

Answer on Question #52351-Physics-Optics

A thin glass lens (refractive index 1.5) has optical power of -5D in air. Its optical power in a liquid medium with refractive index 1.6 will be...

1)-25D. 2)25D. 3)-1D. 4) 0.625 D

Solution

$$P = \left(\frac{\mu_2}{\mu_1} - 1\right) \left(\frac{1}{R_1} - \frac{1}{R_2}\right).$$
$$-5 = \left(\frac{1.5}{1} - 1\right) \left(\frac{1}{R_1} - \frac{1}{R_2}\right).$$
$$-\frac{5}{0.5} = \left(\frac{1}{R_1} - \frac{1}{R_2}\right) \rightarrow \left(\frac{1}{R_1} - \frac{1}{R_2}\right) = -10.$$

Again,

$$P = \left(\frac{1.5}{1.6} - 1\right) (-10) = \frac{5}{8} D = 0.625 D.$$

Answer: 4) 0.625 D.