## **Heights and Distance Questions Pdf**

- 1. The angle of elevation of the sun, when the length of the shadow of a tree is  $\sqrt{3}$  times the height of the tree is
  - a. 30°
  - b. 45°
  - c. 50°
  - d. 60°

Ans: A



Let AB be the tree and AC be its shadow. Let  $\angle ACB = \theta$ .

Then, 
$$\frac{AC}{AB} = \sqrt{3}$$
  
 $\Rightarrow \cot \theta = \sqrt{3} \Rightarrow \theta = 30^{\circ}.$ 

- 2. Two ships are sailing in the sea on the two sides of a lighthouse. The angles of elevation of the top of the lighthouse as observed from the two ships are 30° and 45° respectively. If the lighthouse is 100 m high, the distance between the two ships is
  - a. 173 m
  - b. 200 m
  - c. 273 m
  - d. 300 m Ans: C



Let AB be the lighthouse and C and D be the Positions of the ships.

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Then, AB = 100 m, 
$$\angle ACB = 30^{\circ}$$
  
and  $\angle ADB = 45^{\circ}$   
 $\frac{AB}{AC} = \tan 30^{\circ} = 1$   
 $\Rightarrow AC = AB \times \sqrt{3} = 100 \sqrt{3} \text{ m}$   
 $\frac{AB}{AD} = \tan 45^{\circ} = 1$   
 $\Rightarrow AD = AB = 100 \text{m}$   
 $\therefore CD = (AC + AD) = (100 \sqrt{3} + 100) \text{m}$   
 $= 100 (\sqrt{3} + 1) \text{m} = (100 \times 2.73) \text{m} = 273 \text{m}$ 

- 3. A man standing at a point P is watching the top of a tower, which makes an angle of elevation of 30° with the man's eye. The man walks some distance towards the tower to watch its top and the angle of elevation becomes 60°. What is the distance between the base of the tower and the point P?
  - a. 4 units
  - b. 8 units
  - c. 12 units
  - d. Data inadequate

Ans: D



One of AB, AD and CD must have been given. So, the data is inadequate. One of AB, AD and CD must have been given. So, the data is inadequate.

- 4. On the same side of a tower, two objects are located. Observed from the top of the tower, their angles of depression are 45° and 60°. If the height of the tower is 150 m, the distance between the objects is
  - a. 63.5 m
  - b. 76.9 m
  - c. 86.7 m
  - d. 90 m

Ans: A



Let AB be the tower and C and D be the objects Then, AB = 150 m,  $\angle ACB = 45^{\circ} \text{ and } \angle ADB = 60^{\circ}$  $\frac{AB}{AD} = \tan 60^{\circ} = \sqrt{3}$  $=> AD = \frac{AB}{\sqrt{3}} = \frac{150}{\sqrt{3}} \text{ m}$  $\frac{AB}{AC} = \tan 45^{\circ} = 1$ => AC = AB = 150 m $\therefore CD = (AC - AD)$  $= \left[150 - \frac{150}{\sqrt{3}}\right] \text{ m} = \left[\frac{150(\sqrt{3} - 1)}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}\right] \text{ m}$  $= 50 (3 - \sqrt{3}) \text{ m} = (50 \times 1.27) \text{ m} = 63.5 \text{ m}$ 

- 5. If a 30 m ladder is placed against 15 m wall such that it just reaches the top of the wall, then the elevation of the wall is equal to
  - a. 30°
  - b. 45°
  - c. 50°
  - d. 60°
  - Ans: A

