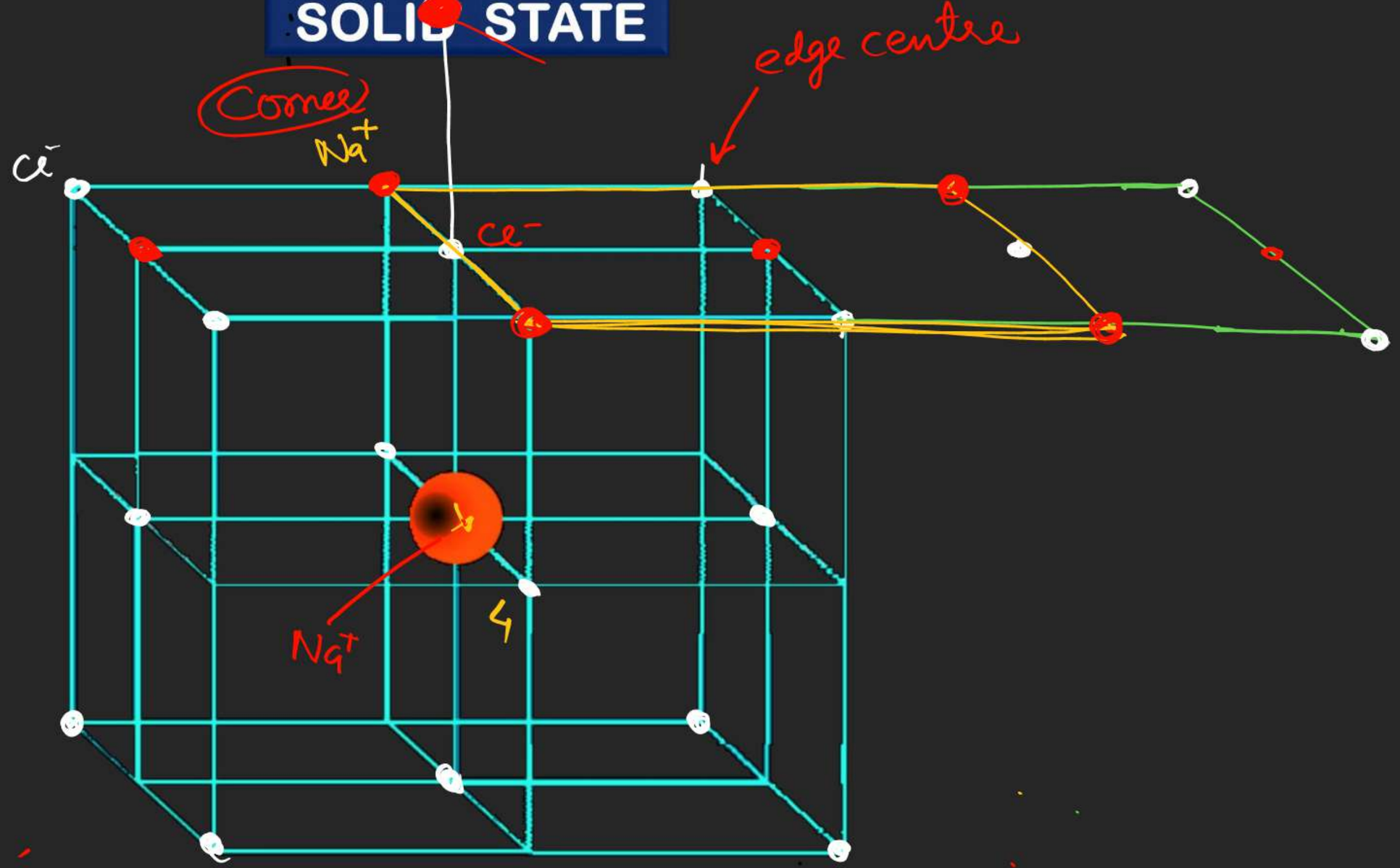
SOLID STATE

1 kg salt

5 kg sugar



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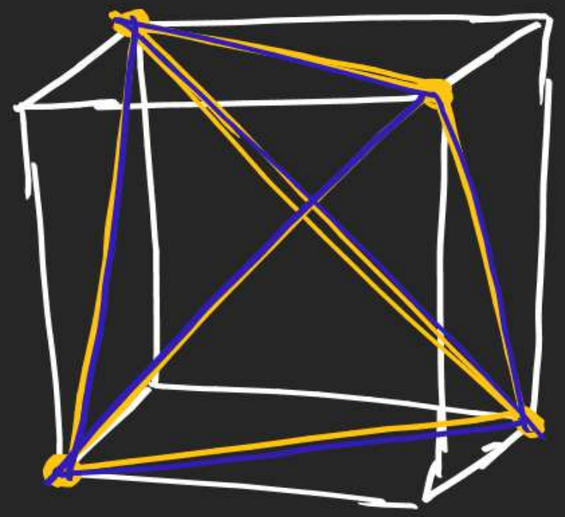

