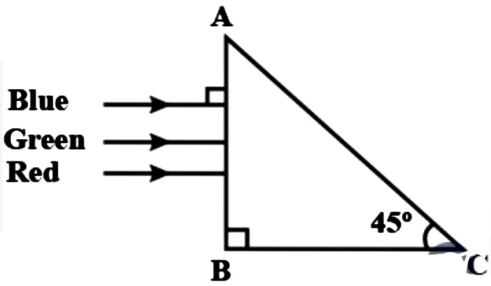
A beam of light consisting of red green and blue colours is incident on a right angled prism. The refractive index of the material of the prism for the above red, green and blue wavelengths are 1.39, 1.44 and 1.47, respectively. The prism will:



A separate the red colour part from the green and blue colours

B separate the blue colour part front the red and green colours

C separateall all three colours from one another

D not separate the three colours at all

Solution

Correct option is
A)

For total internal reflection, $i > i_c$

Here $i = 45^0$

$\frac{\sin i}{\sin r} = \mu$

$\sin 45^0 > \frac{1}{\mu}$

$\mu > \frac{1}{\sqrt{2}} = 1.414$

$\mu_{red} < 1.414$ but $\mu_{green} > 1.414$ and $\mu_{violet} > 1.414$.

Hence, green and violet will be totally internally reflected.
Red will be refracted.