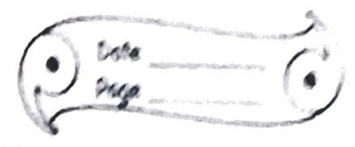


HW  
4/7/21



1- Concavo-convex

- Concave on first side and convex on other side
- It converges all the parallel light rays.

Convexo-concave

- Convex on first side and concave on other side.
- It diverges all the parallel light rays.

2- As diamond has a refractive index of 2.42 so its critical is very less like  $24.4^\circ$ , so whenever  $\pi$  light enters the diamond, max no of ~~rays~~ rays get ~~TIR~~ TIR and get's trap in the ~~diamond~~ diamond. Only a little no of rays is able to get out of diamond.

$$\begin{aligned} \text{As, } \mu &= 2.42 & i_c &= \sin^{-1}\left(\frac{1}{\mu}\right) = \sin^{-1}\left(\frac{1}{2.42}\right) \\ & & &= \sin^{-1}(0.413) \\ & & &= \underline{\underline{24.407^\circ}} \end{aligned}$$

3)

### 3) In Plano convex

$$\rightarrow \frac{1}{f} = (\mu - 1) \left( \frac{1}{R_1} - \frac{1}{R_2} \right)$$



(Lens Maker Formula)

$$\Rightarrow \frac{1}{f} = \left( \frac{3}{2} - 1 \right) \left( \frac{1}{R_1} - \frac{1}{\infty} \right)$$

$$\Rightarrow f = 2R_1$$

$\Rightarrow$  If obj is at a dist =  $u$

$\Rightarrow$  img dist =  $v$

$$\Rightarrow \frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

$$\Rightarrow \frac{1}{v} = \frac{1}{u} + \frac{1}{f} = \frac{1}{u} + \frac{1}{2R_1}$$

By comparison,  
 $v_0 > v$

### In Bi-convex

$$\Rightarrow f_0 = R_1 \left. \begin{array}{l} \Rightarrow \frac{1}{v_0} - \frac{1}{u} = \frac{1}{f_0} \\ \Rightarrow \frac{1}{v_0} = \frac{1}{u} + \frac{1}{R_1} \end{array} \right\}$$

$\Rightarrow$  Minnre dist in bi  
 $\checkmark$

Minnre dist in plano

$\therefore$  So, Bi-convex can easily converge rays and is more powerful thi plano-convex.