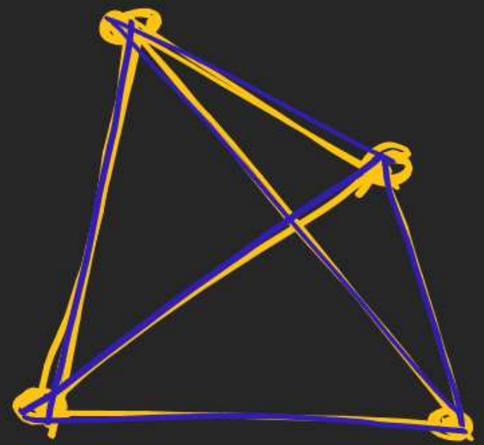

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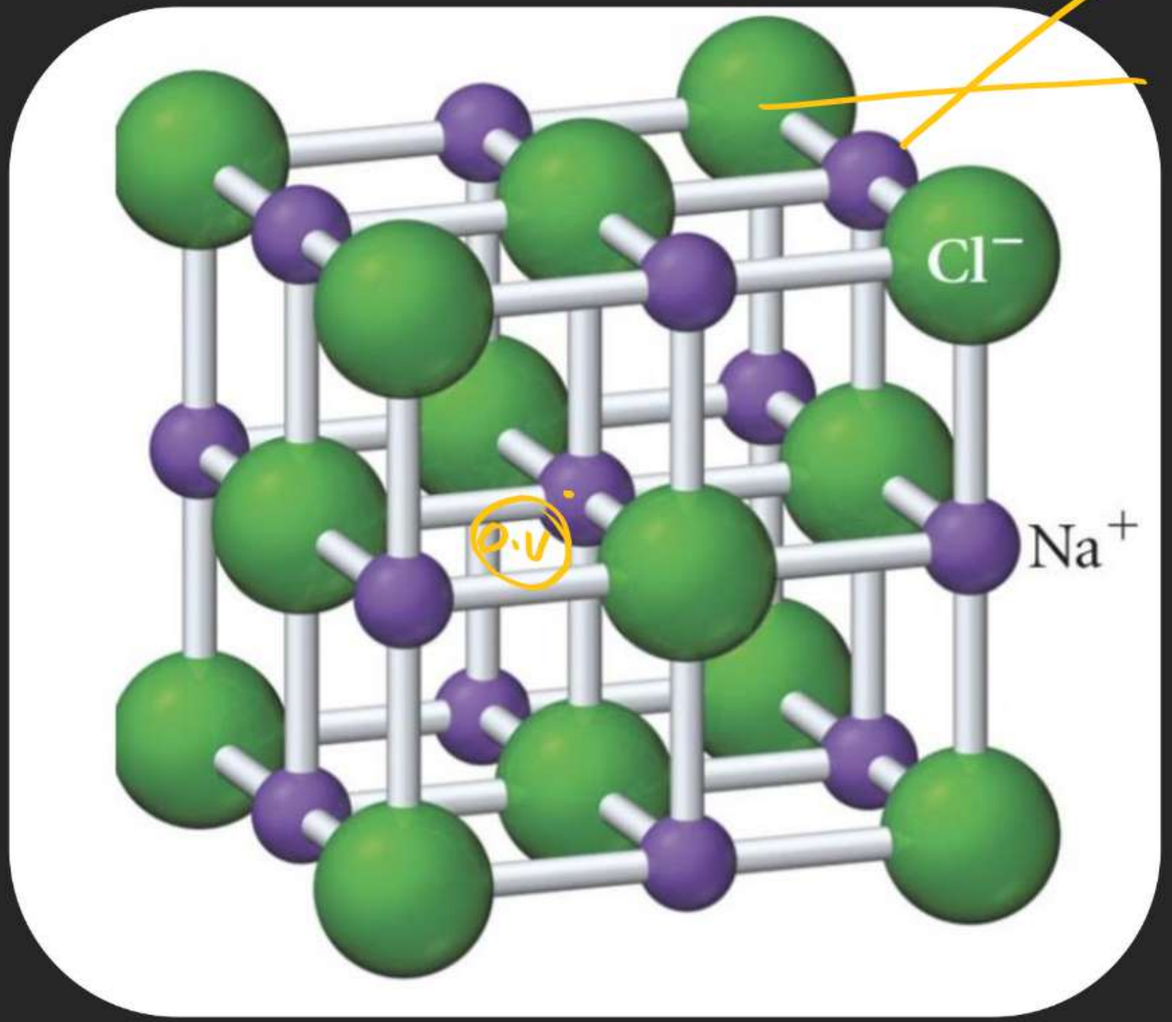

