

## Experiment : 01

### Integrated Circuits:

- fabricated as a single unit on substrate of semi conducting material.

### Printed Circuit Board (PCB):

- Have in-built circuit for providing link b/w ICs, capacitors etc.

### Transistors:

- Used as switch & to amplify electronic signals & power.

### Graphene:

- A single layer of carbon atoms arranged on a hexagonal lattice.

- Very thin & 200 times stronger than steel & flexible.

- Has great potential when used as a membrane to separate liquids.

- Able to detect minute traces of dangerous gases & chemicals.

- Absorbs light & retains it's as energy.

### Shape memory Alloy:

- Able to retain their shape

- Return original state after subjecting to heat, radiation etc.

- Example:

Cardiovascular stents, Robotic hands

## Hydroxyapatite:

- Used as biomaterial due to its similarities to hard human tissue, for it's non-toxicity, bio-compatibility, bio-activity.
- Bone tissue engineering, dental implant coating.

## Piezoelectric materials:

- Creates electric potential when subjected to stress.
- Example,  
Pressure sensors, actuators

## Experiment No. 2 & 3:

### Simple cubic:

Coordination no: 6

Equivalent atoms:  $\frac{1}{8} \times 8 = 1$

$$a=2R$$

### BCC:

Coordination no: 8

Equivalent atoms:  $1 \times 1 + \frac{1}{8} \times 8 = 2$

linear Density:  $\frac{4R}{\sqrt{2}a}$

$$a = \frac{4R}{\sqrt{3}}$$

FCC:

Coordination no: 8

Equivalent atoms:  $\frac{1}{2} \times 6 + \frac{1}{8} \times 8 = 4$

Linear density:  $\frac{4R}{\sqrt{3}a}$

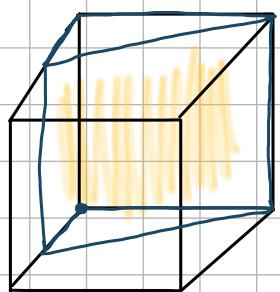
$$a = \frac{4R}{\sqrt{2}}$$

APF:  $\frac{\text{no.of atoms}}{\text{a}^3} \times \frac{4}{3}\pi R^3$

Planes:

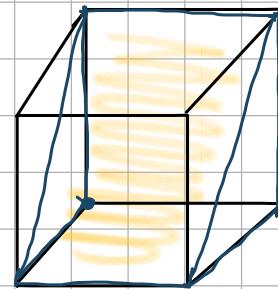
210

$\frac{1}{2} 1 \infty$

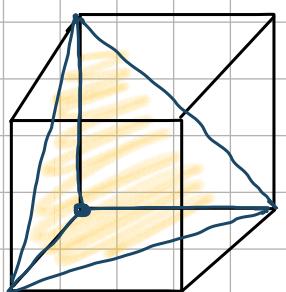


$a^3$

101

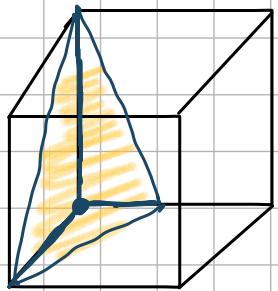


(111)



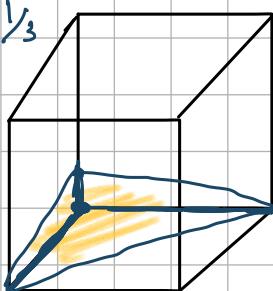
121

$1 \frac{1}{2} 1$



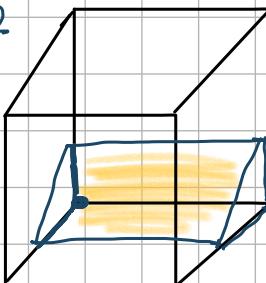
113

$1 \frac{1}{3} \frac{1}{3}$



202

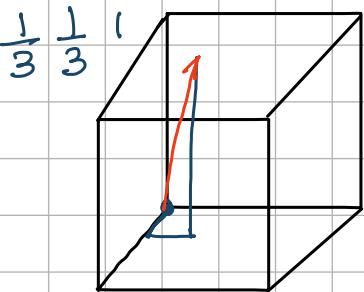
$\frac{1}{2} \infty \frac{1}{2}$



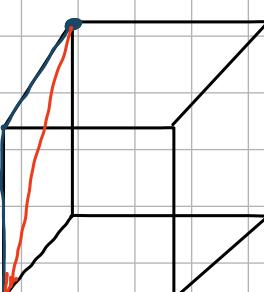
Directions:

