

Mr Deepak M.Sc.,M.A.,B.Ed.,DCA.,TET-1.,TET-2.,

App Name: Archangel,

PH .NO: 9944249262,

KATTUPUTHUR - 621207,

Thottiyam(T.K),

Trichy(D.T).

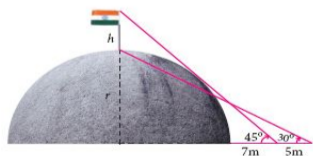
Exam Time : 03:00:00 Hrs

Total Marks : 145

29 x 5 = 145

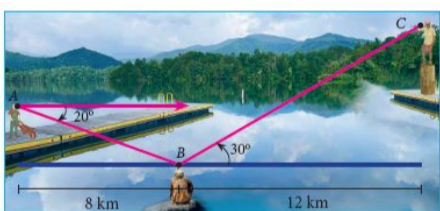
I. ANSWER ALL QUESTION

- 1) if $\operatorname{cosec}\theta + \cot\theta = p$, then prove that $\cos\theta = \frac{p^2-1}{p^2+1}$
- 2) If $\frac{\cos^2\theta}{\sin\theta} = p$ and $\frac{\sin^2\theta}{\cos\theta} = q$, then prove that $p^2q^2(p^2 + q^2 + 3) = 1$
- 3) If $\frac{\cos\alpha}{\cos\beta} = m$ and $\frac{\cos\alpha}{\sin\beta} = n$, then prove that $(m^2 + n^2) \cos^2\beta = n^2$
- 4) if $\sin\theta + \cos\theta = p$ and $\sec\theta = p$ and $\sec\theta + \operatorname{cosec}\theta = q$, then prove that $q(p^2 - 1) = 2p$
- 5) Two ships are sailing in the sea on either sides of a lighthouse as observed from the ships are 30° and 45° respectively. if the lighthouse is 200 m high, find the distance between the two ships. ($\sqrt{3} = 1.732$)
- 6) A kite is flying at a height of 75m above the ground, the string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60° . find the length of the string, assuming that there is no slack in the string.
- 7) From a point on the ground, the angles of elevation of the bottom and top of a tower fixed at the top of a 30m high building are 45° and 60° respectively. find the height of the tower. ($\sqrt{3} = 1.732$)
- 8) A tv tower stands vertically on a bank of a canal. the tower is watched from a point on the other bank directly opposite to it. the angle of elevation of the top of the tower is 58° . from another point 20m away from this point on the line joining this point of the tower, the angle of elevation of the top of the tower is 30° . find the height of the tower and the width of the canal. ($\tan 58^\circ = 1.6003$)
- 9) As shown in the figure, Two trees are standing on the flat ground. the angle of elevation of the top of both the trees from a point x on the ground is 40° . if the horizontal distance between x and the smaller tree is 8m and the distance of the top of the trees is 20m, calculate, the distance between the point x and the top of the smaller tree.
- 10) To a man standing outside his house, the angles of elevation of the top and bottom of a window are 60° and 45° respectively. If the height of the man is 180 cm and if he is 5 m away from the wall, what is the height of the window? ($\sqrt{3} = 1.732$)
- 11) A statue 1.6 m tall stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is 60° and from the same point the angle of elevation of the top of the pedestal is 40° . Find the height of the pedestal. ($\tan 40^\circ = 0.8391, \sqrt{3} = 1.732$)
- 12) A flag pole of height 'h' metres is on the top of the hemispherical dome of radius 'r' metres. A man is standing 7 m away from the dome. Seeing the top of the pole at an angle 45° and moving 5 m away from the dome and seeing the bottom of the pole at an angle 30° . Find (i) the height of the pole (ii) radius of the ($\sqrt{3} = 1.732$)