$= 1 + \frac{1}{4} \times 12$

$= 1 + 3$

$= 4$

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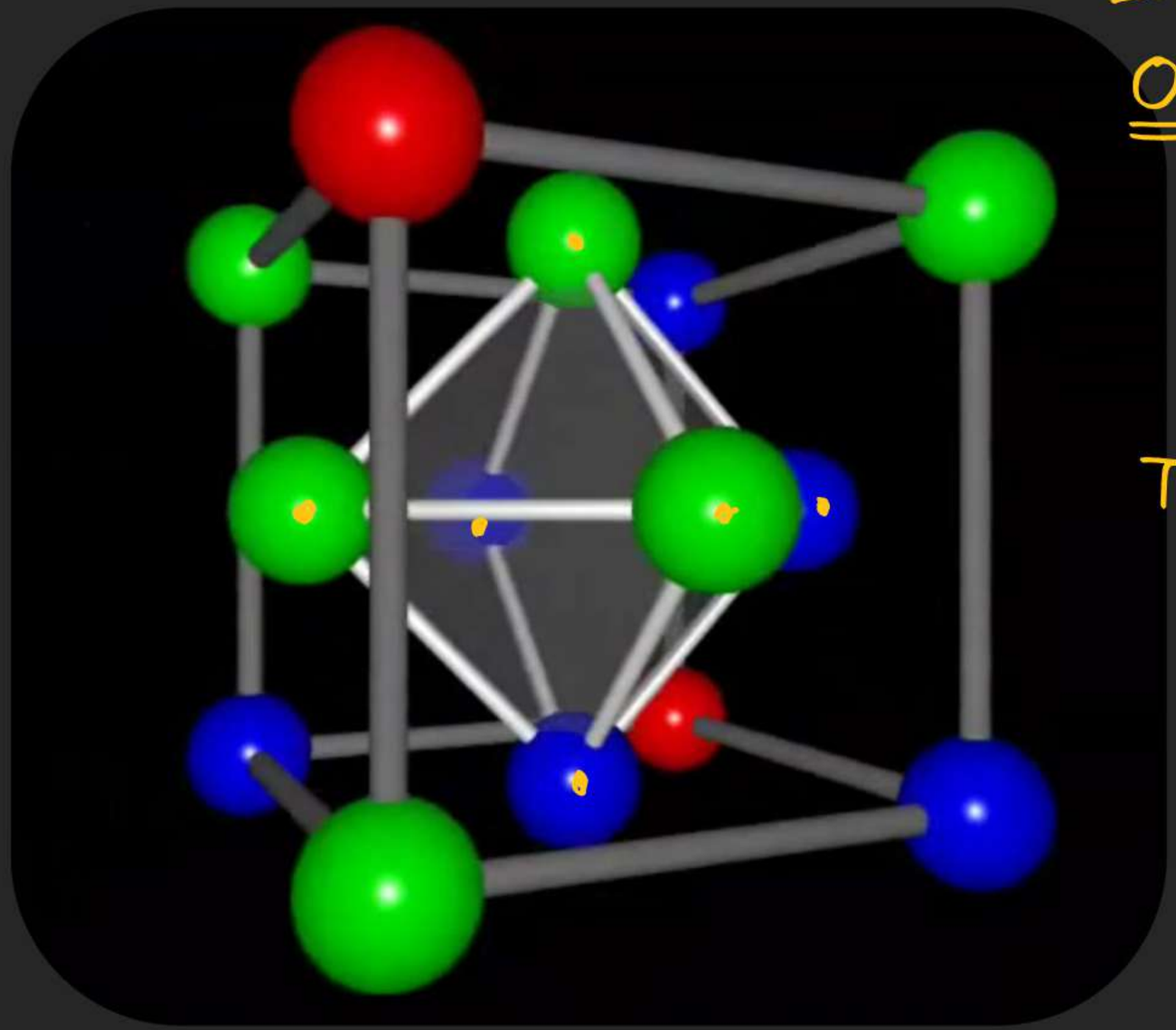

