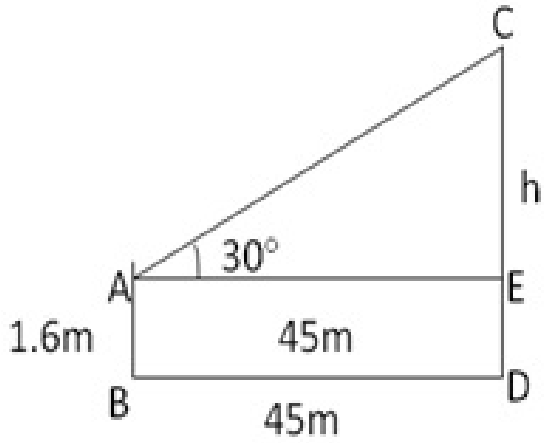
Question 3:
Let AB be the man,
AB= 1.6m, CD is the tower
AE CD, DE = AB
Let CE = h



In Δ ACE,

$$\angle AEC = 90°,\ \angle CAE = 30°$$

$$\frac{CE}{AE} = \tan 30 \Rightarrow \frac{h}{45} = \sqrt{3}$$

$$\therefore h = \frac{45}{\sqrt{3}}\,m = \frac{45\sqrt{3}}{3}\,m$$

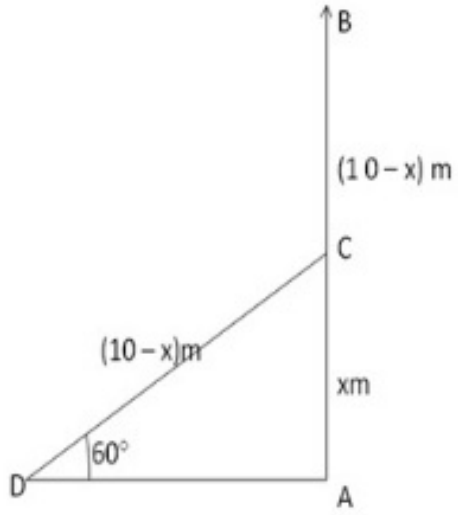
$$= 15\sqrt{3}m$$

$$= 15 \times 1.732$$

$$= 25.98m$$

Height of tower = DE + DC = (1.6 + 25.98)m = 27.58 m

Question 4:
Let AB be the tree bent at the point C so that part CB takes the position CD, then CD = CB
Let AC = x meters
Then, CD = CB = (10 – x) m
and ∠ADC = 60°



$$\therefore \frac{AC}{CD} = \sin 60^\circ$$

$$\frac{x}{(10-x)} = \frac{\sqrt{3}}{2}$$

$$\Rightarrow 2x = 10\sqrt{3} - \sqrt{3}x$$

$$\Rightarrow x = \frac{10\sqrt{3}}{(2+\sqrt{3})} \times \frac{2-\sqrt{3}}{2-\sqrt{3}} = (20\sqrt{3} - 30)\,m$$

$$\Rightarrow x = (20 \times 1.732 - 30)\,m = (34.64 - 30)\,m = 4.64m$$

Hence, AC = 4.64m

Therefore, tree bent at the height of 4.64m from the bottom.

********** END **********