# 9 SOME APPLICATIONS OF TRIGONOMETRY

## OBJECTIVE SECTION
[BASIC/STANDARD]

### MULTIPLE CHOICE QUESTIONS

**1.** If a pole 6 m high, casts a shadow $2\sqrt{3}$ m long on the ground, then the Sun's elevation is :

(a) 60° (b) 30° (c) 45° (d) 90°

**2.** A tree broken by a wind touches the ground at a distance of 10 m from the foot of the tree. If the height of the tree is 30 m and that of the broken portion 20 m, then the angle which the broken part makes with the ground is :

(a) 60° (b) 30° (c) 45° (d) 15°

**3.** The angle of elevation of a cloud, from a point 10 m above a lake is 45°. The angle of depression of its reflection in the lake is 60°. The horizontal distance from the point to the cloud is :

(a) $\sqrt{3}$ m (b) $(10\sqrt{3} - 1)$ m (c) $10\ (\sqrt{3} + 1)$ m (d) $\frac{20\sqrt{3}}{3}$ m

**4.** The angle of elevation of a plane $2x$ units above the ground from a point $x$ units above the ground is θ. At this moment, the angle of depression of a point on the ground just below the plane will be :

(a) $\sin(45° - \theta)$ (b) $\cot(45° - \theta)$ (c) $2\theta$ (d) $\theta$

**5.** If the angles of elevation of the top of a vertical tower from two points A and B on the ground are respectively 30° and 60°, then the ratio of the distances of A and B from the upper end of the tower is

(a) $\sqrt{3}:1$ (b) $1:\sqrt{3}$ (c) $\sqrt{3}+1:1$ (d) $1:\sqrt{3}-1$

**6.** A tower stands vertically on the ground. From a point on the ground, which is 15 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60°, then the height of the tower is :

(a) $6\sqrt{3}$ m (b) $15\sqrt{3}$ m (c) 18 m (d) $\frac{25}{\sqrt{3}}$ m

**7.** The length of the shadow cast by a rod is equal to length of the rod. Then the angle of elevation of the Sun is :

(a) 30° (b) 45° (c) 60° (d) 90°

**8.** A bridge, in the shape of a straight path, across a river, makes an angle of 60° with the width of the river. If length of the bridge is 100 metres, then the width of the river is :

(a) 50 m (b) 175.5 m (c) 92 m (d) 100 m

**9.** An observer 1.5 metres tall is 18.5 metres away from the tower. If the angle of elevation

of the top of the tower from his eye is 45°, the height of the tower is :

(a) 15 m (b) 20 m (c) 8.5 m (d) 25.6 m

**10.** An electrician has to repair an electric fault on a pole of height 4 m. He needs to reach a point 1.3 m below the top of the pole to undertake the repair work. Then the length of the ladder which should be used, inclined at an angle of 60° to the horizontal to reach the required position is :

(a) $10\sqrt{3}$ m (b) $\frac{\sqrt{3}}{5}$ m (c) $\frac{9\sqrt{3}}{5}$ m (d) $\frac{25\sqrt{3}}{10}$ m

**11.** The shadow of a tower, standing on a level ground, is found to be 40 m longer when Sun's altitude is 30° than when it was 60°. Then height of the tower is :

(a) 20 m (b) $10\sqrt{3}$ m (c) 10 m (d) $20\sqrt{3}$ m

**12.** The angles of depression of the top and bottom of an 8m tall building from the top of a multi-storeyed building are 30° and 45° respectively. The height of the multistoreyed building is :

(a) $4\left(\sqrt{3}+5\right)$ m (b) $4\sqrt{3}\left(\sqrt{3}+1\right)$ m (c) $6\sqrt{3}$ m (d) $9\left(3+\sqrt{3}\right)$ m

**13.** From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45° respectively. If bridge is at the height of 30 m from the bank, then the width of the river is :

(a) 90 m (b) $30\sqrt{3}$ m (c) $30\left(\sqrt{3}+1\right)$ m (d) $25\left(\sqrt{3}-1\right)$ m