In FCC

O.V → Centre of Cube
→ edge centre

Total = 4

T.V → There are Two T.V. on each Body diagonals.

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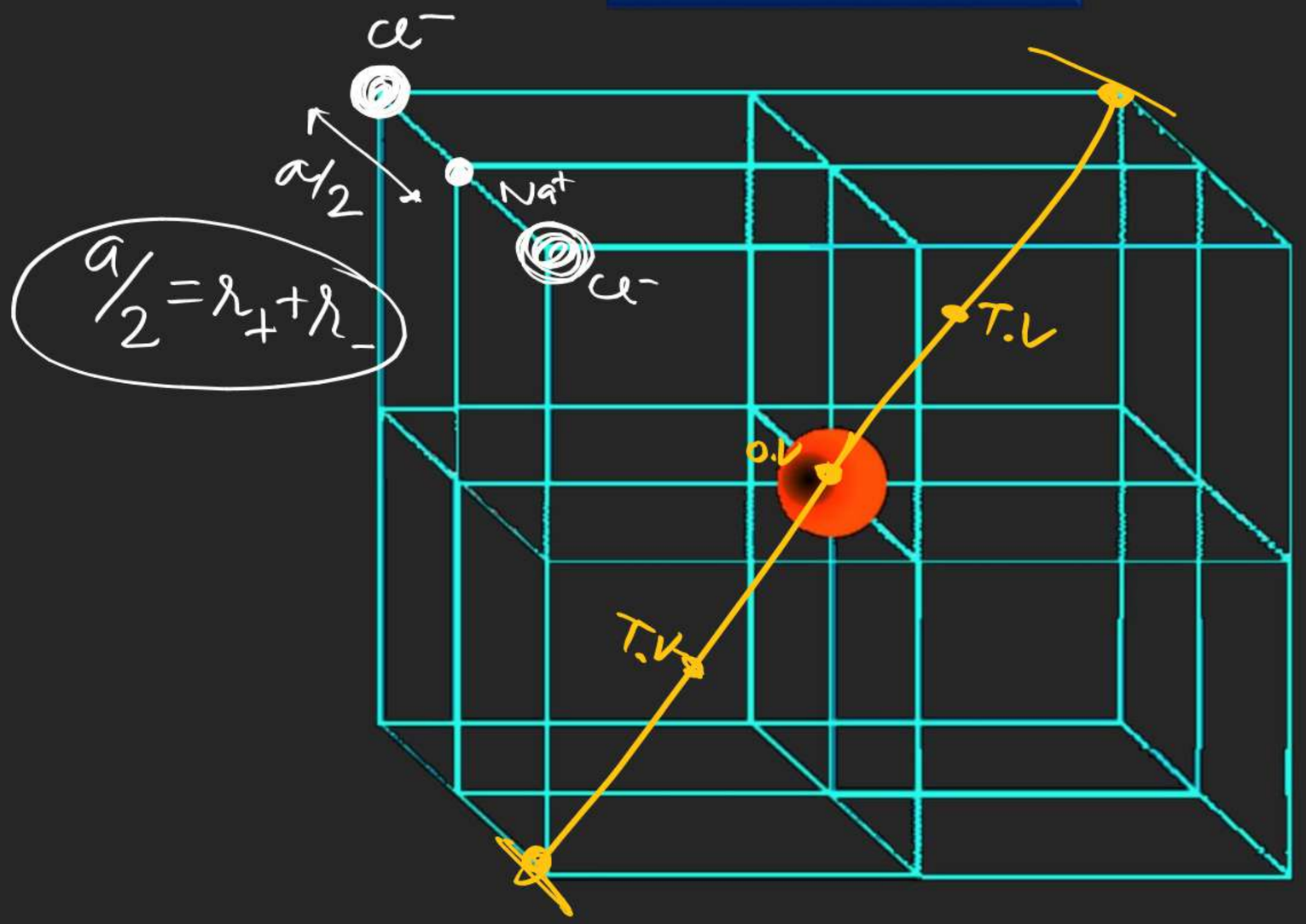

