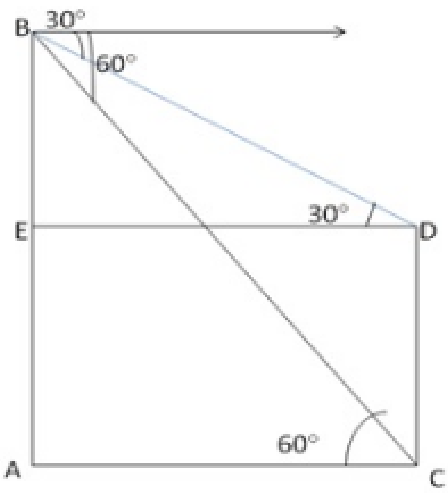
Question 15:
Let AB be the hill and let CD be the pillar. Draw DE AB, then, ∠ACB = 60° and ∠EDB = 30° and AB = 200 m



$$\frac{AC}{AB} = \cot 60^{\circ}$$

$$= \frac{AC}{200} = \frac{1}{\sqrt{3}}$$

$$\Rightarrow AC = \frac{200}{\sqrt{3}} m$$

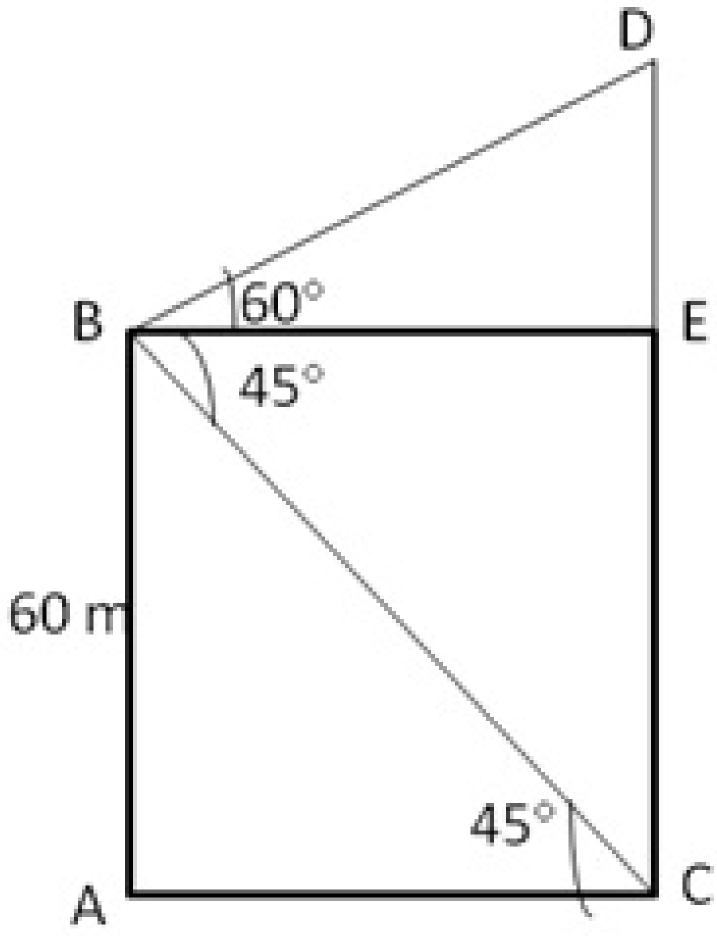
$$\therefore ED = AC = \frac{200}{\sqrt{3}} m$$

$$\frac{BE}{ED} = \tan 30^{\circ} \Rightarrow \frac{BE}{\left(\frac{200}{\sqrt{3}}\right)} = \frac{1}{\sqrt{3}} \Rightarrow BE = \frac{200}{3} m$$

$$\therefore CD = (AB - BE) = \left(200 - \frac{200}{3}\right) m = \frac{400}{3} m = 133.33m$$

Height of the pillar = CD = 133.33 m
Distance of the pillar from the hill = ED = $200/\sqrt{3} \times \sqrt{3}/\sqrt{3}$ = 115.33m

Question 16:
Let AB be the height of the window of house and CD be another house on the opposite side of the street AC
Then, AB = 60 m
Draw BE ⊥ CD and join BC
Then, ∠EBD = 60° and ∠ACB = ∠CBE = 45°



From right ΔCAB, we have

$$\frac{AC}{AB} = \cot 45° \Rightarrow \frac{AC}{60} = 1$$

$$\Rightarrow AC = 60\,m$$

$$\therefore BE = AC = 60\,m$$

From right ΔBED, we have

$$\frac{ED}{BE} = \tan 60^\circ$$

$$\Rightarrow \frac{ED}{60} = \sqrt{3}$$

$$ED = 60\sqrt{3}m$$

$$\therefore CD = (CE + ED) = (AB + ED)$$

$$= (60 + 60\sqrt{3})m$$

$$= 60(1 + \sqrt{3})m$$

Hence, the height of the opposite house is 60(1+√3)

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