Chapter 9

ASSIGNMENT

OBJECTIVE EXCERCISE - 9.1

1. Upper part of a vertical tree which is broken over by the winds just touches the ground and makes an angle of 30^0 with the ground. If the length of the broken part is 20 metres, then the remaining part of the trees is of length

(A) 20 metres (B) $10\sqrt{3}$ metres (C) 10 metres (D) $10\sqrt{2}$ metres

2. The angle of elevation of the top of a tower as observed from a point on the horizontal ground is 'x'. If we move a distance 'd' towards the foot of the tower, the angle of elevation increases to 'y', then the height of the tower is

(A) $\frac{d\tan x\tan y}{\tan y-\tan x}$ (B) d(tan y + tan x) (C) d(tan y – tan x) (D) $\frac{d\tan x\tan y}{\tan y+\tan x}$

3. The angle of elevation of the top of a tower, as seen from two points A & B situated in he same line and at distances 'p' and 'q' respectively from the foot of the tower, are complementary, then the height of the tower is

(A) pq (B) $\frac{p}{q}$ (C) $\sqrt{pq}$ (D) noen of these

4. The angle of elevation of the top of a tower at a distance of $\frac{50\sqrt{3}}{3}$ metres from the foot is 60^0. Find the height of the tower

(A) $50\sqrt{3}$ metres (B) $\frac{20}{\sqrt{3}}$ metres (C) -50 metres (D) 50 metres

5. The Shadow of a tower, when the angle of elevation of the sun is 30^0, is found to be 5 m longer than when its was 45^0, then the height of tower in metre is

(A) $\frac{5}{\sqrt{3}+1}$ (B) $\frac{5}{2}(\sqrt{3}-1)$ (C) $\frac{5}{2}(\sqrt{3}+1)$ (D) None of these.

SUBJECTIVE EXCERCISE - 9.2

1. From the top a light house, the angles of depression of two ships of the opposite sides of it are observed to be α and β. If the height of the light house be h meters and the line joining the ships passes thought the foot of the light house. Show that the distance between the ships is $\frac{h(\tan\alpha+\tan\beta)}{\tan\alpha\tan\beta}$ meters.

2. A ladder rests against a wall at angle α to the horizontal. Its foot is pulled away from the previous point through a distance 'a', so that is slides down a distance 'b' on the wall making an angle β. With the horizontal show that $\frac{a}{b}=\frac{\cos\alpha-\cos\beta}{\sin\beta-\sin\alpha}$

3. From an aeroplanne vertically above a straight horizontal road, the angle of depression of two consecutive kilometer stone on opposite side of aeroplane are observed to be α and β. Show that the height of aeroplane above the road is $\frac{\tan\alpha\tan\beta}{\tan\alpha+\tan\beta}$ kilometer.

4. A round balloon of radius 'r' subtends an angle θ at the eye of an observer while the angle of elevation of its centre is ϕ. Prove that the height of the centre of the balloon is r sin ϕ cosec $\frac{\theta}{2}$.

5. A window in a building is at a height of 10 m from the ground. The angle of depression of a point P on the ground from the window is 30^0. The angle of elevation of the top of the building from the point P is 60^0. Find the height of the building.

6. A man on a cliff observers a boat at an angle of depression of 30^0 which is approaching the shore to the point immediately beneath the observer with a uniform speed. Six minutes later, the angle of depression of the boat is found to be 60^0. Find the total time taken by the boat from the initial point to reach the shore.

7. The angles of elevation of the top of a tower two points 'P' and 'Q' at distances of 'a' and 'b' respectively from the base and in the same straight line with it, are complementary. Prove that the height of the tower is $\sqrt{ab}$.

8 Two pillars of equal height are on either side of a road, which s 100m wide. The angles of elevation of the top the pillars are 60^0 and 30^0 at a point on the road between the pillar. Find the position of the pint between the pillars. Also find the height of each pillar,

9 At a point, the angle of elevation of a tower is such that its tangent is $\frac{5}{12}$,On walking 240mnearer the tower, the tangent to the angle of elevation becomes $\frac{3}{4}$, Find the height of the tower.

10 From a window 'x'mtres high above the ground in a street, the angles of elevation and depression of the top and foot of the other hose on the opposite side of the street are α and β respectively, Show that the opposite house is x (1 + $\tan\alpha\cot\beta$) metres.

11 A pole 5m high is fixed on the top of a towel, the angle of elevation of the top of the pole observed from a point 'A' on the ground is 60^0 an the angle of depression the point ;A; from the top of the tower is 45^0 Find the height of the tower.

12 The angle of elevation of a jet fighter from a point A on the ground is 60^0 After a flight of 15 seconds, the angle o elevation changes to 30^0 If the jet is flying at a spies of 720km/fr, find the constant height at which the jet is flying. [use $\sqrt{3}$ = 1.732]