RK VISION ACADEMY

NEET | IIT – JEE | FOUNDATION

CBSE PRACTICE PAPER(2024)

(Mathematics)

Grade : X **Marks: 40 marks**

Chapter: APP Trig SET-2 **Time: 90 minutes**

SECTION A

(This section comprises of Multiple-choice questions (MCQ) of 1 mark each.)

1. The value of (sin30° + cos30°) – (sin60° + cos60°) is

(A) – 1 (B) 0 (C) 1 (D) 2

2. A technician has to repair a light on a pole of a height of 10 m. She needs to reach a point 1 m below the top of the pole to undertake the repair work. What should be the length of the ladder that she should use when inclined at an angle of 60° to the ground that would enable her to reach the required position? Also, how far from the foot of the pole should she place the foot of the ladder?

(A) $\frac{1}{6\sqrt{3}}$ (B) $\frac{\sqrt{3}}{6}$ (C) $\frac{1}{\sqrt{3}}$ (D) $6\sqrt{3}$

3. A statue, 2 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 45°. Find the height of the pedestal.

(A) $2(\sqrt{3}+1)$ (B) $2(\sqrt{3}-1)$ (C) $\frac{1}{2\sqrt{3}}$ (D) $\frac{\sqrt{3}+1}{2}$

4. The angle of elevation of the top of a building from the foot of the tower is 30°, and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 60 m high, find the height of the building.

(A) 30m (B) 40m (C) 20m (D) 10m

5. A TV tower stands vertically on a bank of a canal, with a height of 10 √3 m. From a point on the other bank directly opposite the tower, the angle of elevation of the top of the tower is 60°. From another point on the line joining this point to the foot of the tower, the angle of elevation of the top of the tower is 30°. Find the distance between the opposite bank of the canal at the point with a 30° angle of elevation.

(A) 30m (B) 45m (C) 20m (D) 35m

6. As observed from the top of a 150 m high lighthouse from the sea level, the angles of depression of the two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships.

(A) $150(\sqrt{3}+1)$ (B) $150(\sqrt{3}-1)$ (C) $\frac{150}{\sqrt{3}+1}$ (D) $\frac{150}{\sqrt{3}-1}$

7. An observer of √3m tall is 3 m away from a pole of 2√3 high. What is the angle of elevation of the top of the pole from the observer?

(A) 60° (B) 30° (C) 45° (D) 90°

8. 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 the tower, is 30°. Find the height of the tower.

(A) $10 + \sqrt{3}$ (B) $10-\sqrt{3}$ (C) $10\sqrt{3}$ (D) $\frac{10}{\sqrt{3}}$

9. An observer having 1.5 m tall is 28.5 m away from a tower. The angle of elevation of the top of the tower from her eyes is 45°. What is the height of the tower?

(A) 20 m (B) 10 m (C) 40 m (D) 30 m

10. An electrician has to repair an electrical fault on a pole of a height of 4 m. He needs to reach a point 1.3 m below the top of the pole to undertake the repair work. What should be the length of the ladder that he should use when inclined at an angle of 60° to the horizontal that would enable him to reach the required position

(A) $\frac{9\sqrt{3}}{5}$ (B) $\frac{45}{\sqrt{3}}$ (C) $\frac{9}{\sqrt{3}}$ (D) $\frac{\sqrt{3}}{5}$

SECTION B

(This section comprises of very short answer type-questions (VSA) of 2 marks each)

11. If the length of the shadow of a tower is increasing, then the angle of elevation of the sun is also increasing.
12. If a man standing on a platform 3 metres above the surface of a lake observes a cloud and its reflection in the lake, then the angle of elevation of the cloud is equal to the angle of depression of its reflection.
13. The angle of elevation of the top of a tower is 30°. If the height of the tower is doubled, then the angle of elevation of its top will also be doubled.

SECTION C

(This section comprises of short answer type questions (SA) of 3 marks each)

14. A man standing on the bank of a river observes that the angle of elevation of a tree on the opposite bank is 60°. When he moves 50 m away from the bank, then he find the angle of elevation to be 30°. Calculate
(i) the width of the river.
(ii) the height of the tree.
15. A vertical tower is 20 m hight. A man standing at some distance from the tower knows that the cosine of the angle of elevation 0 of the top of the tower is 0.53 i.e. $\cos \theta = 0.53$ How far is he standing from the foot of the tower?
16. A girl of height 80 cm is walking away from the base of a lamp-post at a speed of 2.1 m/sec. If the lamp is 4 m above the ground, then find the length of her shadow after 4 sec.

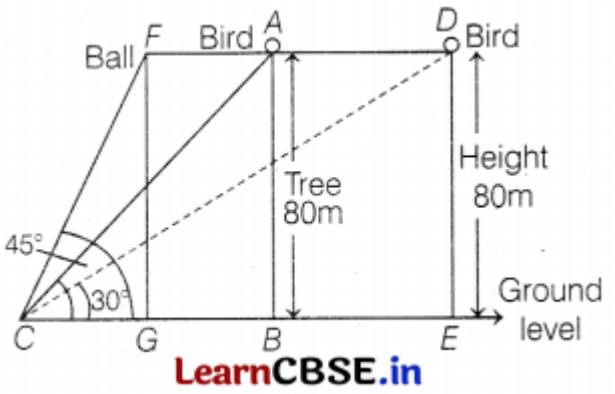
SECTION D

(This section comprises of long answer-type questions (LA) of 5 marks each)

17. One evening, Kaushik was in a park. Children were playing cricket. Birds were singing on a nearby tree of height 80m. He observed a bird on the tree at an angle of elevation of 45°.

When a sixer was hit, a ball flew through the tree frightening the bird to fly away. In 2 s, he observed the bird flying at the same height at an angle of elevation of 30° and the ball flying towards him at the same height at an

angle of elevation of 60°.



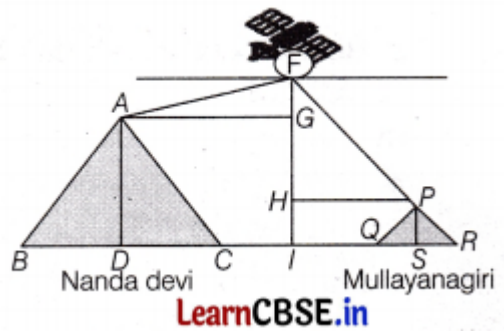
(i) At what distance from the foot of the tree was he observing the bird sitting on the tree? [1]

(ii) How far did the bird fly in the mentioned time? [1]

After hitting the tree, how far did the ball travel in the sky when Kaushik saw the ball? [2]

(iii) What is the speed of the bird in m/min, if it had flown $20(\sqrt{3} + 1)$ m? [1]

18 A satellite flying at height h is watching the top of the two tallest mountains in Uttarakhand and Karnataka, them being Nanda Devi (height 7,816 m) and Mullayanagiri (height 1,930 m). The angles of depression from the satellite, to the top of Nanda Devi and Mullayanagiri are 30° and 60° respectively. If the distance between the peaks of two mountains is 1937 km and the satellite is vertically above the midpoint of the distance between the two mountains.



(i) Find the distance of the satellite from the top of Nanda Devi.
(ii) Find the distance of the satellite from the top of Mullayanagiri.
(iii) Find the distance of the satellite from the ground.

What is the angle of elevation if a man is standing at a distance of 7816 m from Nanda Devi?

19 An aeroplane flies horizontally in a fixed direction at a height of 1500V3m from ground. At any time the angle of elevation from a point on a ground is 60° and after 15 s, the angle of measurement of an aeroplane becomes 30°. Find the speed of the aeroplane.