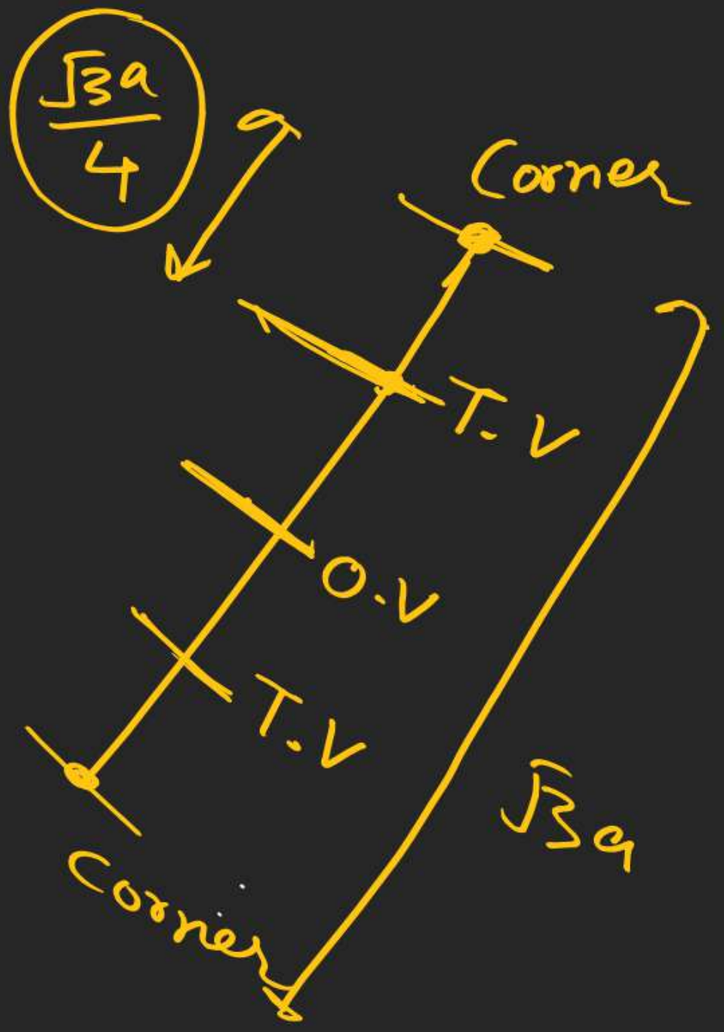

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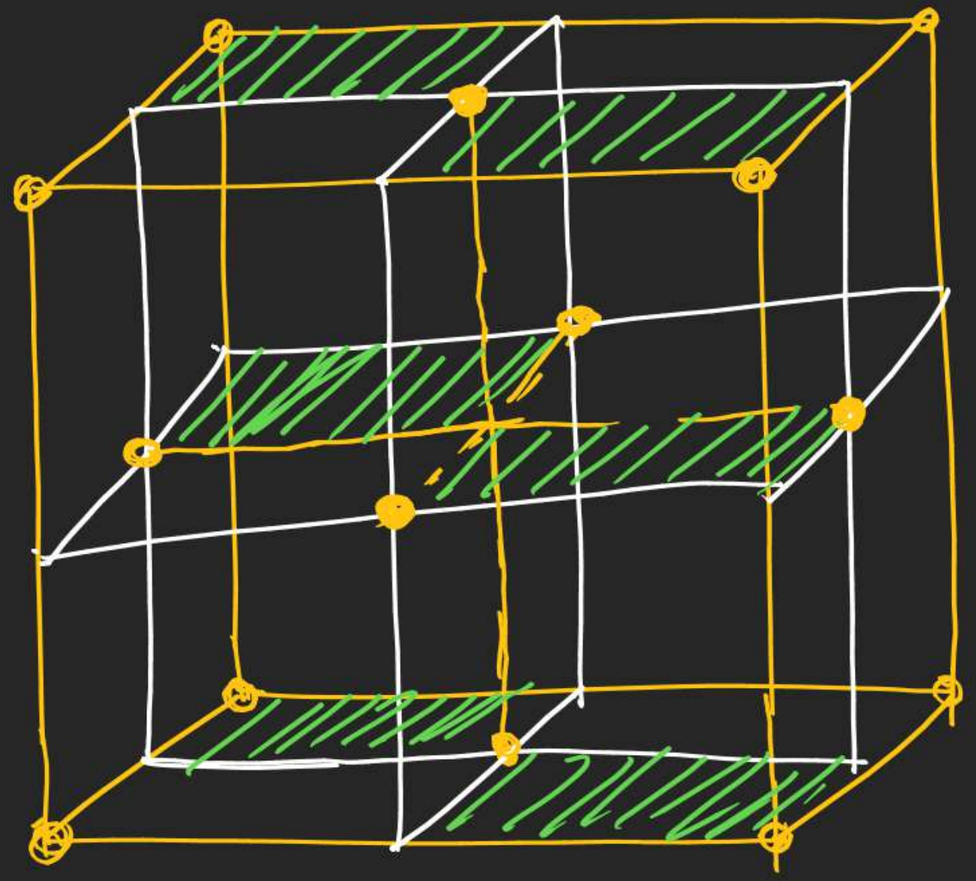

