H.W.

Ashutosh Acharya School No-1366

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1) There are two conditions for total internal reflection of light to take place:

(i) light has to travel from denser medium to rarer medium but not vice-versa

(ii) Critical angle of the medium

$$\theta_c = \sin^{-1}\left(\frac{n_{rarer}}{n_{denser}}\right)$$

where n is the refractive index

Angle of Incidence θ must be greater than the critical angle

of medium Q

2) Real deapth,

$d = 30$ cm

The refractive Index of water

$= \frac{4}{3}$

$\mu =$ ~~real~~ $\frac{\text{real depth}}{\text{apparent depth}}$

$\mu = \frac{4}{3}$ (given)

$\Rightarrow \frac{4}{3} = \frac{\text{real deapth}}{\text{apparent depth}}$

$\Rightarrow$ apparent ~~dea~~ depth $= \frac{\text{real}}{\frac{4}{3}}$

On Substituting the value of real death we get,

⇒ apparent depth = $\frac{30 \text{ cm}}{\frac{4}{3}}$

∴ apparent depth = $\frac{30 \times 3}{4} = \frac{90}{4}$

$= 22.5$ cm

∴ the fish will appear at a death of 22.5 cm from the top.

3) apparent depth = $\frac{\text{real depth}}{\text{refractive index}}$

$= \frac{8}{1.6} = 5$

Normal Shift = real depth - apparent depth = 8 - 5 = 3 cm

∴ the Image will appear 3cm raised.