

# COMPETENCY BASED QUESTIONS

Q1. A contractor plans to install two slides for the children to play in a park. For the children below the age of 5 years, she prefers to have a slide whose top is at a height of 1.5 m, and is inclined at an angle of  $30^\circ$  to the ground, whereas for elder children, she wants to have a steep slide at a height of 3 m, and inclined at an angle of  $60^\circ$  to the ground. What should be the length of the slide in each case ?

Q2. A man standing on the deck of a ship, which is 10m above the water level, observes the angle of elevation of the top of a hill as  $60^\circ$  and the angle of depression of the base of the hill as  $30^\circ$ . Calculate the distance of the hill from the ship and the height of the hill.

Q3. A spherical balloon of radius  $r$  subtends an angle  $\theta$  at the eye of an observer. If the angle of elevation of its centre is  $\phi$ , find the height of the centre of the balloon.

Q4. If the angle of elevation of a cloud from a point  $h$  metres above a lake is  $\alpha$  and the angle of depression of its reflection in the lake is  $\beta$ , prove that the height of the cloud is  $\frac{h(\tan \beta + \tan \alpha)}{\tan \beta - \tan \alpha}$

Q5. The angle of elevation of a cliff from a fixed point is  $\theta$ . After going up a distance of  $k$  metres towards the top of the cliff at an angle of  $\phi$ , it is found that the angle of elevation is  $\alpha$ . Show that the height of the cliff is 
$$\frac{k(\cos \phi - \sin \phi \cot \alpha)}{\cot \theta - \cot \alpha}$$