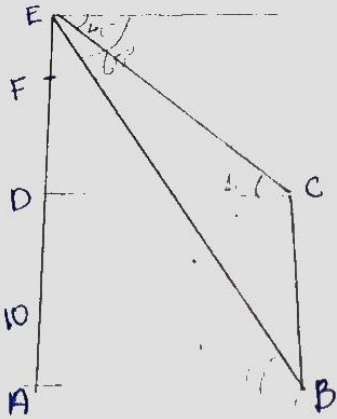A man 1.8 metre tall standing at the top of a telephone tower saw the top of a 10 metre high building at a depression of 40° and the base of the building at a depression of 60°. What is the height of tower? How far is it from building?

Ans:-

$AE \; x$

In $\triangle ABE$, $\tan 60° = \dfrac{AE}{AB}$

$AB \times \tan 60° - AE$

$AB = \dfrac{AE}{\tan 60} = \dfrac{x}{1.7321}$ — ①

In $\triangle CDE$,

$\tan 40° = \dfrac{DE}{DC} = \dfrac{x-10}{AB}$

$AB \tan 40° = x - 10$

$AB = \dfrac{x-10}{\tan 40} = \dfrac{x-10}{0.8391}$ — ②

From ① & ②,

$\dfrac{x}{1.7321} = \dfrac{x-10}{0.8391}$

$1.7321(x-10) = 0.8391 x$

$1.7321 x - 17.321 = 0.8391 x$

$(1.7321 - 0.8391)x = 17.321$

$0.893 x = 17.32$

$x = \dfrac{17.32}{0.839} = 19.39$

Height of tower = 19.39 -
                         1.80
                  —————————
                  17.59

$\underline{17.59}$