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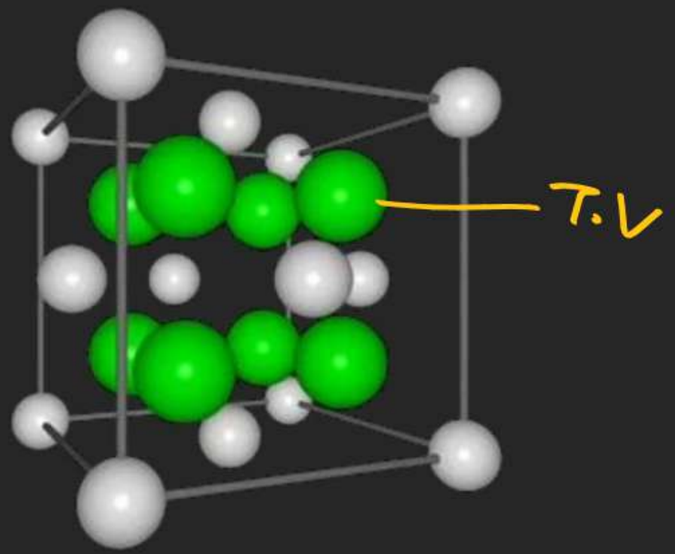
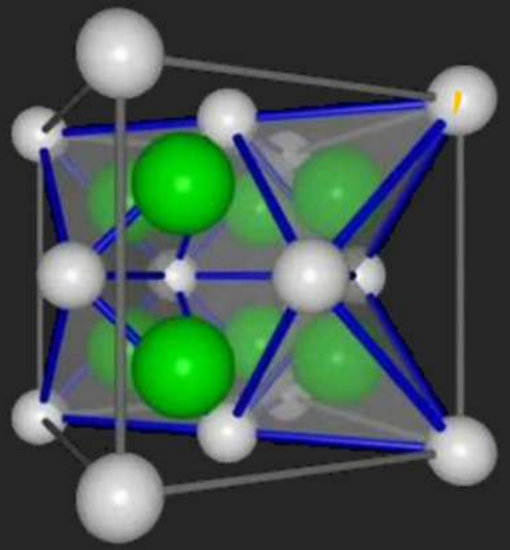
SOLID STATE

