

EINSTEIN'S ACADEMY

10TH MATHS

UNIT- 6

CHOOSE THE BEST WITH OPTION :-

7x1=7

1. A ladder leaning against a vertical wall, makes an angle of 60° with the ground. Foot of the ladder is 3.5 m away from the wall then the length of the ladder is

- (A) 8 m (B) 7m
(C) 9m (D) 7.5m

2. The angle of depression of the top and bottom of 20 m tall building from the top of a multistoried building are 30° and 60° respectively. The height of the multistoried building and the distance between two buildings (in metres) is

- (A) 20, $10\sqrt{3}$ (B) 30, $5\sqrt{3}$
(C) 20, 10 (D) 30, $10\sqrt{3}$

3. The electric pole subtends an angle of 30° at a point on the same level as its foot. At a second point 'b' metres above the first, the depression of the foot of the pole is 60° . The height of the pole (in metres) is equal to

- (A) $\sqrt{3}b$ (B) $\frac{b}{3}$
(C) $\frac{b}{2}$ (D) $\frac{b}{\sqrt{3}}$

4. Two persons are standing 'x' metres apart from each other and the height of the first person is double that of the other. If from the middle point of the line joining their feet an observer finds the angular elevations of their tops to be complementary, then the height of the shorter person (in metres) is

- (A) $\sqrt{2}x$ (B) $\frac{x}{2\sqrt{2}}$
(C) $\frac{x}{\sqrt{2}}$ (D) $2x$

5. A tower is 60 m high. Its shadow is x metres shorter when the sun's altitude is 45° than when it has been 30° , then x is equal to

(A) 41.92m

(B) 43.92

(C) 43 m

(D) 45.6

6. The angle of elevation of a cloud from a point h metres above a lake is β . The angle of depression of its reflection in the lake is 45° . The height of location of the cloud from the lake is

(A) $\frac{h(1+\tan\beta)}{1-\tan\beta}$

(B) $\frac{h(1-\tan\beta)}{1+\tan\beta}$

(C) $h \tan(45^\circ - \beta)$

(D) none of these

7. A kite is flying with a string of length 200 m. If the thread makes an angle 30° with the ground, then the distance of the kite from the ground level is

(A) 200m

(B) 150m

(C) 1000m

(D) 140 m

II. ANSWER ANY 5 OF THE FOLLOWING. Q.NO 14 IS COMPULSORY :-

5X2=10

8. 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.

9. Find the angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of a tower of height $10\sqrt{3}$ m

10. A tower stands vertically on the ground. From a point on the ground, which is 48m away from the foot of the tower, the angle of elevation of the top of the tower is 30° . Find the height of the tower.

11. A player sitting on the top of a tower of height 20m observes the angle of depression of a ball lying on the ground is 60° . Find the distance between the foot of the tower and the ball.

12. From the top of a rock $50\sqrt{3}$ m high, the angle of depression of a car on the ground is observed to be 30° . Find the distance of the car from the rock.

13. A girl of height 150 cm stands in front of a lamp-post and casts a shadow of length $150\sqrt{3}$ cm on the ground. Find the angle of elevation of the top of the lamp-post.

14. A simple pendulum of length 40 cm subtends 60° at the vertex in one full oscillation. What will be the shortest distance between the initial position and the final position of the bob? (between the extreme ends)

III. ANSWER ANY 5 OF THE FOLLOWING. Q.NO 22 IS COMPULSORY:-

15. From a window (h meters high above the ground) of a house in a street, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are θ_1 and θ_2 respectively. Show that the height of the opposite house is $h \left[1 + \frac{\cot \theta_2}{\cot \theta_1} \right]$
16. Two ships are sailing in the sea on either sides of a lighthouse. The angle of elevation of the top of the lighthouse as observed from the ships are 30° and 45° respectively. If the lighthouse is 200m high, find the distance between the two ships. ($\sqrt{3} = 1.732$)
17. A statue 1.6m 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. ($\tan 40^\circ = 0.8391$, $\sqrt{3} = 1.732$)
18. From the top of a 12m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 30° . Determine the height of the tower.
19. From the top of the tower 60m high the angles of the depression of the top and bottom of a vertical lamp post are observed to be 38° and 60° respectively. Find the height of the lamppost. ($\tan 38^\circ = 0.7813$, $\sqrt{3} = 1.732$)
20. A vertical tree is broken by the wind. The top of the tree touches the ground and makes an angle 30° with it. If the top of the tree touches the ground 30 m away from its foot, then find the actual height of the tree.
21. As observed from the top of a 60m high light house from the sea level, the angles of depression of two ships are 28° and 45° . If one ship is exactly behind the other on of the lighthouse, find the distance between the two ships. ($\tan 28^\circ = 0.5317$)
22. A man is standing on the deck of a ship, which is 40m 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. ($\sqrt{3} = 1.732$).

IV. ANSWER (ANY 1) OF THE FOLLOWING :

1X8 = 8

24. Draw the two tangents from a point which is 10 cm away from the centre of a circle of radius 5 cm. Also, measure the lengths of the tangents
23. An aeroplane sets off from G on a bearing of 24° towards H, a point 250km away. At H it changes course and heads towards J on a bearing of 55° and a distance of 180km away. (i) How far is H to the North of G? (ii) How far is H to the East of G? (iii) How far is J to the North of H? (iv) How far is J to the East of H?