113

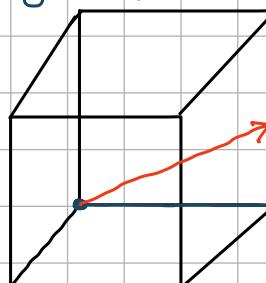
$\frac{1}{3} \frac{1}{3} 1$



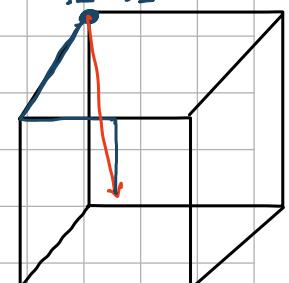
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211



## Experiment no: 05

Check NM-101 Quiz & prep

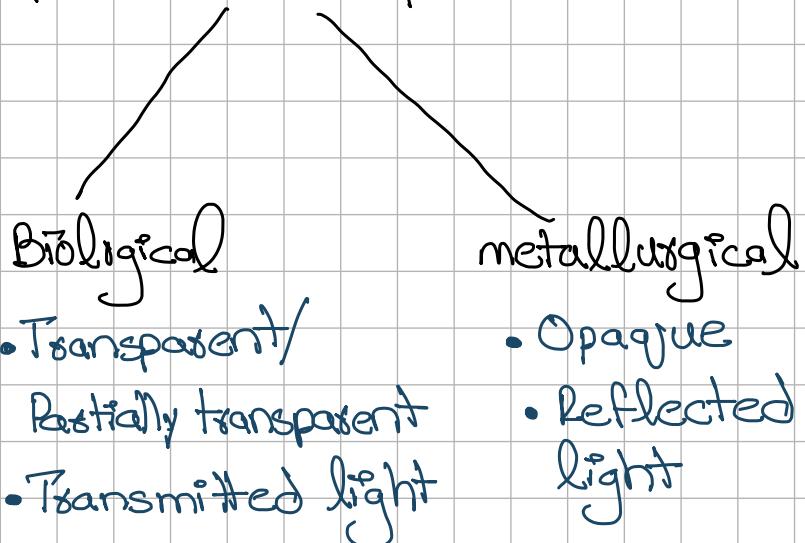
## Experiment no: 06

Grinding → 220 - 1000 / SiC papers

Polishing → Diamond / alumina paste

Etching → Etchants nital, picral (grain boundaries visible)

Optical microscope



Magnification:  $\frac{\text{Apparent size of final image}}{\text{size of object}}$

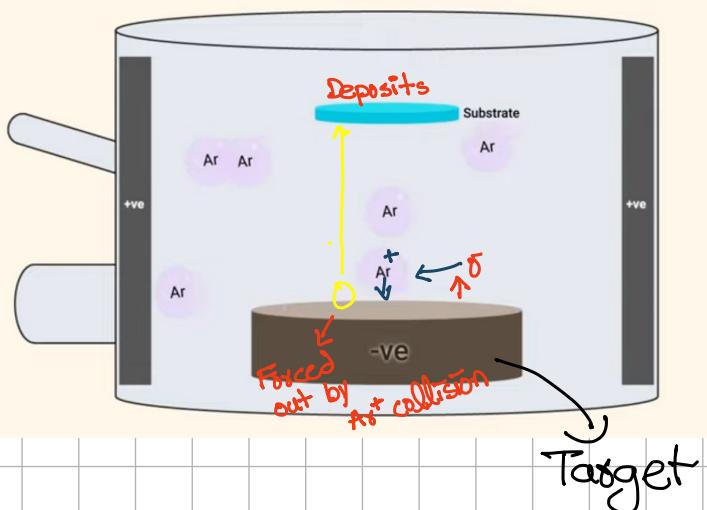
Resolution: Smallest distance b/w two points

Grain size:

$$N = 2^{n-1}$$

Grit size: number of particles per square inch.

## Experiment no: 12



In reactive sputtering, the forced out atom reacts with  $\text{O}_2$  or  $\text{N}_2$  & forms a compound which the forms a thin layer on substrate

Magnets placed under target material, the collision is increased because -ve air concentrated in a region near target