**14.** The angles of depression of two ships from the top of a lighthouse are 45° and 30° towards east. If the ships are 100 m apart, the height of the lighthouse is :

(a) $\frac{20}{\left(\sqrt{3}+1\right)}$ m (b) $\frac{20}{\left(\sqrt{3}-1\right)}$ m (c) $50\left(\sqrt{3}-1\right)$ m (d) $50\left(\sqrt{3}+1\right)$ m

**15.** If the angle of elevation of a cloud from a point 200 m above a lake is 30° and the angle of depression of its reflection in the lake is 60°, then the height of the cloud above the lake, is :

(a) 100 m (b) 200 m (c) 400 m (d) 500 m

**16.** The angle of elevation of the sun when the shadow of a pole $h$ metres high is $\sqrt{3}\,h$ metres, then the angle of elevation is : [NCERT (EP)]

(a) 30° (b) 45° (c) 60° (d) None of these

**17.** A ladder 15 metres long just reaches the top of a vertical wall. If the ladder makes an angle of 60° with the wall, then the height of the wall is : [NCERT (EP)]

(a) $\frac{13}{2}$ m (b) $\frac{15}{2}$ m (c) $\frac{17}{2}$ m (d) $\frac{15}{\sqrt{3}}$ m

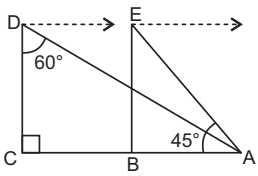
**18.** An observer 1.5 metres tall is 20.5 metres away from a tower 22 metres high the angle of elevation of the top of the tower from the eye of the observer is : [NCERT (EP)]

(a) 45° (b) 60° (c) 30° (d) None of these

**19.** From a balloon vertically above a straight road, the angles of depression of two cars at an instant are found to be 45° and 60°. If the cars are 100 m apart, then the height of the balloon is : [NCERT (EP)]

(a) $20\,(3+\sqrt{3})$ m (b) $50\,(3+\sqrt{3})$ m (c) $70\,(3+\sqrt{3})$ m (d) $(3+\sqrt{3})$ m

**20.** In the figure, what are the angles of depression from the observing positions D and E of the object A.




(a) 30°, 45° (b) 60°, 45°
(c) 45°, 60° (d) None of these

**21.** The ratio of the length of a rod and its shadow is 1 : $\sqrt{3}$ . The angle of elevation of the sun is :

(a) 30° (b) 60° (c) 45° (d) None of these

**22.** What is the angle of elevation of the sun when the length of the shadow of a vertical pole is equal to its height?

(a) 30° (b) 60° (c) 45° (d) None of these

**23.** If the ratio of the height of a tower and the length of its shadow is $\sqrt{3}$ : 1. What is the angle of elevation of the sun?

(a) 30° (b) 60° (c) 45° (d) None of these

**24.** If the angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary, then the height of the tower is :

(a) 10 m (b) 6 m (c) 8 m (d) none of these

**25.** The height of the tower is 10 m, what is the length of its shadow when sun's altitude is 45°?

(a) 10 m (b) 30 m (c) 20 m (d) none of these

**ANSWERS**

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|---|---|---|---|---|---|---|---|
| **1.** (*a*) | **2.** (*a*) | **3.** (*c*) | **4.** (*d*) | **5.** (*a*) | **6.** (*b*) | **7.** (*b*) | **8.** (*d*) |
| **9.** (*b*) | **10.** (*c*) | **11.** (*d*) | **12.** (*b*) | **13.** (*c*) | **14.** (*d*) | **15.** (*c*) | **16.** (*a*) |
| **17.** (*b*) | **18.** (*a*) | **19.** (*b*) | **20.** (*a*) | **21.** (*a*) | **22.** (*c*) | **23.** (*b*) | **24.** (*b*) |
| **25.** (*a*) | | | | | | | |