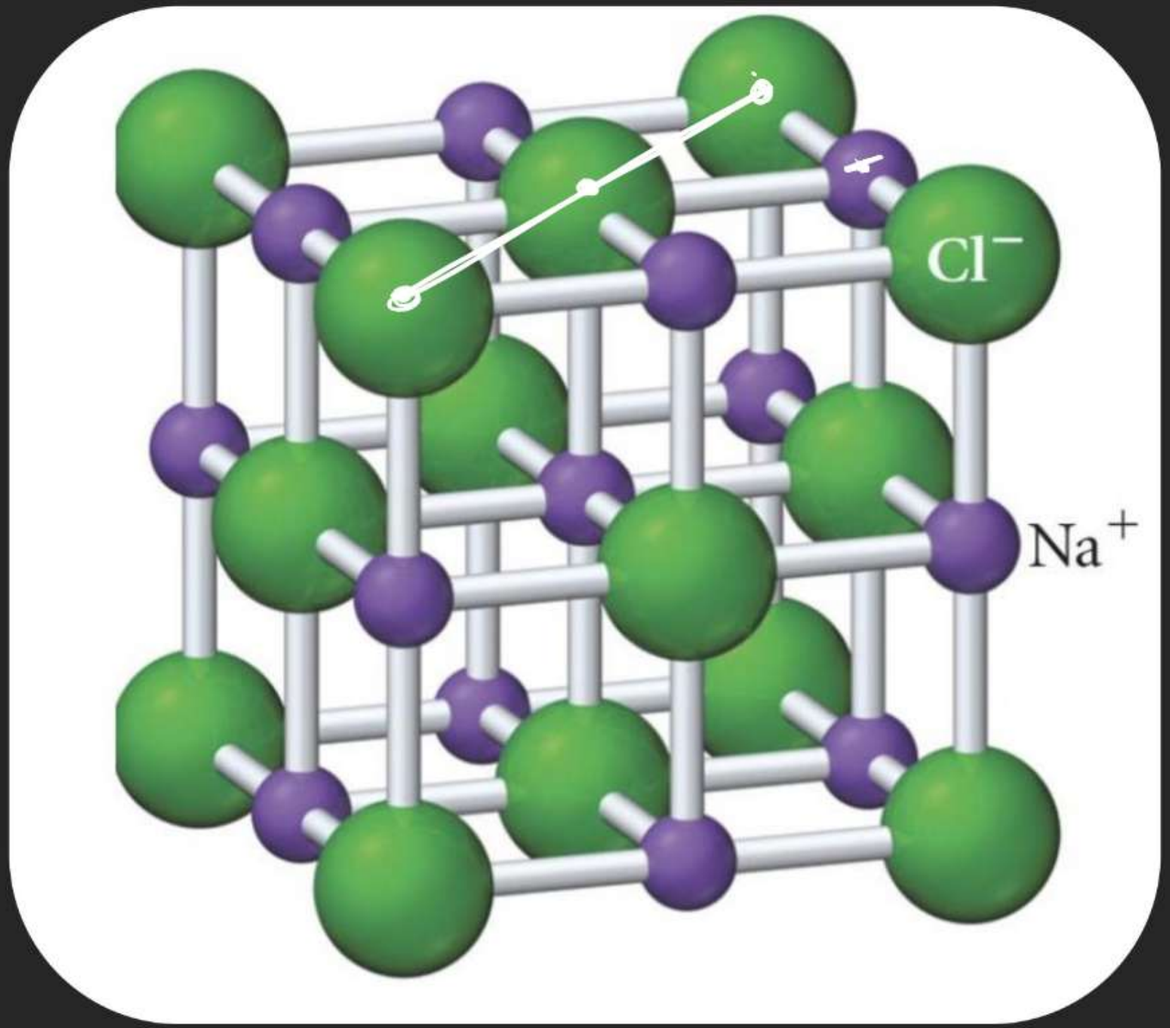


Fluoride Ions Occuy Tetrahedral Holes



NaCl str (Rock Salt)

$\frac{r_+}{r_-} = 0.414$



$\sqrt{2}a = 4r_-$

$\frac{a}{2} = r_+ + r_-$

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(I) Cl^- form FCC Lattice — 4

Na^+ occupy all O.V — 4

(II) $\sqrt{2}\,a = 4r_-$ (when $\frac{r_+}{r_-} = 0.414$)

$a/2 = r_+ + r_-$ (always applicable)

(III) Coordination no $Na^+ = 6$

$C_{q^-} = 6$

$A_x B_y$

$y : x$

NaCl

1 : 1

(IV) in NaCl Na^+ form FCC lattice & Cl^- occupy all O.V → True

for numericals → always consider Cations in the void of anion

(V) Packing fraction of NaCl $= \dfrac{4 \times \frac{4}{3}\pi\left(r_+^3 + r_-^3\right)}{a^3}$

$$\text{Density} = \frac{\text{mass of unit cell}}{\text{Volume of unit cell}}$$

$$\text{density} = \frac{4 \times \frac{M_{NaCl}}{N_A}}{a^3}$$

$4\,Na^+$ $4\,Cl^-$

4 NaCl unit

e.g. alkali halides NaCl, KBr, KI
[except that of Cs]

