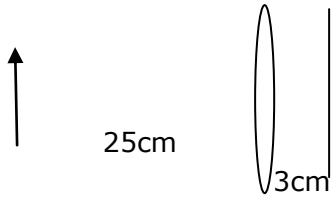
Q- The minimum focal length of the eye lens is f = 2.8 cm and the distance between the lens and retina is 3.00 cm.
a) At what distance from the retina the image of an object at 25 cm from the eye lens is formed?
b) What type of lens is required to make the image of the object on retina?
c) What is the focal length of the lens required?

a) The object distance is u = - 25 cm.

The image distance v from the eye lens is given by lens formula.

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

Gives $\frac{1}{v}=\frac{1}{f}+\frac{1}{u}$



Or $\frac{1}{v}=\frac{1}{2.8}+\frac{1}{-25}=0.3171$

Gives v = 3.153 cm

Hence the distance of the image from the retina will be

3.153 - 3 = 0.153 cm to the right of the retina.

b) As the image is to brought near the eye lens, a converging lens is required, which converges the rays more and the image will be formed on the retina.

c) To form the image on the retina the total focal length of the combination required F is given by using the lens formula

$$\frac{1}{F}=\frac{1}{3.00}-\frac{1}{-25}$$

Or $F=25*3/(25+3)=2.6786$ cm

Hence the focal length of the lens required f_l will be given by the formula of the combination of thin lenses we have

$$\frac{1}{F}=\frac{1}{f}+\frac{1}{f_l}$$

Gives $f_l=\frac{Ff}{f-F}=\frac{2.6786*2.8}{2.8-2.6786}=61.78$ cm

Hence a convex lens of focal length 61.8 cm is required to see the clear image of the object.