Answer on Question #38953, Physics, Optics

A small object is placed 20 cm in front of a block of glass 10 cm thick and its farther side silvered.The image is formed 22 cm behind the silvered face. Find refractive index of glass.
options are :
(1) 1.15
(2) 1.25
(3) 1.67
(4) 1.1

Solution:

Refractive index n = Real depth/Apparent depth.

Thus,

$$n = \frac{20}{x}$$

Silvered surface act as mirror.
Thus, to get the image 22 cm behind, the object should be 22 cm in front.

x + thickness of glass = 22

$$x + 10 = 22$$
$$x = 22 - 10 = 12$$

Thus

$$n = \frac{20}{12} = 1.67$$

Answer. (3) 1.67.