Oxides of 2nd group → MgO, CaO
except BeO

AgBr
AgI
AgCl

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Crystal system - 7

Unit cell — 14

SC —

BCC —

FCC —

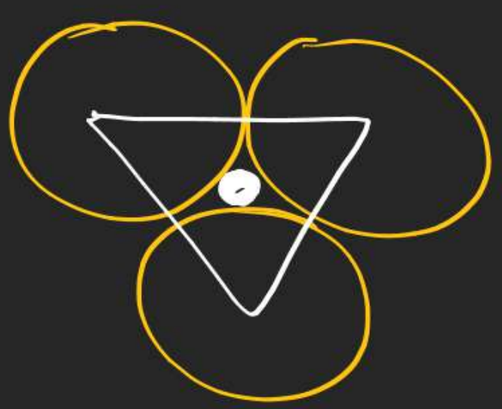
HCP —

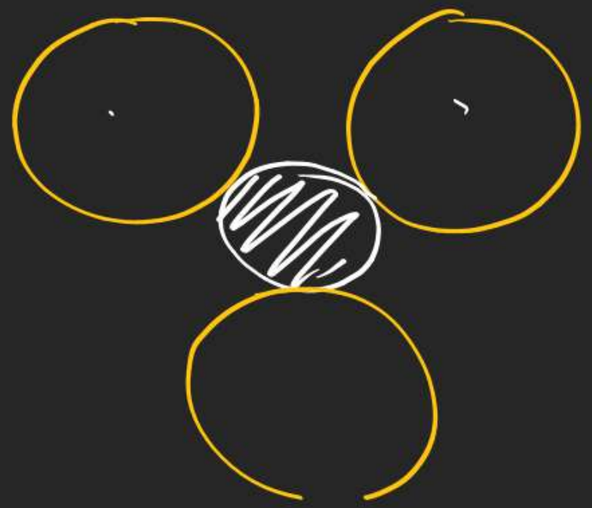
T.V & O.V —

NaCl —

O-I 29, 32-34

S-I 17-25





equals to the limiting radius ratio

$\frac{r_+}{r_-} = 0.155$

A cation always touches all the anion forming the void in which cation is present but anions forming a void touch each other only when radius ratio

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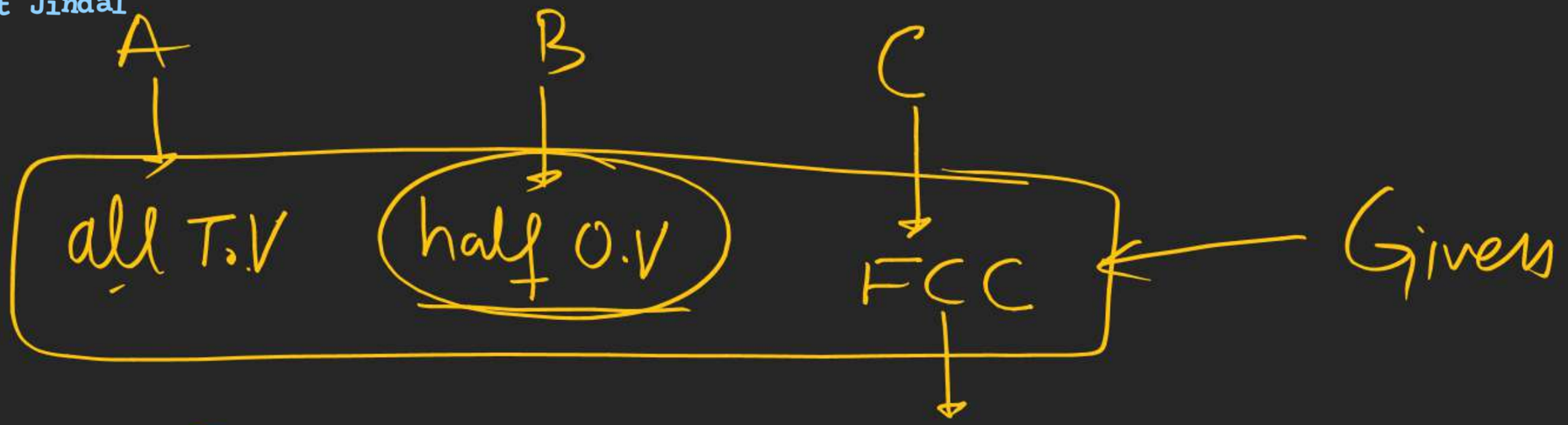

FCC
HCP

8 2 4

4 1 2

A_4BC_2