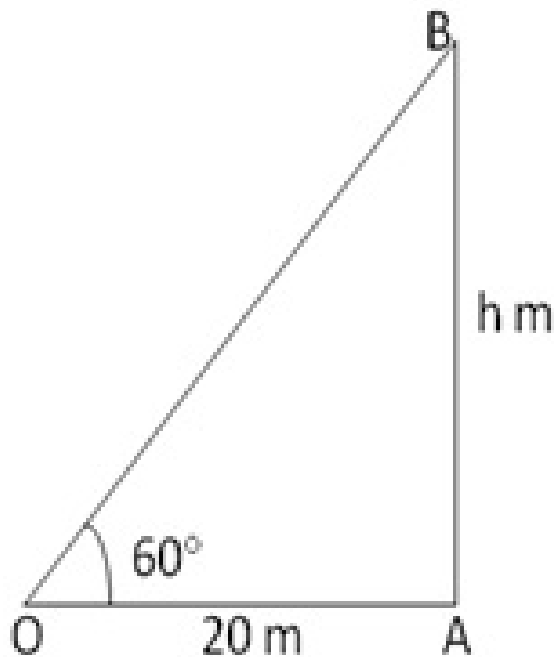Exercise 14

Question 1:
Let AB be the tower standing on a level ground and O be the
position of the observer. Then OA = 20 m and ∠OAB = 90° and ∠AOB
= 60°

Let AB = h meters
From the right Δ OAB, we have

$$\frac{AB}{OA} = \tan 60° = \sqrt{3}$$

$$\Rightarrow \frac{h}{20} = \sqrt{3}$$

$$\Rightarrow h = \left(20 \times \sqrt{3}\right)$$
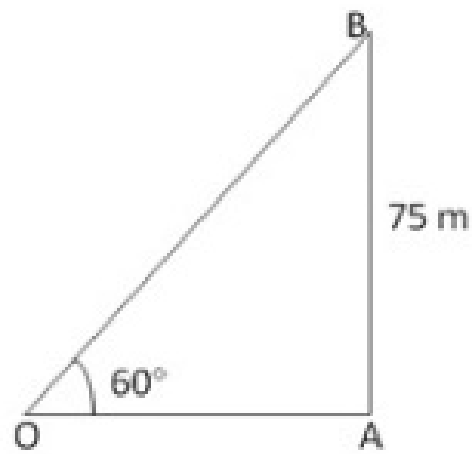
$$\Rightarrow h = 20 \times 1.732$$

$$\Rightarrow h = 34.64m$$

Hence the height of the tower is $20\sqrt{3}$ m = 34.64m

Question 2:
Let OB be the length of the string from the level of ground and O
be the point of the observer, then, AB = 75m and ∠OAB = 90° and
∠AOB = 60°, let OB = l meters.
From the right Δ OAB, we have

$$\frac{OB}{AB} = \text{cosec} 60° = \frac{2}{\sqrt{3}}$$

$$\frac{l}{75} = \frac{2}{\sqrt{3}}$$

$$\Rightarrow l = \left(75 \times \frac{2}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}\right)$$

$$\Rightarrow l = 25 \times 2 \times \sqrt{3}$$

$$\Rightarrow l = 50\sqrt{3}\,m$$

$$\Rightarrow l = 86.6\,m$$

Hence, the length of the string 86.6 m