

Maths 10th (Some Applications of Trigonometry) Paper

Total Time: 1 Hour

Total Marks: 35

General Instructions:

1. All questions are **compulsory**.
2. There is no choice in any of the questions.
3. Question number **1 to 5** in Section A is of three-mark question.
4. Question numbers **6 to 10** in Section A are four-mark questions.

Question 1. The shadow of a tower, when the angle of elevation of the sun is 45° , is found to be 10 meter longer than when it was 60° . Find the height of the tower.

Question 2. The length of a string between a kite and a point on the ground is 90 meters. If the string makes an angle θ with the ground level such that $\tan \theta = 15/8$, how high is the kite? Assume that there is no slack in the string.

Question 3. A vertical tower stands on a horizontal plane and is surmounted by a vertical flag-staff. At a point on the plane 70 metres away from the tower, an observer notices that the angles of elevation of the top and the bottom of the flag-staff are respectively 60° and 45° . Find the height of the flag-staff and that of the tower.

Question 4. On the same side of a tower, two objects are located. When observed from the top of the tower, their angles of depression are 45° and 60° . If the height of the tower is 150 m, find the distance between the objects.

Question 5. A balloon is connected to a meteorological ground station by a cable of length 215 m inclined at 60° to the horizontal. Determine the height of the balloon from the ground. Assume that there is no slack in the cable.

Question 6. A man on the deck of a ship is 10 m above the water level. He observes that the angle of elevation of the top of a cliff is 45° and the angle of depression of the base is 30° . Calculate the distance of the cliff from the ship and the height of the cliff.

Question 7. The angle of elevation of an aeroplane from a point on the ground is 45° . After a flight of 15 seconds, the elevation changes to 30° . If the aeroplane is flying at a height of 3000 meters, find the speed of the aeroplane.

Question 8. A tree standing on a horizontal plane is leaning towards east. At two points situated at distances a and b exactly due west on it, the angles of elevation of the top are respectively α and β . Prove that the height of the top from the ground is $\frac{(b-a)\tan \alpha \tan \beta}{\tan \alpha - \tan \beta}$.

Question 9. If the angle of elevation of a cloud from a point h meters above a lake is a and the angle of depression of its reflection in the lake be b , prove that the distance of the cloud from the point of observation is $\frac{2h \sec \alpha}{\tan \beta - \tan \alpha}$.

Question 10. A carpenter makes stools for electricians with a square top of side 0.5 m and at a height of 1.5 m above the ground. Also, each leg is inclined at an angle of 60° to the ground. Find the length of each leg and the lengths of two steps to be put at equal distances.