- 13) The top of a 15 m high tower makes an angle of elevation of 60° with the bottom of an electronic pole and angle of elevation of 30° with the top of the pole. What is the height of the electric pole?
- 14) A vertical pole fixed to the ground is divided in the ratio 1:9 by a mark on it with lower part shorter than the upper part. If the two parts subtend equal angles at a place on the ground, 25 m away from the base of the pole, what is the height of the pole?
- 15) A traveler approaches a mountain on highway. He measures the angle of elevation to the peak at each milestone. At two consecutive milestones the angles measured are 4° and 8° . What is the height of the peak if the distance between consecutive milestones is 1 mile. ($\tan 4^\circ = 0.0699, \tan 8^\circ = 0.1405$)
- 16) From the top of the tower 60 m high the angles of depression of the top and bottom of a vertical lamp post are observed to be 38° and 60° respectively. Find the height of the lamp post ($\tan 38^\circ = 0.7813, \sqrt{3} = 1.732$)
- 17) An aeroplane at an altitude of 1800 m finds that two boats are sailing towards it in the same direction. The angles of depression of the boats as observed from the aeroplane are 60° and 30° respectively. Find the distance between the two boats. ($\sqrt{3} = 1.732$)

- 18) From the top of a lighthouse, the angle of depression of two ships on the opposite sides of it are observed to be 30° and 60° . If the height of the lighthouse is h meters and the line joining the ships passes through the foot of the lighthouse, show that the distance between the ships is $\frac{4h}{\sqrt{3}}$ m.
- 19) A lift in a building of height 90 feet with transparent glass walls is descending from the top of the building. At the top of the building, the angle of depression to a fountain in the garden is 60° . Two minutes later, the angle of depression reduces to 30° . If the fountain is $30\sqrt{3}$ feet from the entrance of the lift, find the speed of the lift which is descending.
- 20) From the top of a tree of height 13 m the angle of elevation and depression of the top and bottom of another tree are 45° and 30° respectively. Find the height of the second tree. ($\sqrt{3} = 1.732$)
- 21) A man is standing on the deck of a ship, which is 40 m above water level. He observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of the hill as 30° . Calculate the distance of the hill from the ship and the height of the hill. ($\sqrt{3} = 1.732$)
- 22) If the angle of elevation of a cloud from a point 'h' metres above a lake is θ_1 and the angle of depression of its reflection in the lake is θ_2 . Prove that the height that the cloud is located from the ground is $\frac{h(\tan \theta_1 + \tan \theta_2)}{\tan \theta_2 - \tan \theta_1}$
- 23) The angle of elevation of the top of a cell phone tower from the foot of a high apartment is 60° and the angle of depression of the foot of the tower from the top of the apartment is 30° . If the height of the apartment is 50 m, find the height of the cell phone tower. According to radiations control norms, the minimum height of a cell phone tower should be 120 m. State if the height of the above mentioned cell phone tower meets the radiation norms.
- 24) The angles of elevation and depression of the top and bottom of a lamp post from the top of a 66 m high apartment are 60° and 30° respectively. Find
The height of the lamp post.
- 25) A bird is sitting on the top of a 80 m high tree. From a point on the ground, the angle of elevation of the bird is 45° . The bird flies away horizontally in such away that it remained at a constant height from the ground. After 2 seconds, the angle of elevation of the bird from the same point is 30° . Determine the speed at which the bird flies. ($\sqrt{3} = 1.732$)
- 26) An aeroplane is flying parallel to the Earth's surface at a speed of 175 m/sec and at a height of 600 m. The angle of elevation of the aeroplane from a point on the Earth's surface is 37° at a given point. After what period of time does the angle of elevation increase to 53° ? ($\tan 53^\circ = 1.3270$, $\tan 37^\circ = 0.7536$)
- 27) Two ships are sailing in the sea on either side of the lighthouse. The angles of depression of two ships as observed from the top of the lighthouse are 60° and 45° respectively. If the distance between the ships is $200\left(\frac{\sqrt{3}+1}{\sqrt{3}}\right)$ metres, find the height of the lighthouse.
- 28) A man is watching a boat speeding away from the top of a tower. The boat makes an angle of depression of 60° with the man's eye when at a distance of 200 m from the tower. After 10 seconds, the angle of depression becomes 45° . What is the approximate speed of the boat (in km / hr), assuming that it is sailing in still water? ($\sqrt{3} = 1.732$)
- 29) Three villagers A, B and C can see each other across a valley. The horizontal distance between A and B is 8 km and the horizontal distance between B and C is 12 km. The angle of depression of B from A is 20° and the angle of elevation of C from B is 30° . Calculate the vertical height between B and C ($\tan 20^\circ = 0.3640$, $\sqrt{3} = 1.732$)



ALL THE BEST
