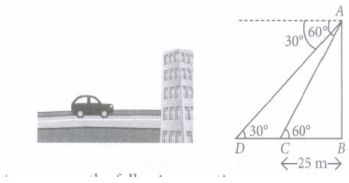
QB365 QUESTION BANK SOFTWARE

10th Maths Important Case Study Questions for Some Applications Of Trigonometry 2024

SECTION A

2 x 4 = 8

1) Rohit is standing at the top of the building observes a car at an angle of 30°, which is approaching the foot of the building with a uniform speed. 6 seconds later, angle of depression of car formed to be 60°, whose distance at that instant from the building is 25 m.



Based on the above information, answer the following questions.

(i) Height of the building is

$(a) 25\sqrt{2}\ m$ **(b) 50 m** $(a) 25\sqrt{3}\ m$ **(d) 25 m**

(ii) Distance between two positions of the car is

(a) 40 m **(b) 50 m** **(c) 60 m** **(d) 75 m**

(iii) Total time taken by the car to reach the foot of the building from starting point is

(a) 4 sec. **(b) 3 sec.** **(c) 6 sec.** **(d) 9 sec.**

(iv) The distance of the observer from the car when it makes an angle of 60° is

(a) 25 m **(b) 45 m** **(c) 50 m** **(d) 75 m**

(v) The angle of elevation increases

(a) when point of observation moves towards the object

(b) when point of observation moves away from the object

(c) when object moves away from the observer

(d) None of these

Answer : (i) (c): $\text{In } \Delta ABC, \frac{AB}{BC} = \tan 60^\circ$

$\Rightarrow \quad AB = 25 \times \sqrt{3}$

$\therefore$ Height of building is $25\sqrt{3}$ m .

(ii) (b): $\text{In } \Delta ABD, \frac{AB}{BD} = \tan 30^\circ$

$\Rightarrow \frac{25\sqrt{3}}{BD} = \frac{1}{\sqrt{3}} \Rightarrow BD = 75 \text{ m}$

$\therefore$ Distance between two positions of car = (75 - 25) m = 50m.

(iii) (d): Time taken to cover 50 m distance = 6 sec.

$\therefore$ Time taken to cover 25 m distance = 3 sec.

$\therefore$ Total time taken by car = 6 sec + 3 sec = 9 sec

(iv) (c): $\text{In } \Delta ABC, \frac{BC}{AC} = \cos 60^\circ$

$\Rightarrow \quad \frac{25}{AC} = \frac{1}{2}$

$\Rightarrow AC = 50 \text{ m}$

(v) (a)

2) Suppose a straight vertical tree is broken at some point due to storm and the broken part is inclined at a certain distant from the foot of the tree. Based on the above information, answer the following questions.

(i) If the top of upper part of broken tree touches ground at a distance 000 m (from the foot of the tree) and makes an angle of inclination 30°, then the height of remaining part of the tree is

$(a)\sqrt{3} \text{ m} (b) 30\sqrt{3} \text{ m} (c) \frac{30}{\sqrt{3}} \text{ m}$ **(d) 30 m**

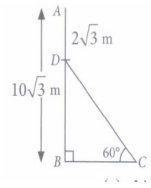
(ii) If the top of broken part of a tree touches the ground at a point whose distance from foot of the tree is equal to height of remaining part, then its angle of inclination is

(a) 30° (b) 60° (c) 45° (d) None of these

(iii) The angle of elevation are always

(a) obtuse angle (b) acute angle (c) right angle (d) reflex angle

(iv) If $AB = 10\sqrt{3} \text{ m}, AD = 2\sqrt{3} \text{ m}, \text{ then } CD =$



(a) 9 m (b) 11 m (c) 14 m (d) 16 m

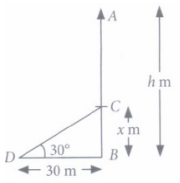
(v) If the height of a tree is 6 m, which is broken by wind in such a way that its top touches the ground and makes an angles 30° with the ground. At what height from the bottom of the tree is broken by the wind?

(a) 2 m (b) 4 m (c) 8 m (d) 10 m

Answer : (i) (c): Let AB be the tree of height h m and let it broken at height of x m, as shown in figure. Clearly CD = AC = (h - x) m
Now, in ΔCBD, we have

$$\tan 30^\circ = \frac{x}{30}$$

$$\Rightarrow \quad x = \frac{30}{\sqrt{3}} \text{ m}$$



Thus, the height of remaining part of the tree is $\frac{30}{\sqrt{3}}$ m

(ii) (c): In this case, BD = BC = x m
$\therefore$ If θ be the angle of inclination, then

$$\tan\theta = \frac{BC}{BD} = 1$$

$$\Rightarrow \tan\theta = \tan 45^\circ$$

$$\Rightarrow \theta = 45^\circ$$

(iii) (b): The angle of elevation and depression are always acute angles.
(iv) (d): Clearly, BD = AB - AD

$$= (10\sqrt{3} - 2\sqrt{3})\text{m} = 8\sqrt{3}\text{ m}$$